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CONTENTS

Chest wall deformities. <i>Y. Akçali, H. Ceyran and L. Hasdiraz</i>	1
Bronchopleural fistula after pneumonectomy: a major challenge. <i>K. Athanassiadi, G. Kalavrouziotis and I. Bellenis</i>	5
The role of CT examination in diagnostics and surgery of chronic empyema thoracis. <i>G. Balogh, J. Mendly, Gy. Horváth and I. Repa</i>	9
Early oesophageal cancer. Does it exist? Why we cannot find it? <i>J. Błaszczuk and A. Adamus</i>	13
Extrapleural bullectomy or lung volume reduction: air tight surgery for emphysema without strip-patch. <i>A. Busetto, R. Moretti, S. Barbaresco, P. Fontana and V. Pagan</i>	15
Pericardial abscess — a rare complication of sepsis. <i>I. Čapov, J. Wechsler, J. Šumbera, M. Pavlík and V. Jedlička</i>	19
Lung resection for the treatment of severe localised bronchiectasis in cystic fibrosis patients. <i>M. J. R. Dalrymple-Hay, J. Lucas, G. Connett and R. E. Lea</i>	23
Surgery for oesophageal carcinoma in the elderly. <i>M. J. R. Dalrymple-Hay, K. E. Evans and R. E. Lea</i>	27
High frequency jet ventilation in trachea reconstructions — its advantages in our experience. <i>I. Džuberová, L'. Sabaková, O. Juráková, S. Haruštíak and I. Majer</i>	31
A pitfall with the use of ¹¹¹ In-pentetreotide scintigraphy in the resected bronchopulmonary carcinoids follow-up: a case report. <i>M. Grazia, L. Ansaloni, A. Bini, G. Grani, M. Mastrorilli, D. Pagani, F. Sellitri, F. Stella and R. Bazzocchi</i>	35
Difficulties with CT-guided needle biopsy and VATS, as combined approach for the diagnosis and treatment of peripheral pulmonary nodules: a case report. <i>M. Grazia, L. Ansaloni, A. Bini, G. Grani, M. Mastrorilli, D. Pagani, F. Sellitri, F. Stella and R. Bazzocchi</i>	39

War injuries to the chest. <i>N. Ilić, A. Petričević, S. Tanfara, Ž. Mimica, V. Radonić, A. Tripković and N. Frleta Ilić</i>	43
Limited resection of lung cancer. <i>A. Jackevicius, S. Cicenias and P. Naujokaitis</i>	49
A case of a pulmonary arteriovenous malformation treated by lobectomy. <i>J. Wechsler, V. Jedlička, J. Kerwitzer, J. Novotný, M. Pavlík, A. Peštál and I. Čapov</i>	53
Pulmonary Leiomyomatosis in women after hysterectomy for uterine myoma. Benign metastasizing leiomyoma? <i>M. Kadry, C. Sievers and C. Engelmann</i>	57
Catamenial pneumothorax — 3 case reports and view of literature. <i>M. Kadry, K. Hässler and C. Engelmann</i>	63
Isolated chylothorax after penetrating trauma. <i>N. Karaoğlanoğlu, A. Eroğlu and A. Başoğlu</i>	67
The value of Asamura-Naruke type main bronchus stump closure and pleuro-pericardial flap covering by own method to avoid broncho-pleural fistula (BPF). <i>L. Kecskés, Gy. Bátori, P. Gehér and B. Kiss</i>	71
Five year study on the injury of the great thoracic vessels after penetrating chest injury. <i>S. Sz. Kiss, P. Tóth, S. Kollár, Z. Nábrádi and J. Bóni</i>	75
Videothoracoscopy and muscle flaps in the treatment of bronchial stump fistula. <i>J. Kowalewski, M. Brocki, M. Galikowski and K. Kapron</i>	79
Anterior transsternal approach to the upper thoracic spine. <i>A. Maciejczak, A. Radek, J. Kowalewski and A. Palewicz</i>	83
How should we treat malignant pleural mesothelioma (MPM)? <i>L. Lampl and R. Jakob</i>	87
The position of spiral CT in the complex diagnostics system for pulmonary embolism. <i>J. Mendly, G. Bajzik and I. Repa</i>	91
Predictive value of MRI in lung cancer. <i>T. F. Molnár, E. Juhász, I. Benkő and Ö. P. Horváth</i>	95
Risk of lung resections in patients after inductive chemotherapy of non-small cell bronchogenic cancer. <i>K. Novák and M. Pešek</i>	101
The improvement of arterial oxygenation during one-lung ventilation — effect of different CPAP levels. <i>M. Pavlík, D. Čtvrtečková, V. Zvoníček, P. Ševčík, I. Čapov and V. Jedlička</i>	103
Penetrating thoraco-abdominal gun-shot wounds procedure. <i>T. Przystasz, E. Stanowski and A. Chmieliński</i>	107
Non-epithelial neoplasmas of the esophagus. <i>T. Przystasz and A. Chmieliński</i>	111
Extensive multiple and lobe-sparing pulmonary resections with the Nd:YAG laser and a new wavelength of 1318 nm. <i>A. Rolle and E. Eulerich</i>	115
Management of corrosive injuries of the esophagus. <i>A. Vereczkei, G. Varga, L. Pótó and Ö. P. Horváth</i>	119

CHEST WALL DEFORMITIES

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Background: Pectus deformities and atypical costal anomalies are congenital thoracic wall defects that can cause a marked cosmetic defect with attendant psychological trauma and limited physical performance.

Patients and methods: We reviewed 43 patients with chest wall deformities, 24 (55.8%) were pectus excavatum, 13 (30.2%) pectus carinatum and 6 (14%) atypical costal anomalies, in the last sixteen years. There were nine female and 34 (79.1%) male patients. The mean age of the patients was 14.4 years (range, 5 to 23). Scoliosis (13.5%), Poland's syndrome (5.4%), Marfan's syndrome (5.4%), neurofibromatosis (2.7%), atrial septal defect (2.7%) and mitral valve prolapse (13.5%) were associated with pectus deformities. The modified Ravitch's technique was used in pectus cases. Concomitant surgery was performed in two patients with pectus carinatum.

Results: The complications of pectus deformity repair were pneumothorax (24.3%), wound infection (8.1%), and local tissue necrosis (2.7%). There was no major recurrence, while minor recurrence rate was 10.8%. There was no mortality.

Conclusion: Timely surgical procedures for the treatment of pectus deformities result in an excellent cosmetic outcome and improve cardiorespiratory function, providing both physical and psychological benefits.

Introduction

Surgical treatment offers a great deal to the patients with congenital chest wall deformity, and it can be performed effectively and safely with the expectation of encouraging results. A sixteen years experience of the operative treatment of these conditions was presented.

Patients and methods

Between 1982 and 1998, forty-three patients underwent operative correction of the anterior chest wall deformity. The mean age was 14.4 years (range, 5 to 23). There were 9 females and 34 males. Twenty-four patients (55.8%) had pectus excavatum (PE), thirteen (30.2%) pectus carinatum (PC), and six (14%) atypical costal anomalies. Five patients (13.5%) had a family history of pectus deformity. Seven patients (16.3%) referred dyspnea and/or tiredness for small efforts, and the remainder (83.7%) were asymptomatic. Scoliosis (13.5%), Poland's syndrome (5.4%, $n = 2$), Marfan's syndrome (5.4%), neurofibromatosis (2.7%), atrial

septal defect (2.7%, $n = 1$) and mitral valve prolapse (MVP) (13.5%, $n = 5$) were associated with pectus deformities.

Twenty-nine patients had no significant lateral curvature ($<5^\circ$) but five patients had a positive Adam's forward flexion screening and lateral curvature of the spine $>5^\circ$ by roentgenographic measurement. A systolic ejection murmur of grade II–III/IV was identified in thirteen (35.1%) pectus patients. Three patients had WPW, eight had an intraventricular conduction defect (Rr waves in III and a VF) and two had a RBBB on ECG. Vital capacity was mean 91% of predicted VC in pectus patients. Maximum breathing capacity was also diminished. It was 12% less than predicted MBC. The differences among values of VC, MBC, FEV, FVC, po_2 , and pCO_2 of the patients before and after effort were not significant statistically.

Cardiothoracic rate was greater than 50% in 13 patients with PE. Seven (18.9%) of the patients with PC had an asymmetric deformity, and two "pouter pigeon" deformity. All of the patients with PE, except four (16.6%), had a Welch index greater than 5 on the scale of 1–10. Surgical indications were cosmetic purposes (45.9%, $n = 17$), or the pectus patients who had Welch index >5 (54.1%, $n = 20$) or Wada's Grade 2/3. Incisions were midline vertical in twenty (54.0%) pectus patients. The modified Ravitch's technique was used in pectus cases. Concomitant surgery was performed in two patients with PC; mediastinal tumor resected in one (2.7%) and atrial septal defect patched in the other, associated with pectus deformity correction.

Results

Complications of surgical correction in pectus patients were relatively unimportant. The complications of pectus deformity repair were pneumothorax (24.3%, $n = 9$) for which two patients required chest tube placement, wound infection (8.1%, $n = 3$), wound hematoma (2.7%, $n = 1$) and local tissue necrosis (2.7%). There was no major recurrence, while minor recurrence rate was 10.8% in pectus patients.

The results of surgical correction of our patients with anterior chest wall deformity were as the following: satisfactory correction in 73% ($n = 27$) of the pectus patients (excellent 50% and good 23%), mild recurrence in 10.8% ($n = 4$), and we were not able to get any information about the rest of the patients (16.2%, $n = 6$). There was no early/late mortality.

Discussion

PE is commonly present from birth, but occasionally de novo cases appear at adolescence. There is an increased familial incidence of pectus deformities. Family history is present in 37 percent of cases with PE. Chest wall deformities are associated with such disease as Marfan's syndrome, Poland's syndrome, etc. [5]. PE occurs in almost 67% of patients with the Marfan syndrome. In a series [4], scoliosis that is frequently described as a major component of Marfan syndrome have been identified in 21.5 percent of patient with PE. Congenital heart diseases such as transposition of great arteries, ventricular septal defect, ASD etc. are identified in 1.5% of PE cases [5]. In our cases, type two ASDs were identified.

A systolic ejection murmur which is attributed to the close proximity of or contact between the posterior sternal cortex and the pulmonary artery, and is magnified with a short interval of effort, is usually identified in 57 to 100% of patients with PE. Electrocardiographic abnormalities which are attributed to the abnormal configuration of the thoracic wall and the displacement and rotation of the heart into the left thoracic cavity are common. It has been showed that the vital capacity and maximum voluntary ventilation in men with PE were significantly decreased compared to control population. Several authors identified, that 18%–65% of MVP is due to anterior compression of the heart against the spine by the depressed sternum with resulting deformity of the ventricular chamber or the mitral annulus [1, 3, 5].

Primary indication for surgery has been to relieve pressure on the heart and lungs. The indices, were defined by Welch, Wada, or Haller, have proved useful for assessing whether or not surgery indicated. Correction in the 4th to 7th year of age provides space for the intrathoracic organs and thereby allows their normal development. Marfan's syndrome is not a contraindication to correction, and good cosmetic and functional results has been noted [3, 5].

Results of surgical repair in a clinical study with long-term postoperative follow-up had been found in 83.6 percent of 192 patients as satisfactory (excellent 44.1% and good 39.5%) [2].

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BRONCHOPLEURAL FISTULA AFTER PNEUMONECTOMY: A MAJOR CHALLENGE

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Objective: Bronchopleural fistula (BPF) is a life-threatening complication of pneumonectomy. Its treatment still challenges the thoracic surgeon. We present our 10-year experience in the management of this entity.

Material: From 1986 to 1997, 8 patients with BPF, representing 2.5% of the 315 pneumonectomies performed in the same period, were treated in our Department. All were male, aged 52–74 (mean: 62.5) years. Pneumonectomy (right: 5, left: 3) was undertaken due to lung cancer. BPF occurred within one month postoperatively.

Results: No difference in BPF incidence was observed comparing hand suturing and stapling of the bronchial stump. BPF was associated with empyema thoracis (ET) in 5 patients. Methods of management included prolonged chest tube drainage (n = 5), open thoracostomy (n = 3), bronchoscopic injection of fibrin sealant (n = 2), BPF closure through the previous thoracotomy with autologous tissue buttress (n = 2), transternal transpericardial closure of the BPF (n = 1). Two patients died (mortality 25%): one patient treated with chest tube drainage due to myocardial infarction, and the other undergone transternal BPF closure due to sepsis. In the rest 6 patients closure of the BPF was achieved.

Conclusion: BPF after pneumonectomy continues to be a problem without definite solution at present. Prevention has not been achieved with the use of staples for bronchial stump closure. Small leaks may be sealed endoscopically with fibrin glue. Otherwise, early surgical closure is mandatory, especially when empyema thoracis coexists.

Introduction

Bronchopleural fistula after pneumonectomy a major challenge in thoracic surgery. Its incidence varies from 2.1% to 9.2% in the modern era. It requires early diagnosis, leads to prolonged hospital stay, often requires multiple operations, and results to devastating mortality of 16–75%. According to the biggest series reported in the literature [3] one-year survival is less than 50%. We present our 12-year experience in treating this challenging entity.

Material and methods

Over a 12-year period (1986–1997) 315 pneumonectomies for lung cancer were performed in the department of Thoracic and Vascular Surgery at "Evangelismos" General Hospital of Athens. Eight of these developed bronchopleural fistula (2.5%). All were male. Age

ranged from 52 to 74 years with a mean of 62.5 years. All operations were carried out by one surgical team. A double lumen endotracheal tube was used. Either the closed technique or the open technique were employed for main bronchus division depending on the proximity of the tumor to the resection line. Bronchial closure was achieved by using either nonabsorbable monofilament 2.0 polypropylene suture or staples. The bronchial stump was checked for air leak after immersing it under water with a sustained airway pressure of 40 cm H₂O. The stump was rarely covered with mediastinal tissues. The hemithorax was drained with one clamped tube, which was opened periodically for a few seconds and was removed on the first postoperative day.

Results

Bronchopleural fistula was developed after right pneumonectomy in 5 cases and after left pneumonectomy in 3 cases. The onset of bronchopleural fistula was within one month in all cases, in 2 cases within one week. Bronchoscopy revealed a complete dehiscence of the bronchial stump in 5 patients and partial one in the rest 3. Seven fistulas were developed in patients with squamous cell carcinoma and one in a patient with adenocarcinoma. Empyema thoracis coexisted in 5 cases.

Management

Methods of management included:

1. Chest tube drainage in 5 patients (4 with empyema thoracis). Healing of a small bronchopleural fistula was achieved in the patient without empyema. One patient in this group died due to myocardial infarction. The rest 3 patients underwent an open thoracostomy.
2. Open thoracostomy in 3 patients with persisting empyema. Two Eloesser and one Claggett procedures were performed. One patient had healing of the fistula without further procedures. Of the rest two patients, one underwent rethoracotomy and autologous muscle closure of the fistula and the second transsternal closure of the bronchial stump.
3. Endobronchial injection of fibrin glue was attempted with success in 2 patients with a small bronchopleural fistula [2, 3, 5].
4. Rethoracotomy through the previous incision and closure of the bronchial stump with intercostal muscle flap was performed in two patients resulting to healing of the fistula in both cases.
5. Transsternal closure of the bronchopleural fistula was attempted in one patient with empyema after chest tube drainage and open thoracostomy had failed eliminate the empyema. Closure of the fistula was achieved with operation, but three days later the fistula reoccurred and the patient died soon due to aspiration pneumonia and sepsis [2, 4].

Morbidity and mortality. There were 5 complications in 8 patients (empyema thoracis excluded), resulting in 2 deaths (overall mortality rate 25%).

Of the risk factors reported in the literature:

1. Sex

Although all bronchopleural fistulas after pneumonectomy were developed in male patients (8/266, 3%) and none in female (0/49), this difference was not statistically significant.

2. Side of pneumonectomy

There were 131 right pneumonectomies with 5 bronchopleural fistulas (prevalence 3.8%) and 184 left pneumonectomies with 3 fistulas (1.6%). This difference was not statistically significant. So, side of pneumonectomy was not proved to be a risk factor in our series.

3. Technique of bronchial stump closure

There were 7 bronchopleural fistulas in the hand-suture technique group (2.57%) and one in the staples group (2.32%). The difference was not proved to be statistically significant. This is in accordance with the conclusion found in the literature that "manual closure is at least as good as, if not better than, stapled closure" [1, 5].

Conclusions

1. Postpneumonectomy bronchopleural fistula continues to be a problem without definite solution at present.
2. Prevention has not been achieved with the use of staples for bronchial stump closure.
3. Early surgical closure with the use of autologous muscle is mandatory, especially when empyema thoracis coexists.
4. Endoscopic glue injection is a good alternative to surgery in small leaks.

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THE ROLE OF CT EXAMINATION IN DIAGNOSTICS AND SURGERY OF CHRONIC EMPYEMA THORACIS

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Computer tomography (CT) has become one of the most important modern diagnostic procedure in the detection, differential diagnosis, treatment and the postoperative follow up of patients suffering from chronic intrathoracic suppuration. Although CT examination is nowadays almost unlimitedly available it is still not regarded as a routine diagnostic procedure. It proves to be remarkably useful in the surgical treatment of neglected, chronic cases of suppuration in the thoracic cavity.

On the basis of the Moores empyema thoracis classification [3] patients in the third stage belong to the group with chronic intrathoracic suppuration. Their empyema can only be treated by a major surgery or a series of operations.

Method

The examinations were performed by a Somatom Plus 40 (Siemens, Erlangen, Germany) device set in spiral operation method and extended from the tip of the lungs to the suprarenal gland. The examination parameters were 120–137 kV, 145–210 mA, scan time 1–2 sec, slice width 10 mm, pitch 1. Pictures for the analysis of soft parts were taken by standard algorithm with a 350 HU window width and a 30 HU level. Pictures for the analysis of the lungs were taken by high resolution algorithm with a 1500 HU window width and a 500 HU level.

Prior to the examinations 1.5 ml/kg contrast material (Omnipaque 350 / Nycomed /, Iopamiro 300 /, Bracco/) was injected intravenously by an injector.

Beside the general method of analysing thoracic CT pictures, in each case the following phenomena were examined with high priority, documented and measured as objectively as possible: the width of the visceral and parietal pleura; the demarcation of the visceral pleura and the pulmonary tissues; the presence, topography, size and morphology of effusion and/or pneumatosis in the thoracic cavity; the position of drains in the thoracic cavity, the signs of bronchopleural fistulae; the retraction of the operated side; the hyperextension of the uninjured side (retraction index); the morphology of the twisted muscular lobe; the measure of the contrast material accumulation; the signs of recurrent tumour and metastasis; and the signs of recurrent residual cavity and empyema.

Patients

338 patients were treated due to intrathoracic suppuration between 1 January 1987 and 31 December 1998. The youngest was 13 and the oldest was 90; the mean age was 53.2. Of these 11 died representing a mortality rate of 3.2%. Seven of these patients suffered from chronic suppuration. The total number of patients suffering from chronic intrathoracic suppuration, stage III according to Moores [3], was 82 (24.2%). The present study is dealing with the cases of those patients suffering from chronic intrathoracic suppuration who had to undergo a series of surgical interventions and CT examinations. Of these 82 patients, in 33 cases surgical interventions were performed in two or more stages. Three of the 11 patients underwent open surgery died; they had been admitted to the department in a moribund condition. Prolonged open surgery was performed in five patients and three received treatment prior to thoracoplasty and myoplasty.

Table 1
Distribution of empyema thoracis depending on the kind of treatment,
and the mortality rate 1987–1998

		Mortality
Moores Stage I–II	Drainage	81
	Drainage and lavage	75
	Pleural-lavage and thoracoscopy	73
	Balance-drainage	20
	Early decortication	7
Moores Stage III	Decortication	25
	Decortication and resection	8
	Thoracoplasty	5
	Thoracoplasty and myoplasty	33
	Fenestration	11
Total		338
		11 (3.2%)

The department has had opportunities to perform CT examinations at the Diagnostic centre of the Pannon Agriculture University (PATE) since 1990. Eighty-nine CT examinations were requested in the case of 32 patients with an average of almost three examinations per patient. The lower number of examinations per patient was one and the higher number was five.

Discussion

CT examinations play an important role in the diagnosis of chronic postpneumonic empyema thoracis and septic processes in the pleural cavity developing either after partial resections and pneumonectomy or due to other reasons. CT is the best, so far known, diagnostic method to reveal the exact topography of the empyema, which is of utmost importance for

the drainage and lavage treatment [1, 4]. In certain cases CT makes the drainage of small, hardly accessible encysted effusions possible.

On analysing thoracic CT pictures the retraction of the operated side and the hyperextension of the uninjured side can be observed in every patient. The anteroposterior and transverse diameter at the height of the main bronchus can accurately be measured in the CT pictures. The sum of the anteroposterior and transverse diameter on the operated side divided by the sum of the anteroposterior and transverse diameter on the other side is the so-called retraction index. If this value equals one then the two hemithoraces are symmetric, if the retraction index is smaller than one then retraction on the operated side and hyperextension on the other side can be observed. The changes appearing during the open surgical interventions can be well followed by CT. The accuracy of the data measured can be distorted by the movement of the mediastinum so the retraction index can only be given by a \pm deviation.

Table 2

The role of computer tomography (CT) in the treatment of chronic empyema thoracis

I. Examination

1. The determination of the position of the empyema.
2. The evaluation of the size and the extension of the empyema between the visceral and parietal pleura and the analysis of the relationship between the visceral pleura and the pulmonary parenchyma (demarcation).
3. The examination of the bronchial stump subsequent to partial resection or pneumonectomy.
4. The verification or exclusion of a bronchopleural fistula.
5. The examination of the parenchyma of the contralateral side of the lungs or that of both sides following partial resection.

II. Period between the operations

1. The examination of the size and shape of the suppurative cavity treated by open surgery to avoid strangulation.
2. The examination of the thickening of the granulation tissue surrounding the cavity.
3. The measure of the retraction of the thoracic cavity treated by open surgery.
4. The measure of the diameter of the bronchopleural fistula.
5. The exclusion of recurrent tumour, tumour on the contralateral or ipsilateral side, metastasis or lymph node involvement prior to thoracoplasty or myoplasty in cases of patients with tumours.
6. The examination of the muscle which is suitable for sealing the cavity (e.g. m. latissimus dorsi).

III. Postoperative period

1. The management of the complications developing postoperatively: the detection of pneumatosis and effusions; the evaluation of the position of the drains.
2. The test of the vitality of the muscular lobe twisted on the basis of the contrast material accumulation.
3. The examination of the scaled bronchial stump.
4. The exclusion of a residual cavity.

IV. Care

Regular control of patients within the framework of care.

By a continuous CT control the changes and "thickening" of the granulation tissue of the parietal pleura, occurring during the open surgical treatment, can accurately be followed and

the shrinking of the cavity can be observed and measured. The position, size and quantity of the pneumatosis and effusion in the pleural cavity after thoracoplasty and myoplasty can be diagnosed, which is essential for the detection and management of postoperative complications. CT makes the targeted drainage of pneumatosis and effusion be possible. Also, CT is suitable for evaluating the sealing of the bronchial stump in broncho-fistular empyema, the position and vitality of the myoplombage twisted to fill the cavity, the sealing of the broncho-pleural fistula, and the imperforation of the bronchial stump.

By evaluating the tissue conditions with the assistance of CT tissue necrosis can be detected in time. Thus the necessary interventions can be performed in the right time: drainage, refenestration, complementary thoracoplasty. Although on the basis of the literature the incidence of chronic empyema thoracis has been decreasing this serious complication still must be considered especially if polyresistent *Mycobacterium tuberculosis* or *Aspergillus fumigatus* can be diagnosed, if there is a bacterial infection in the background of a central tumour, after a cystic bronchiectasis surgery, following postoperative irradiation, in the case of suppuration in the pleural cavity developing as a complication after pneumogangrene and pneumoinfarction etc. The most serious condition develops when suppuration occurs following pneumonectomy or partial resection of the lungs because sepsis appears after an extremely serious surgical operation [1, 2, 4, 5]. In most of the cases a series of surgical interventions are necessary for the recovery. Drainage, lavage and lavage controlled by thoracoscopy can manage cases without bronchial fistula. In 9.7% of the patients open surgery was necessary and later thoracoplasty and myoplasty were performed. As CT accurately explains why the suppuration does not respond to the drainage treatment it proves to be fairly useful in making difficult decisions in terms of treatment. Furthermore, it gives a clear picture about the position of the drains and the multilocular empyema sac surrounded by a thick callus. Table 2 summarises the role of CT examination in the treatment of chronic intrathoracic suppuration.

CT examination has become the best diagnostic technique developed so far in the examination of patients suffering from chronic intrathoracic suppuration where in the substantial majority of cases a series of major operations are needed for recovery, in the follow-up of patients between the operations, in the planning of operations, in the detection and care, in a later period, of possible postoperative complications.

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EARLY OESOPHAGEAL CANCER. DOES IT EXIST? WHY WE CANNOT FIND IT?

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Results of surgery in oesophageal cancer are still disappointing. The only possible solution is to search actively for early cancer in nonsymptomatic person. The group of patients with Barrett's oesophagus or after lye ingestion was included in the endoscopic screening programme.

In order to improve our results and increase sensitivity we have employed the Lugol solution for mucous membrane staining.

During five years follow-up period four cases of early cancer were found. All cases were treated surgically showing cancer confined only to the mucous membrane in two patients.

Endoscopic ultrasonography is currently the best technique for the staging of oesophageal cancer.

Our preliminary data are encouraging shown that its possible to use population screening programme in some well-defined group of patients.

Results of surgery in oesophageal cancer are still disappointing. All surgeons are trying to improve results by applying more aggressive surgical approach. But this does not give any significant improvement regarding survival data. All doctors know that results are better when early stages of disease are treated. But how many cases of early oesophageal cancer do we encounter? There are no early symptoms to attract attention. The only possible solution is to search actively for early cancer in nonsymptomatic person. But population screening for oesophageal cancer is not possible because of its low incidence. The only possible solution of this dilemma is identification of increased risk group by the means of personal and family medical history.

In last years incidence of oesophageal cancer increased greatly. It is due to Barrett's cancer because columnar epithelium in Barrett's oesophagus has a 50–200-fold increase in the risk for development of oesophageal adenocarcinoma [2].

22-fold increase of the incidence of oesophageal cancer in patients after lye ingestion is observed [3]. Those two types of patients composed our target group we were screening for early oesophageal malignancy. That's the only well-defined group of patients in which the screening programme is justified economically.

In order to improve our results we have employed the Lugol solution for mucous membrane staining. It allows easy differentiation between the normal and changed mucous membrane and increases the sensitivity of endoscopic biopsy.

Our preliminary data are encouraging. In the group of twenty-two patients with high risk of development of oesophageal cancer during five years follow-up period four cases of early cancer were found. All of them were treated surgically showing cancer confined only to the mucous membrane in two patients.

Radical operation consisted of gastrectomy, resection of oesophagus and lymphadenectomy. Continuity of gastrointestinal tract after total oesophagectomy was re-established by the anastomosis of the pedunculated colon or jejunal substitute with oesophageal remnant in the neck.

In one case postoperative lung complications were observed. They were treated medically with good results.

Lately emerged new diagnostic tool is the endoscopically induced laser spectroscopic fluorescence. It allows distinction between high-grade dysplasia/cancer and low-grade dysplasia and normal oesophageal mucous membrane [5]. Endoscopic ultrasonography is currently the best technique for the staging of oesophageal cancer [1]. Its sensitivity and specificity in estimation of infiltration and nodal involvement is evaluated on 89% [4].

In those early cases laser ablation or photodynamic therapy has the potential of destruction of abnormal tissue and allows regeneration of normal oesophageal squamous cell membrane [2].

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EXTRAPLEURAL BULLECTOMY OR LUNG VOLUME REDUCTION: AIR TIGHT SURGERY FOR EMPHYSEMA WITHOUT STRIP-PATCH

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Air leaks after stapled lung resections for emphysema remain the most common postoperative complication. Staple line reinforcement, alone or in association with a parietal pleural tent, is recognised as an effective technique for decreasing the occurrence of air leaks after pulmonary wedge resection. Several materials have been employed for reinforcement, most of them prosthetic and costly. We use the parietal pleural tent covering the pulmonary targets to be excised, as a reinforcement on which the staple is fired (2 LVRS and 6 bullectomy procedures).

Air tightness and obliteration of intrapleural space are simultaneously achieved.

We named our technique: Extrapleural Bullectomy (EB) or Extrapleural Lung Volume Reduction (ELVR), according to the indication of the operation.

No mortality nor significant morbidity, particularly prolonged postoperative air leak, were observed. At the follow-up (3 to 12 months) no pneumothorax or residual spaces have occurred.

Introduction

Air leaks after stapled lung resections for emphysema remain the most common postoperative complication. Staple line reinforcement, alone or in association with a parietal pleural tent, is recognised as an effective adjunctive technique for decreasing the occurrence of air leaks after pulmonary wedge resection. The most frequently used buttressing materials are the bovine pericardial and the expanded PTFE strips. However, their cost is significant, while the pleural tent can turn ineffective if air leaks are consistent. Looking for a less expensive buttressing material, we elected to use the same parietal pleural tent as a staple line reinforcement.

Material and methods

Since January 1998 eight patients have been submitted to pleural and lung stapled resection: six had a bullectomy and two lung volume reduction for diffuse emphysema.

All patients underwent a unilateral vertical muscle-sparing thoracotomy. Once the apical pleural tent has been created, a small temporary incision is made to allow exploration of the lung. The target lung areas and the overhanging pleural tent are then grasped together and

both stapled and excised, providing an air-tight suture and, at the same time, the obliteration of any intra-pleural residual space. The Premium-TA 55 or 90 Stapler (Autosuture) and the ELC 60 Stapler (Ethicon, Cincinnati, OH) were either used.

We named our technique Extrapleural Bullectomy (EB) or Extrapleural Lung Volume Reduction (ELVR) according to the indication of the operation.

Results

The first two cases (1 EB and 1 ELVR) had an air leak lasting more than 7 days, but the total duration of the chest tube drainage was respectively 8 and 11 days.

In the other 6 cases (5 EB and 1 ELVR) no postoperative air leak was observed and all the tubes were removed in less than 7 days.

No patient required reoperation for control of hemostasis and no deaths, infections or other complications occurred. The length of hospital stay ranged within 8–9 days in patients submitted to EB procedure (except for the first case that required 14 days) and 12–15 days in those submitted to ELVR. In all cases the apical extrapleural residual space gradually reduced and was no longer evident after 2–3 month.

At the follow-up (2 to 12 months) no pneumothorax or other technique-related complications have occurred.

Discussion

Air leaks after stapled lung resection may occur because of tearing of the lung by excessive surface tension between two parallel staple lines that are too close together. The friable consistency of emphysematous lung tissue makes it especially susceptible to tearing.

Several surgical techniques and materials have been used to decrease the occurrence of air leaks by buttressing the suture lines: everted walls of bullae and pleura [1, 2], fibrin glue [2], blood patches [2], polydioxane ribbon [3], polyglycolic acid materials [4] or, most dependably, bovine pericardial strips [2], and expanded PTFE sleeves [5]. However, the cost of any single operation rises significantly when prosthetic buttressing materials are used.

To seal residual air spaces and minimal leaks, Cooper [2] has reintroduced the apical pleural tent. The procedure is attractive as it is possible to drop the parietal pleura down to the lung to reapproximate the two pleural surfaces whenever gaps or air leaks would prevent natural inter-pleural contact. The procedure has been employed also after "difficult" lobectomies [6].

We therefore elected to use the autologous pleural tent either for its air tightness and as staple reinforcement. The procedure is expeditious, able to achieve an air-tight suture, avoid any infection or host reaction to prosthetics, obtain stable obliteration of the apical intrapleural space and effectively lower costs.

In all the patients the extrapleural residual space filled with fluid which gradually disappeared, partly because absorbed and partly as effect of lung redistribution. After 2–3 months, only a little apical cap was noticeable.

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PERICARDIAL ABSCESS — A RARE COMPLICATION OF SEPSIS

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Pericardial abscess is a very rare complication of sepsis. Authors describe the case of a 69-year-old woman. In her case staphylococcus sepsis led to pericardial abscess. During the course positive blood cultures (3×) indicated the sepsis and pus was obtained from the left pleural cavity (pleuropneumonia). Concomitant purulent process in the left shoulder also was noted. Decline immunity due to long-standing corticoid therapy (prednisone) for proctocolitis idiopathica was observed. Following antibiotic treatment successful surgical evacuation of the pericardial abscess was performed.

Introduction

Pericardial abscess is very rare complication of sepsis or infections in surroundings. We found in world literature only rare case reports [2–5].

Case report

We describe the case of a 69-year-old woman. She has been treated for proctocolitis idiopathica since 1968 being on long-standing corticoid therapy (Prednison and Sulfosalazin). The last exacerbation of the disease was noted in the summer of 1998. A few years ago she underwent surgery for rectovaginal fistula. On 30/8/1998 she was admitted to the Internal Medicine Department for dyspnoe, weakness, retrosternal pain and rough bilateral shoulder ache. Her status was without remarkable findings, only the blood pressure was low (90/60 Hgmm) and the heart rate was too high (120/min) and irregular. The laboratory findings at admission showed elevated inflammatory marker levels. The investigations followed (ECG, Chest X-Ray, V/P Scan) revealed lung embolisation. Low molecular weight heparin (Clexane) therapy was commenced. Complaints of shoulder pain (especially on the left side) and swelling necessitated the puncture of the joint on 7/9/1998. 16 ccm pus was aspirated. *Staphylococcus aureus* was identified in the fluid. Antibiotic therapy was introduced immediately (Augmentin i.v.). Joint puncture was repeated. The patient was discharged to home care as her condition was stabilised (8/10/1998).

She was admitted again to the Internal Medicine Department for dyspnoea, fever and pain in the left side of the chest (1/11/1998). On chest X-ray veiling over the left costophrenic angle was found. There were positive inflammatory markers in the laboratory findings again. *Staphylococcus aureus* was obtained from the blood culture. The same bacterium was found in the fluid of the left pleural space. CT-scan revealed marked liquid formation with different density in the pericardial sac. The extension of the formation was $61 \times 38 \times 87$ mm. Bilateral hydrothorax and inflammatory infiltration of the left lower lobe was also noted. CT-scan of the brain gave negative result. Antibiotic therapy (combination of Ampicilin, Ciprinol, and Oxacillin) was administered according to the sensitivity tests. The next investigation performed was an echocardiography (ECHO). Under ultrasonography control puncture of the pericardial formation was performed. (Result: 250 ccm of dense, chocolate-like pus—*Staphylococcus aureus*.) During control investigation (ECHO) abscess formation in the same extent as prior to the puncture was found. Control CT-scan confirmed the presence of the pericardial abscess formation. It was situated on the wall of the left chamber and in front of the aorta. The thickness of the wall was 7–10 mm.

Surgery was performed on 15/12/1998 in antibiotic prophylaxis (Tazocin, 4.5 gr i.v.). The approach chosen was a short-vertical muscle sparing thoracotomy. The reason for preferring this approach rather than VATS was the thickness of the wall. Approximately 150 ccm of pellucid fluid was found in the pleural space. The lung was adherent to the pericardium and to the chest wall. In the expected location of the abscess we performed first of all diagnostic puncture, because palpation was negative. Aspirated liquid was dense, like pus. We performed opening abscess cavity and resected area 4×4 cm of the wall. Pleural space and cystic formation was irrigated with diluted Betadine (povidone iodine). Thin drain was inserted into abscess cavity for irrigation, and two thoracic drains. Fluid-like pus was sterile. It was not confirmed tuberculosis. Histologic examination confirmed extensive thickness of the wall with granulations tissue. Muscle sparing thoracotomy was healed p.p.i. 14th postoperative day patient was transferred in good repair to Department of Internal Medicine.

Discussion

Spread of infection into pericardial sac is possible in three ways:

- through way (perforation of liver abscess)
- per continuitatem (pleuropneumonia, tbc)
- hematologic way (during sepsis)

Chao et al. report case of amoebic pericarditis. It is extremely rare complication of liver abscess and an uncommon etiology of sterile pericardial effusion with cardiac tamponade. Emergency pericardiectomy was performed [3]. Yamada et al. reported case of pyogenic hepatic abscess, that ruptured into the free pericardial cavity [5]. Also an emergency subxiphoid pericardiectomy was performed. Tuberculous pericarditis is estimated to occur in 1–2% of cases of pulmonary tuberculosis. Despite adequate therapy a subset of patients may eventually require pericardiectomy [2]. In our case report pericardial abscess was very well marked.

There is another possible hypothesis, that first of all pericardiac cyst existed, which was secondarily infected. We have very good experiences with vertical muscle sparing thoracotomy [1] and we recommend this approach.

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LUNG RESECTION FOR THE TREATMENT OF SEVERE LOCALISED BRONCHIECTASIS IN CYSTIC FIBROSIS PATIENTS

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Background. A small proportion of cystic fibrosis patients develop severe localised bronchiectasis. When this persists despite maximal medical therapy it presents a difficult management problem. Lung transplantation cannot be justified. We report encouraging results in six patients with severe localised bronchiectasis and cystic fibrosis who underwent pulmonary resection.

Methods. Each child had severe localised bronchiectasis despite maximal medical therapy. Intensive preoperative toilet was instituted and pulmonary resection undertaken when lung function was optimal.

Results. There was a marked improvement in symptoms in every case. No significant long-standing morbidity was associated with the resection. There was no significant decrease in pulmonary function following resection.

Conclusion. Pulmonary resection should be considered in the management of severe localised bronchiectasis unresponsive to maximal medical therapy in cystic fibrosis patients.

Introduction

Cystic fibrosis (CF) is the commonest lethal genetic disorder affecting Caucasians. It is known to affect a wide variety of organs, however more than 90% of patients will die of respiratory failure due to progressive lung destruction and infection [1]. Pulmonary involvement is usually multifocal and when severe respiratory failure develops the risks of transplantation are justifiable [3]. Rarely patients, however, have disease which is localised to one area of the lung, most commonly the right upper lobe and hence may be amenable to surgical resection. We describe six children who have benefited both objectively and subjectively from a localised pulmonary resection.

Methods

In all cases the children were symptomatic requiring multiple admissions despite maximal medical therapy. Chest X-rays, ventilation-perfusion and CT scans were used to document the anatomical distribution of both damaged and functioning lung.

Each patient was admitted prior to surgery and aggressive pulmonary toilet was instituted utilising a combination of aerosol treatments with mucolytic agents, incentive spirometry

and postural drainage. Broad spectrum oral and intravenous antibiotic therapy was begun. No surgery was undertaken until pulmonary function had been optimised.

Mean age at operation was 7 years (range 1–12). Four patients underwent right upper lobectomy, 1 right lower lobectomy and 1 left lower lobectomy. All patients underwent thoracotomy and pulmonary resection under general anaesthetic using a single/double lumen tube. In every case the child was extubated in theatre. Postoperative pain was controlled with an extrapleural infusion and patient/nurse controlled analgesia. Intensive physio and antibiotic therapy was continued for a minimum of seven days. No patient required a tracheostomy.

Lung function was recorded preoperatively and six months postoperatively following bronchodilator therapy.

Results

The operative mortality was zero. One child who underwent right lower lobectomy infarcted his right middle lobe and required reoperation. Following this he made a full recovery. All patients were much less productive of sputum and had an increased exercise capacity. The FEV 1 and FVC increased in 4 patients and decreased in 2. There was, however, no significant difference in pre- and postoperative FEV 1 and FVC.

Discussion

Isolated lobar abnormalities are relatively rare in cystic fibrosis. Early intervention and treatment with new therapies such as DNAase might prevent such severe bronchiectasis. None of our patients had such treatment. In this series 4 children had never fulfilled the local criteria for such therapy, this suggests that even with a prompt neonatal diagnosis some children will still develop severe localised pulmonary disease.

There was no significant decrease in pulmonary function in any child following resection. Smith et al. [2] reports similar findings for patients with FEV 1 > 30% but not if FEV 1 < 30%. Cases of worsening pulmonary function following resection if the FEV 1 > 30% occur when functioning lung tissue is excised [2]. Preoperative investigation with a chest X-ray, ventilation perfusion scan and CT should prevent this.

Resection of an infected segment removes a potential source of infection from the remaining unaffected lung. Our expectation is that the removal of infected, inflamed tissue will limit the spread of bacterial pathogens to other lung areas and therefore slow down any destructive lung process. Longer follow-up is required to ascertain if this delays the onset of respiratory failure.

Summary

We describe a small series of patients with cystic fibrosis who experienced a marked symptomatic improvement following resection of severe local bronchiectasis unresponsive to medical treatment. Lobectomy does not preclude subsequent transplantation.

We believe pulmonary resection can be helpful in the management of severe localised bronchiectasis in cystic fibrosis patients. Detailed assessment is required to identify those children who might benefit from this unusual approach.

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SURGERY FOR OESOPHAGEAL CARCINOMA IN THE ELDERLY

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Objective. There has been a gradual increase in the number of elderly patients referred for oesophageal surgery. The aim of this study is to review our experience with oesophageal cancer surgery in the elderly.

Methods. Between January 1974 and December 1996, 591 patients (408 males, 183 females; mean age 66 years) underwent an oesophageal resection for carcinoma. 221 were aged greater than 70 years of age (group A) and 370 less than 70 (group B).

Results. Total in hospital mortality was 8.8% (52/591). This has decreased to less than 5% over the last decade. There was no significant difference in perioperative morbidity or mortality between the groups ($P = 0.11$). When deaths from unrelated medical conditions were excluded, there was no significant difference in survival between the different age groups ($P = 0.96$).

Conclusion. Oesophageal surgery can be performed in a selected elderly population with a low operative morbidity and mortality. The survival benefit of resection is the same in the elderly as for younger patients.

Introduction

The main age of the population is increasing. Those aged over 70 are the fastest growing section of the population. Following several encouraging reports there has been a gradual increase in the number of elderly patients referred for oesophageal surgery [2]. The expectation of both referring physicians and patients has changed and accurate documentation of outcome following surgery in these patients is necessary.

Thus we report our experience with oesophageal surgery in the elderly.

Materials and patients

Between 1974 and 1996, 591 patients (408 males, 183 females), mean age (\pm SEM) 65.7 years (\pm 10.6) underwent an oesophageal resection for carcinoma of the oesophagus or oesophagogastric junction under the care of one surgeon. 221 were greater than 70 years of age (gp. A) and 370 less than 70 (gp. B).

A left oesophagogastricectomy was performed for lower third and oesophagogastric lesions and an Ivor-Lewis oesophagectomy for mid-third lesions. The tumour-free resection

margin in both oesophagus and stomach was at least 5 cms. No adjuvant treatment either in the form of chemotherapy, radiotherapy or a combination has been routinely used in these patients. Staging was based on operative findings and histological reports on resected specimens.

Results

Fifty-two (8.8%) patients died within 30 days, the in hospital mortality has decreased to less than 5% for the last decade. In hospital mortality was 24 in group A and 28 in group B ($P = 0.26$). The usual length of stay in ITU was one day (268 patients). There was no significant difference in length of ITU stay between different aged patients ($P = 0.19$). 156 predominantly pulmonary nonfatal complications occurred in 123 patients. There were more cardiovascular complications in group A patients but this did not reach significance.

Sixteen patients were lost to follow-up, leaving a total follow-up of 1,256 patient years. Survival for all patients (\pm SEM) was 53.98% (± 2), 31.77% (± 2) and 15.3% (± 2) at 1, 2 and 5 years, respectively. Median survival was 11.96 months (359 days). Age at operation ($P < 0.01$), advanced TNM stage ($P < 0.0001$), incomplete resection ($P < 0.02$) and splenectomy ($P < 0.009$) were significantly associated with worse survival (Cox's proportional hazards method). However, when deaths from unrelated medical conditions were excluded, there was no significant difference in survival between the different age groups ($P = 0.96$).

Discussion

Accepting the difficulties and pitfalls of a retrospective analysis, this series clearly demonstrates that for selected elderly patients oesophagectomy for carcinoma can be performed with an acceptable operative morbidity and mortality.

The mortality rate of 10.2% is similar to other series [2]. In common with other series, we have experienced a decrease in early mortality for all patients undergoing oesophagectomy [1]. The reasons for this are multifactorial and include: improved preoperative investigation, an increasingly experienced surgical team; more advanced monitoring technology in theatre and ITU; and increased provision and use of ITU.

TNM stage is an important predictor of survival following resection [3]. In particular, the presence or absence of lymph node involvement is most significant. The most interesting finding in this series is the demonstration of similar survival between the two age groups when deaths from nonmedically related disorders were excluded. This supports the hypothesis that the elderly attain similar benefit from resection as younger patients.

Conclusions

Age alone should not preclude anyone from oesophageal resection for carcinoma of the oesophagus.

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HIGH FREQUENCY JET VENTILATION IN TRACHEA RECONSTRUCTIONS — ITS ADVANTAGES IN OUR EXPERIENCE

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Maintaining sufficient airflow in the distal airways during tracheal resection remains to be a challenging task. Disadvantages of cross-field intubation are well known. Experiences with using two models (CHIRAJET NCA and PARAVENT PAT) of ventilators for High Frequency Jet Ventilation (HFJV) during 82 resection of trachea (94 applications) are reported. Postintubation or post-tracheostomy stenosis required surgery in 76% of the cases. 11% of the cases required surgery for tumour stenosis. In 4/82 cases trauma necessitated the trachea surgery. Six tracheo-esophageal fistulas were operated on using this technique.

No perioperative technique related complications was encountered. No perioperative and early postoperative mortality was noted. The usage of HFJV is method of first choice in our experience, especially in lesions of upper part of the trachea. It proved to be safe, effective and easy to use ventilation technique.

Aim

The aim was to present use of High Frequency Jet Ventilation (HFJV) as a comfort and safe mode of ventilation in reconstructive surgery of trachea, especially in upper parts of tracheal tube [2, 3]. HFJV enables ventilation of patient with the use of a thin catheter without endotracheal intubation (ability based on physical characteristics of HFJV) [1, 3, 5]. This type of ventilation provides more of free space in the operation field and higher level of safety for the thoracic surgeon. HFJV seems to be safe and effective for patients and there is a possibility to use this mode of ventilation in long-term postoperative period, too [3–5]. It is necessary to gently monitoring the position of the HFJV catheter in the trachea (risk of barotrauma in case of distal endobronchial transposition of catheter-end) [4].

Methods

Between 1991 and 1998 (8 years) HFJV was used in 82 patients (94 times) in operative treatment of tracheal lesions. All patients were operated in intravenous general anesthesia with relaxation of muscles. In period of the HFJV air with partial tension of oxygen (FiO_2) > 40% was used. Standards were continually monitored: Thoracic electrocardiograph and heart rate, invasive intra-arterial blood pressure, expiratory tension of CO_2 , saturation of oxygen

(SaO_2). Standards were intermittently monitored: arterial acidobasic balance (pH, PaCO_2 , PaO_2), auscultation monitoring of lung and respiration mechanics.

HFJV was performed by 2 types of ventilators: CHIRAJET NCA (Chirana Stara Tura, Slovak Republic) and PARAVENT PAT (Elmed, Prelouc, Czech Republic). Chirajet NCA is electronically actuated ventilator for the HFJV, with adjustable frequency 20–600 cycles/min. Paravent PAT is transportable ventilator with rigid frequency 120 c/min, only for short-time usage (for transport or toilette of the airways). Both ventilators have an injector flow pressure generator. Ventilation was performed by original HFVJ sets and catheters.

Results

In all HFJV (94) we have found adequate blood gases exchange without adverse effects and complications, according to the standard conditions. Standard conditions were: $\text{FiO}_2 > 40\%$, frequency about 120 c/min inspiratory time (Ti) 0.55. Adjustable insufflation pressure (PIN) 120 kPa and range 90–160 kPa, with limit pressure in airways < 2.5 kPa and normal blood gases partial pressures. Year-by-year cumulation of patients (males and females) and HFJV are in Table 1.

Table 1
Cumulation of patients (males and females) and HFJV

Year	No.	(%)	Males	Females	HFJV	(%)
1991	4	(5)	4	0	5	(6)
1992	8	(10)	6	2	10	(12)
1993	12	(15)	9	3	12	(13)
1994	15	(18)	11	4	18	(19)
1995	7	(9)	4	3	8	(9)
1996	9	(11)	8	1	10	(12)
1997	12	(15)	8	4	13	(14)
1998	15	(18)	12	3	18	(19)
Total (8 y)	82	(100)	62 (76%)	20 (24%)	94	(100)

Age range and age distribution are in Table 2.

Table 2
Age range and age distribution

Age range		(10;70)
Median age	(all)	39.8
Median age	(males)	38.4
Median age	(females)	44.3

Spectrum of diagnoses and percentages are in Table 3.

Table 3
Spectrum of diagnoses and percentages

Diagnosis	No.	%
Stenosis post-tracheostomy	40	49
Stenosis postintubation	22	27
Tumorous stenosis (direct or indirect)	9	11
Acute traumatic rupture of trachea	4	5
Tracheo-esophageal fistula	6	7
"Functional" stenosis of principal bronches	1	1
Number of cases	82	100

No perioperative complications caused by HFJV was found. No perioperative and early postoperative mortality was presented.

Discussion

This overview presents HFJV as useful, safe and reliable mode of ventilation in operative reconstructions of the trachea. The mode of use HFJV in our conditions is method of the first choice, especially in lesions of upper trachea parts. The exchange of gases was adequate, according to knowledge of other authors [1–5].

In our sample (82 patients and 94 HFJV cases) predominance of males was present. Age median in the sample was about 40 years. Only 3 patients were in higher child age (10 and 15 years). The oldest patient was 70, the youngest was 10 years old. In diagnoses prevalence of stenoses post-tracheostomy (maybe technical mistakes in providing tracheostomy) and stenosis postintubationem (maybe high pressure tube-ballon) was found. Direct or indirect tumorous stenosis of trachea was in 11%, tracheo-oesophageal fistula in 7%, direct or indirect acute traumatic rupture in 5%. In one case idiopathic functional stenosis of principal bronches was found in patient with chronic bronchopulmonal obstructive disease (COBPD). "Y"-Dumont stend was applied. On the same day rupture of the trachea appeared. The short-time HFJV, and then bypass ventilation (because HFJV is contraindicated in the COBPD patients –1.5) was used.

It is necessary to prevent distal tracheo-endobronchial movement of end of the HFJV-catheter. The danger of barotrauma is high. Monitoring of catheter position with intermittent auscultation of lungs and eye-control of the catheter in operation field (in about 10–15 min. periods) is mandatory. HFJV decreases the danger of blood aspiration into the airways due to continuous outflow of gases.

Conclusion

Use of HFJV in reconstructive surgery of trachea is very safe, effective and reliable ventilation mode. It seems to be method of first choice in operations of trachea.

- The gas exchange was adequate according standard conditions.
- No perioperative complication and early postoperative mortality was found.
- The danger of blood aspiration into airways due to HFJV is minimal.
- HFJV is minimally invasive method of ventilation, according the minimalisation of mechanical damage of trachea.
- HFJV offers significantly more space for manipulation during HFJV for thoracic surgeon.

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A PITFALL WITH THE USE OF ^{111}In -PENTETREOTIDE SCINTIGRAPHY IN THE RESECTED BRONCHOPULMONARY CARCINOIDS FOLLOW-UP: A CASE REPORT

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Aim. To re-evaluate the use of ^{111}In -pentetreotide scintigraphy (Octreoscan) in the follow-up of patients operated for carcinoids, as second-step investigation, after chest X-ray, CT-scan and serological marker' levels.

Methods and Results. We describe the case of a female patient, 58-year-old, operated on for a non-secretory lung carcinoid. Five years after surgery, the CT-scan showed the enlargement of the bilateral hylo-mediastinal lymphnodes, suggestive for carcinoid recurrences. In order to confirm that, the patient was submitted to an Octreoscan that showed the presence of enlarged hylo-mediastinal adenopathies matching with the lesions observed at the CT-scan. Because the serological examination of NSE, chromogranin and serotonin, and the 5-HIAA were in the normal range, the patient was submitted to a lymphnode biopsy through a mediastinoscopy. The histological examination of the specimens revealed a sarcoidosis and the patient was started on steroid therapy with good outcome.

Conclusions. We conclude that: 1. the octreoscan scintigraphy in the follow-up of resected carcinoids can give false-positive results and 2. in consequence, the mediastinoscopy is a discriminating investigation in case of mediastinal lymphnodes disease.

Introduction

Bronchial carcinoids are well-differentiated neuroendocrine tumors. These tumors are locally invasive and rarely responsible for nodal and distal metastases. Bronchial carcinoids belong to the so-called amine-precursor-uptake-decarboxylase (APUD) tumors. This group of neoplasms is characterized by the ability to express somatostatin receptors and to secrete a variety of chemical messengers such as neuroamines and neuropeptides. The use of ^{111}In -pentetreotide scintigraphy (Octreoscan) in the follow-up of patients resected for neuroendocrine carcinomas of the lung is well known. The Octreoscan documents not only the carcinoid recurrences, but mainly its receptor status, indicating, for some authors, the sensitivity to octreotide [1, 2]. For these reasons we decided to introduce the Octreoscan in the follow-up after surgical therapy for carcinoids, as second-step investigation, after chest X-ray, CT-scan and serological markers level. We describe the case of a patient, where the use of Octreoscan, in the follow-up, could divert us from the correct diagnosis.

Methods

A female patient, 58-year-old, came in January 1998 for a follow-up examination of a non-secretory lung carcinoid, resected in 1992. The operation performed at that time was an atypical resection of the left inferior lobe for a 2 cm typical carcinoid. During the operation the mediastinal lymphadenectomy was carried out and the microscopic examination excluded lymphnode involvement. We submitted the patient to a scheduled follow-up: she had a chest-X-ray every six months and a chest-CT scan each year. In January 1998, the CT-scan showed an enlargement of hylo-mediastinal lymphnodes bilaterally, suggestive for carcinoid recurrence. In order to confirm that, the patient was submitted to a ^{111}In -pentetreotide scintigraphy (Octreoscan). Tomographic imaging of the chest and a whole body scan were performed 4 and 24 hours postradioactivity. The SPECT imaging of the thorax showed the presence of enlarged hylo-mediastinal lymphnodes matching with the lesions observed at the CT-scan. Because the serological levels of NSE, chromogranin and serotonin, and the 5-HIA were in the normal range, the patient was submitted to a lymphnode biopsy through a mediastinoscopy. The histological examination revealed a sarcoidosis lymphadenitis. Thus the patient started a steroid therapy. A CT-scan, done six months later, showed the disappearance of the mediastinal lymphadenopathy.

Conclusions

A somatostatin is a neuropeptide with many physiological effects of inhibitory nature. Somatostatin receptors have been detected in pituitary, brain and in hormone-producing tumors of gastrointestinal tract and bronchial tree. It is possible to detect such somatostatin-receptor-positive tumors with radiolabeled somatostatin analogs. Therapy with somatostatin analogs results in the control of hormonal hypersecretion, symptomatic improvement and tumor shrinkage in patients with acromegaly, endocrine pancreatic tumors and metastatic carcinoids. Thus, *in vivo* demonstration of somatostatin receptors is very important for the prediction of therapeutic effectiveness of somatostatin analogs. But even somatostatin receptors have previously been detected on normal and activated lymphocytes and macrophages. So the somatostatin analogue octreotide is used successfully for the visualization of a variety of malignant lymphomas and granulomatous diseases [3, 4]. In our patient the Octreoscan positivity for mediastinal lymphadenopathies, 5 years after the resection for bronchial carcinoid, could have driven us to start an incorrect somatostatin therapy. Instead, since the serological examinations were all negative, we decided to obtain a histological diagnosis, before starting any treatment. We conclude that: 1. the octreoscan scintigraphy in the follow-up of resected carcinoids can give false-positive results and 2. in consequence, the mediastinoscopy is a discriminating investigation in case of suspected mediastinal lymphnodes carcinoid metastases.

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DIFFICULTIES WITH CT-GUIDED NEEDLE BIOPSY AND VATS, AS COMBINED APPROACH FOR THE DIAGNOSIS AND TREATMENT OF PERIPHERAL PULMONARY NODULES: A CASE REPORT

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Aim. To re-evaluate the use of CT-guided needle biopsy and VATS, as our combined approach protocol for the diagnosis and treatment of peripheral pulmonary nodules.

Methods and Results. We describe the case of a male smoking patient, 50-year-old, who came to our service for the histological diagnosis of a right pulmonary lesion incidentally revealed. He was submitted to our diagnostic and therapeutic protocol for peripheral pulmonary nodules, that is a combined approach of CT-guided needle biopsy, anchorage of the lesion and VATS resection. Difficulties with this technique can raise when: 1. the cytological CT-guided needle biopsy is not diagnostic, 2. the anchorage is not successful, 3. the malignancy of the lesion cannot be surely determined by the extemporary histological examination. In this patient all these difficulties were encountered.

Conclusions. We conclude that our diagnostic and therapeutic protocol for peripheral pulmonary nodules is not invalidated by this experience, even in consideration of the fact that we applied successfully the protocol in several previous cases.

Introduction

The use of CT-guided pulmonary needle biopsy and VATS in the diagnosis and the treatment of peripheral pulmonary lesions is problematic [1–3]. These techniques have got unquestionable advantages: the possibility of preoperative cytological diagnosis and the possibility of operating on patients with a limited respiratory reserve, than, usually, a higher tolerability and a shorter hospital stay. The difficulty in the application of VATS in the treatment of peripheral pulmonary nodulation lies in the fact that if the neoplasm does not appear on the lung surface, it is hard to find it. If the tumor does not determine the so-called “umbilication”, for the infiltration of the visceral pleura, it is very difficult to recognize it, due to the unsuccessful three-dimensional vision of the operative field and the impossibility of a direct palpation. This difficulty in identifying pulmonary nodules has been overcome by some pre- and intraoperative procedures. Among those preoperative, we could mention the labelling of the nodule with coal powder and/or methylene blue. Among the intraoperative procedures, we could mention the use of palpations with one finger or the palpator instrument and the use of intraoperative echotomography. According to our direct experience, the most effective methodology of reportation is certainly the CT-guided infission of an anchoring needle, which

almost always allows the reportation of the nodule to be resected. But it has to be pointed out that the "displacement" of this repere or pulmonary parenchymal lacerations seldom are present because of the extreme flexibility of the needle. So since it is possible to carry out CT guided transparietal biopsies, and since it is possible to perform limited resections of nodules, we have built up a protocol of diagnosis and treatment for peripheral pulmonary nodules. For this purpose we have decided to carry out, when we are dealing with peripheral pulmonary neoplasms, a CT-guided biopsy of the nodule itself with an extemporary cytological examination. On the basis of the cytological result we would continue, in the presence of a lesion susceptible of VATS treatment, to anchor the nodule, and the patient would undergo an atypical resection within 12/24 hours. If the examination showed a primitive pulmonary neoplasm, the patient would undergo a resective treatment via traditional thoracotomy [4]. Difficulties with this technique can raise when: 1. the cytological CT-guided needle biopsy is not diagnostic, 2. the anchorage is not successful, 3. the malignancy of the lesion cannot be surely determined by the extemporary histological examination. We describe the case where all these difficulties were encountered.

Methods

In November 1998 a male smoking patient, 50-year-old, came to our service for the histological diagnosis of a right pulmonary lesion incidentally revealed. A chest-X-ray performed in April in an other institution revealed a peripheral pulmonary lesion in the middle field of the right lung and the patient was submitted to a monthly chest X-ray in order to observe the evolution of the lesion. A CTscan performed in October, showed a round lesion with an irregular and polilobular perimeter and with 2.8×1.7 cm of diameter without lymphadenopathies. Therefore the patient came to our observation and we decided to propose him for the VATS resection since the small size of the lesion and its peripheral position. The patient was submitted to the anchorage of the nodule by a transparietal CT-guided needle, after the non-diagnostic cytological CT-guided needle biopsy, and the patient was resected by VATS. During the operation we realise that the needle was displaced in the interfissural space and the nodule was palpated at the periphery of the middle lobe. An atypical resection was then performed and since the perioperative histological examination revealed a mucinous cistoadenoma the operation was stopped. Unfortunately the definitive histological examination showed a mucinous (colloid) adenocarcinoma only after several investigations and the patient was submitted to a lobectomy.

Conclusions

The mucinous (so-called colloid) carcinoma of the lung is a rare malignant tumor. Grossly, the tumor is poorly circumscribed, soft, tan-to-gray mucoid lesion. Microscopically, it shows intraalveolar pools of mucin containing small clusters of atypical cells floating in the mucin and foci of neoplastic columnar epithelium lining scattered alveoli. This tumor probably represents a variant of bronchioloalveolar carcinoma and share the prognosis of that neo-

plasm. However, because its often bland histologic features and paucity of malignant cells, it may be difficult to diagnose as malignant neoplasm [5]. These considerations can give reason for the uncorrect diagnosis obtained by the perioperative histological examination. The failure of the cytological CT-guided needle biopsy and the unsuccessful preoperative anchorage should even be taken in account, as rare events that can happen applying our protocol. As shown in this case they can be overcome. For these reasons we conclude that our diagnostic and therapeutic protocol for peripheral pulmonary nodules is not invalidated by this experience, even in consideration of the fact that we applied successfully the protocol in other 67 previous cases [4].

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WAR INJURIES TO THE CHEST

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Aim. Presentation of our experiences in the treatment of war injuries to the chest at the Split University Hospital, Croatia, during the 1991–1995 war in Croatia and Bosnia-Herzegovina.

Methods. Retrospective analysis of clinical and surgical data on 439 (16.3%) patients with war injuries to the chest among 2693 treated battle casualties in general. The medical data from evacuation unit, transportation, emergency department and follow-up were observed and processed by basic statistical analysis.

Results. There were more explosive wounds than gunshot and puncture wounds (ratio 251/158/30). Penetrating injuries were found in 348 (79%) patients and nonpenetrating in 91 (21%) patients. There were 401 (91%) men and 38 (9%) women. Thoracotomy was performed in 98 (22.3%) patients, whereas conservative surgical methods (wound treatment, chest-tube drainage, appropriate fluid therapy, antimicrobial and atelectasis prophylaxis) were used in 341 (77.7%) patients. Mean time elapsed between injury and definitive surgical repair was seven hours (range, 1 to 48 hours). Recovery on discharge was recorded in 411 (93.6%) patients, 19 (4.3%) patients were referred to other institution for further treatment, and 9 (2%) severely wounded persons died.

Conclusions. The treatment of respiratory insufficiency and haemorrhage shock, and prevention of infection are the basis of management of these injuries. Prompt transportation, appropriate diagnostic methods and an adequate surgical treatment can markedly reduce mortality and complications rate in war injuries to the chest. Most war wound of the lung can be successfully managed by "conservative" surgical treatment. The recovery of lung function was similar in conservatively and operatively treated patients.

Introduction

Split University Hospital played a major role as a third echelon war hospital during the 1991–1995 war in Croatia and Bosnia-Herzegovina. During this time period, 2693 wounded from war areas were treated, 439 (16.3%) with injuries to the chest. With the exception of negligible number of patients, all patients were surgically treated by surgeons from our hospital, about two-third were operated on in field war hospitals [6, 7].

Chest injuries occupy a prominent place among war injuries, primarily for lesions to the vital organs, such as the heart, lungs, large blood vessels, esophagus or trachea [8, 9]. Wounds to the right side have been more frequently described, allegedly because wounds to the left side are more fatal. The aim of this presentation is to describe our experience and treatment outcome of war injuries to the chest, and to compare them with the data from other recent wars [1, 11].

Patients and methods

During the 1991–1995 war in Croatia and Bosnia-Herzegovina we treated 439 patients with injuries to the chest [5, 10]. Injured persons were predominantly men (ratio 401/38). The median age was 29 (23 among soldiers and 37 among civilians). Patients were classified by injury mechanism and by physiologic scoring on admission, according to the cardiovascular-respiratory elements of the Injury Severity Score (ISS) into moderately (ISS<50) and severely injured (ISS>50). ISS was <50 in 133 and >50 in 108 patients. Seventy-nine percent of the patients had penetrating injuries to the chest.

The mean time elapsed between injury and definitive surgery repair was seven hours (range 1 to 48 hours). Injured persons were transported from first echelon war hospitals by medical car or ship and later by air-transportation mostly. In our hospital patients were not treated under conditions of disaster care in general, although there were some elements of disaster present. In the beginning of war conflict we had limited resources, but the situation was much better later. Resource utilization analysis showed a great amount of blood products (average 1,050 ml per patient/range, 0 to 11,250 ml) and plasma expanding solutions used (average 3,750 ml per patient/range, 500 to 11,500 ml).

Seven-day antimicrobial chemoprophylaxis with penicillin and gentamycin was regularly initiated on admission. In case of lesions of serous membranes, metronidazole was simultaneously administered. Most of the patients (341) were successfully treated by means of conservative surgical treatment (wound treatment, chest-tube drainage, appropriate fluid therapy, antimicrobial and atelectasis prophylaxis). More aggressive surgical access, with thoracotomy, was performed in 98 (22.3%) patients. Indications for surgery included massive bleeding in 57 patients, massive air leak in 29 patients, esophagus perforation in 3 patients, heart injury in 4 patients and empyema in 5 patients.

Postoperative complications (Table 1) were successfully managed by a prolonged chest-tube drainage, respiratory exercises, prolonged wound care, decortication or a more aggressive antibiotic treatment. Mean hospital stay was 11 days (range, 4 to 43 days). Recovery on discharge was recorded in 411 (93.6%) patients. Nineteen (4.3%) patients were referred to other institution for further treatment. Nine (2%) severely wounded persons died; three due to irreversible hemorrhagic shock, two due to penetrating injuries to the heart and great vessels, and one due to rapidly developed gas gangrene. Two patients with injuries to the head died due to neurosurgical complications. These 9 patients were classified into ISS unsurvivable group of patients on admission.

Results

There were no statistically significant difference between injuries to the right and left side, but there were considerably more explosive wounds, than gunshot and particularly puncture wounds (ratio 251/158/30). Forty-four (9%) patients had an associated extrathoracic injury, which considerably aggravated the prognosis and treatment outcome. In addition to minor or major war wounds of thoracic wall, with or without costal fracture ($n = 173$; 36%), the lungs were the most common injured organ ($n = 389$; 82%), followed by diaphragm

Table 1
Complications in 439 patients with war injuries to the chest treated
in Split University Hospital, Split, Croatia

Complication	No. (%) of patients	
Prolonged pleural effusion		
> 1000 ml (24 hours)	11	2.51
> 1500 ml (24 hours)	12	2.73
Prolonged air leak		
> 5 days air leak on chest tube	6	1.37
> 7 days air leak on chest tube	2	0.45
Atelectasis		
lobary	3	0.68
pulmonary	2	0.45
Secondary wound infection		
minor	10	2.28
major	7	1.59
Secondary empyema		
acute	5	1.14
chronic	4	0.91
Bronchopneumonia		
segmentary	4	0.91
lobary	4	0.91
massive	3	0.68
Other	7	1.59
Total	80	18.20

($n = 35$; 7.5%), heart ($n = 5$; 1%), esophagus ($n = 5$; 1%), large blood vessels ($n = 4$; 0.8%), trachea ($n = 2$; 0.4%) and mediastinum ($n = 3$; 0.6%). Type of surgical procedures and treatment in patients with lung injuries are shown in Table 2. Clinical manifestations included lung lacerations and contusions, air or liquid collections, or their combinations. These entities were determined on the basis of clinical signs, various types of X-ray examinations and laboratory tests. So-called conservative surgical therapy (wound treatment, chest-tube drainage, antimicrobial and atelectasis prophylaxis) was sufficient in majority of cases. More extensive injuries to the lung and other intrathoracic organs were treated by immediate or sometimes delayed thoracotomy. Wedge resections were the most common procedures undertaken, while major lung resections were only exceptionally done.

The patients with heart lesions showed the most dramatic clinical picture. They were all admitted in a state of severe hemorrhagic shock or pericardial tamponade, and were successfully operated on by suturing and patch of the heart lesions, without extracorporeal circulation. It should be noted that cardiac surgery had not previously been performed in the Department, so these injuries presented a great challenge to us. Lesions to the esophagus and the trachea particularly intriguing for their uncertain outcome were, fortunately, quite rare. We performed temporary double exclusion of the esophagus, followed by gastric interposition

after partial esophagectomy in three patients and simple suturing with pericardial protection of the esophagus in one patient. Lesions to the trachea were treated by end-to-end anastomosis, after debridement of the damaged part of the organ.

Lung function analysis showed no statistically significant difference in the lung function recovery between the patients with conservative and more aggressive surgical treatment.

Table 2
Types of surgical procedures and treatment in 389 patients
with lung injuries treated at Split Clinical Hospital

Surgical procedure	N	%
Wound treatment	113	29.0
Drainage	187	48.1
Thoracotomy	62	15.9
Atypical resection	35	9.0
Segmentectomy	18	4.6
Lobectomy	5	1.3
Pneumonectomy	2	0.5
Decortication	2	0.5
Thoracophrenolaparotomy	19	4.9
Atypical resection	10	2.5
Segmentectomy	7	1.8
Lobectomy	2	0.5
Rethoracotomy	8	2.1
Lobectomy	2	0.5
Pneumonectomy	2	0.5
Decortication	4	1.0
Total	389	100.0

Discussion

Changes in military strategy and use of weapon types, on the one hand, and advance in thoracic surgery and intensive care medicine, on the other hand modified certain concepts in the treatment of injuries to the chest [2, 3]. The change from the concept of obligatory thoracotomy to conservative surgical treatment, has much bearing on the treatment of chest injuries. Properly performed resuscitation, rapid transportation, experience and adequate equipment of the surgical team play a major role in the survival outcome [4–6]. We performed 98 (22.3%) standard thoracotomies, which is slightly more than in peacetime conditions and similar to other reports on war injuries to the chest. Distribution, classification, therapeutical methods, and observed complication and mortality rate of our patients correspond to the literature data [1, 5, 11]. The predominance of the injured civilians in the non-penetrating group of patients was expected. The military personnel, as it could be presumed, sustained a higher percentage of gunshot injuries.

We considered chest-tube drainage a crucial method to start the treatment in all patients with intrathoracic air-liquid collections. The cases with massive air leak or bleeding should be immediately treated by thoracotomy [1, 7, 8]. In the majority of thoracotomised patients, wedge resections were sufficient to perform excellent air and hemorrhage control. Major lung resection were only exceptionally needed. Concerning the missiles and other foreign bodies retained in the lung tissue, we do not think that thoracotomy is necessarily indicated for their removal. In such cases we preferred VATS procedure, primarily for psychological disturbances or pending complications.

Cardiac, esophageal and tracheal injuries are fortunately very rare, but in their treatment should always be involved the most experienced and well-equipped surgical team.

After definitive stabilization of respiratory function (i.e., 3 to 6 months after the injury), almost a complete normalization of blood gases and significantly improved restrictive pattern of lung function were found in both conservatively and operatively treated patients. Three months after the surgery, lung functions of the operatively treated patients were at the lower limits of normal values. There was no significant difference in the functional improvement between conservatively and operatively treated patients. The recovery of definitively sustained respiratory defect our patients was not significantly related to the mechanism of injury, despite the fact that mortality was correlated to the injury severity score [2, 4].

In conclusion, our results confirm that appropriately treated war injuries to the chest have the same functional effects as the similar civilian injuries in spite of the increased risk of complications.

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LIMITED RESECTION OF LUNG CANCER

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Aim. Follow-up results after a limited resection (segmentectomy, wedge resection of lung) are represented in this paper according to the TNM classification and histological type of tumour.

Methods. Since 1980 until 1997, 1173 patients (pts) with lung cancer were treated surgically. 42 (36 males and 6 females) of them underwent a limited resection of lung. Distribution of pts according to the TNM classification was: T1N0 was found in 12 pts and T2N0 in 11 pts, T2N0 in 11pts, T2N1 in 7 pts, other 12 pts had N2. Sqamous cell carcinoma was in 19 pts, Adenocarcinoma in 13 pts, Small cell carcinoma in 9 pts, one pt — Carcinosarcoma. After the operation 9 pts received radiation therapy, 9 pts — chemotherapy.

Results. The best follow-up results were in pts with T1-2N0 who received adjuvant therapy: median survival was 45.7 months. The pts, treated only surgically, lived 36.7 months. The pts with N2 lived only 9 months.

Conclusion. 1. A limited resection of lung with lymph nodes dissection can be performed only in cases T1-2N0. 2. In cases with N0 of undifferentiated carcinoma (anaplastic, small cell) adjuvant therapy ought to be given after operation. 3. In cases of N1, N2 we recommend adjuvant therapy regardless of histological type of tumour.

Introduction

In the past 10 years limited resection of lung was introduced in the treatment in stage I of lung cancer. It has been proposed as a beneficial treatment in patients with poor general condition, especially with respiratory insufficiency. The first condition to perform limited resection (segmentectomy, wedge resection) is a small peripheral tumour, without nodal involvement [1]. But in some cases when patients suffered from pulmonary reserve and not able to tolerate a lobectomy, segmentectomy and wedge resection have been used [3]. Many surgeons are afraid that such limited resection could increase the recurrence rate of the tumour. On the other hand there are not many reports in literature about adjuvant therapy (radiation therapy, chemotherapy) after limited resection of lung. In our paper we present our data on limited resection of lung and the survival of our patients according to TNM classification and histological type of tumour.

Patients and methods

In Thoracic Department of Surgery of Lithuanian Oncology Center since 1980 until 1997, 1173 patients (pts) with lung cancer were treated surgically. 42 of them underwent a limited resection of the lung (segmentectomy and wedge resection). There were 36 male and 6 female pts with a mean age of 57.1 years (range between 42 and 79 years). The histological diagnosis was: squamous cell carcinoma in 19 pts, Adenocarcinoma in 13, Small Cell Lung Cancer in 9 and one patient had Carcinosarcoma. Distribution of pts according to the TNM classification was: pT1N0M0 was found in 12 pts, pT2N0M0 in 11 pts, pT2N1M0 in 7 pts, 12 pts had N2. After the operation 18 pts received adjuvant therapy: 9 pts had been treated with radiation therapy, 9 pts — chemotherapy. In cases of N1 and N2 two weeks after operation the patients were treated with radiation therapy: in the region of mediastinum the daily dose 2 Gy during 5 days. Summit dose was 45–50 Gy. In all cases (N0, N1–2) of Small Cell Lung Cancer chemotherapy was given to patients after operation. Morphological diagnosis of Small Cell Lung Cancer was confirmed only after surgery. Patients with Small Cell Lung Cancer were usually given a combination of chemotherapy. Before 1990 Cyclophosphamide, Doxorubicin Vincristine were used and at present Cisplatin is usually administered. In the first year after operation four courses of chemotherapy were given to patients.

Results

The best follow-up results were in patients with pT1-2N0M0 who received adjuvant therapy after operation: Median survival of patients was 45.7 months. The patients of the same group according to TNM classification, treated only surgically, lived 36.7 months. The patients with pT1-2N1M0 lived shorter: median survival was 26.4 months. Most of these patients received radiation therapy after operation. Two patients were treated only surgically: one patient died 6 months after operation, the other has been living for 49 months. The median survival of pts with N2 was very short. They lived only 9 months, but one patient who was treated after the operation with radiation therapy has been living 140 months. 30 pts of 42 died due to the recurrence or progression of tumour. 10 pts have been living without any recurrence of disease, most of them had pT1-2N0. 4 patients had squamous cell carcinoma, 5 — Adenocarcinoma, one — Small Cell Lung Cancer. The latter tumour was pT2N0M0 and after operation was treated with 4 courses of chemotherapy and he has been living for 73 months without the recurrence of tumour.

Discussion

We agree with other authors [2–4] that a limited resection of lung could be performed in cases of T1N0-1M0 with lymph nodes dissection. But in some cases of T2N0 when patients suffered from poor pulmonary reserve and were unable tolerate a lobectomy, it is possible to perform a limited resection of lung. Our follow-up results in cases pT2N0M0 are satisfactory. In cases of pT2N1 we recommended adjuvant therapy after operation to patients with

Non Small Cell Lung Cancer radiation therapy and with Small Cell Lung Cancer — chemotherapy. In our opinion in cases of N2 a limited resection of lung is not recommendable.

Conclusions

1. Limited resection of lung with lymph nodes dissection can be performed only in cases of T1–2N0M0. 2. In cases with N0 of undifferentiated carcinoma (anaplastic, small cell) adjuvant therapy ought to be given after operation. 3. In cases of N1, N2 we recommend adjuvant therapy regardless of the histological type of tumour.

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A CASE OF A PULMONARY ARTERIOVENOUS MALFORMATION TREATED BY LOBECTOMY

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We present a case of pulmonary arteriovenous malformation (PAVM) in central localisation (type IIIa) of the upper lobe of the left lung. We discuss diagnostic (Doppler ultrasonography, CT, MRI, angiography) and therapeutic (embolization therapy) options and a current role of surgery in this uncommon clinical condition. Our patient underwent left upper lung lobectomy as an ultimate therapeutic method without subsequent morbidity. We conclude that surgery is a safe method of treatment of pulmonary arteriovenous malformations in selected cases i.e. when PAVM is solitary and of great diameter (more than two centimeters) and where the risks of embolotherapy are high.

Introduction

Pulmonary arteriovenous malformations (PAVM) are relatively rare vascular anomalies of unknown etiology. This disease occurs in about one quarter of patients with Rendu–Osler syndrome (hereditary hemorrhagic telangiectasia). Recent investigation in genetics mapping has found genetic defects at three chromosomes specific for Rendu–Osler syndrome [1]. Genetic anomalies are expected also in other patients with PAVM. Due to the progress in interventional radiology embolization therapy is the method of choice for most of the patients. Nevertheless, surgery still plays important role in selected cases. We present a case of a patient with large centrally located single arteriovenous aneurysm treated by upper lobectomy of the left lung.

Methods and results

Sixty-two-year-old male was referred to our surgical department. He had been investigated for sideropenic anemia and chronic erosive gastritis with bleeding five months ago. Therapy with omeprazol was successful. He had coronary artery disease and hypertension, too, because he complained of the pressure pain of the left thorax and the chest X-ray was made. It revealed a centrally located shadow of five centimeters in diameter. Bronchoscopy showed only a slight dilation of the left lower lobe bronchus. Tumour markers were negative. Sideropenic anemia was still present, other biochemic and hematologic investigations were

completely normal. Spirometry was without substantial abnormality. An arterial blood sample analysis showed no acid-base chemistry disturbances. Slightly lowered oxygen saturation was repeatedly measured (93%), this result correlates with paO_2 9.0 kPa on room air. No shunt fraction measurement was made. Standard CT scan led to the suspicion of a pulmonary arteriovenous malformation. Neither colour Doppler ultrasound nor pulmonary angiography were specific. The yield of helical CT was representative: an aneurysmatic arteriovenous malformation 51 mm in diameter was observed, with afferent artery 5.5 mm in diameter and efferent vein 4.5 mm in diameter. Arterial root of the fistula was the left pulmonary artery, the fistula was drained to the upper lung vein. According to the PAVM classification by Anabtawi [3], our case was recognized as the type IIIa malformation. The decision about surgical treatment of the disease was made. The procedure was realized by left anterior thoracotomy in lateral decubitus position. Two veins draining aneurysm to the left upper pulmonary vein were isolated. Left upper lung lobectomy was made because of the central position and diameter of the malformation. The postoperative course was uneventful. The patient was discharged completely healed with oxygen saturation 96% on room air.

Discussion and conclusion

PAVM is an uncommon clinical problem, currently rarely referred to the thoracic surgery departments. This is not only due to the efficiency of the radiologic embolization therapy [5], but also to the poor symptomatology in the great part of the patients. On the contrary complications as strokes, transient ischemic attacks, brain abscesses, seizures or hemoptysis are reported relatively often. Our patient had chest pain, murmurs on the site of the malformation, anemia and previously reported gastrointestinal hemorrhage. No other clinical symptoms or signs of the disease as dyspnea, hemoptysis, epistaxis, clubbing or cyanosis occurred. No clinical signs of the Rendu–Osler disease were observed.

After routine chest X-ray the Doppler ultrasonography (with intravenous contrast preferably) is required as a first line investigation with a great sensitivity [4]. In our case the aneurysm was detected but the exact nature of the feeding artery and draining veins was not discovered. Conventional angiography was not specific, but low sensitivity and specificity is mentioned in the literature, where angiography is able to detect about 60% of PAVM. Also the high yield of the helical CT investigation (at best in three dimensional mode) has been observed. Magnetic resonance imaging of PAVM has not been studied extensively.

Because of the high morbidity and mortality of the untreated PAVM in contemporary studies, treatment is indicated, when PAVM is more than 20 mm and afferent arteries more than 3 mm wide. Such malformations have been documented to cause strokes, ischemic attacks and brain abscesses. Embolization therapy is the treatment of choice in the majority of all cases, but in case of large PAVM it is appropriate to consider surgery [2], because the risk of paradoxical embolization during embolization therapy in these cases increases and there is also potential for other serious complications as stroke, lung infarction etc. Surgical or embolization therapy is very risky in case of underlying lung hypertension, which can dangerously increase after the procedure. We decided for the surgery because of the diameter of the malformation and because of the limited experience with the embolotherapy in our

conditions. Due to the nature of the PAVM anatomic lung resection was necessary, but the postoperative course was without any problem and the oxygen saturation increased.

We conclude that surgery is a safe method of treatment of pulmonary arteriovenous malformations in selected cases i.e. when PAVM is solitary and of great diameter and where the risks of embolotherapy are high.

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PULMONARY LEIOMYOMATOSIS IN WOMEN AFTER HYSTERECTOMY FOR UTERINE MYOMA. BENIGN METASTASIZING LEIOMYOMA?

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Introduction. Leiomyomas, which usually occur multilocular in uterus, can develop even if rarely in other organs with smooth muscle cells. The tumour is considered benign; 2 case reports supports the hypothesis that uterus myoma could metastasize, and in the metastasis sites grow invasively.

Methods. 2 female patients 44 y. and 29 y. old were admitted to our clinic for MPL. Due to increasing tumor size respectively dyspnea, they were operated on. Multiple nodules of the left lung in one case, and a mediastinal tumour in the other were resected; resected tumour was histologically examined. Results: In both cases it was a matter of well-differentiated leiomyosarcoma. The mediastinal tumour has already invade the *N. phrenicus*. Post-operatively there were no complications. Patients discharged in well-doing state, medical control one year later revealed no new growth.

Conclusion. Multiple pulmonary leiomyomas are rare, they occur in sexually mature women in coincidence with uterus myoma. Even though many authors assume that MPL is a lung metastasis of benign tumours, the pathogenesis is still hypothetical. Supporting this thesis is the hormone dependence of both the uterine and the pulmonary tumours; against it, is that extrapulmonary locations are too rarely observed. The still open pathogenetical question has no therapeutical consequence. Whenever technically possible, a radical, parenchyma-saving surgical therapy should be the first choice. Otherwise hormon-ablation is a good alternative.

Introduction

Leiomyomas arise from smooth muscle cells. Histomorphologically they are benign tumours. Under hormone action, they occur multilocular in the uteri of sexually mature women. Even though more rarely, they develop also in other organs with smooth muscle cells, like gastro-intestinal tract and lungs. Under these circumstances, strict identification of multiple benign leiomyoma as primary or secondary tumours is not possible. We were confronted with two cases of multiple hormone-dependent pulmonary leiomyomas, which support the suspicion, that uterine myomas could metastasize, and in the metastasis sites grow invasively. In these cases, they should be considered malignant. Since the clinical features of pulmonary leiomyomatosis are generally unknown, both cases should be presented and discussed, taking into account the international medical literature.

Case 1: Patient J. H., 37 y. In 3/1987 at the age of 28 y. presented with dysmenorrhea lower abdominal pain. Due to uterine myomatosis underwent hysterectomy Histology: Paucicellular loosely diffuse fibrotic leiomyoma with regressive changes, no signs of malignancy.

nancy. 6/1996: acute retrosternal pains, effort dyspnea. Multiple left pulmonary nodules, up to 5 × 8 cm in size were radiological identified, no landmarking clinical findings. NSE, CYFRA 21-1 and CEA were within normal range. All other laboratory findings were also normal. Spiral-CT: One nodule (3 cm), in the left third segment, 4 nodules (up to 4 cm) in the left inferior lobe, minor amount of pleural fluid, mediastinum and right lung free of nodules. MRT: semiliquid nodules as in necrosis. Vaginal sonogram: Bilateral ovarian cysts, the tumour marker for ovarian carcinoma (CA 125) was raised, consequently a diagnostical laparoscopy was performed: no sign of malignancy, benign functional ovarian cysts. Breasts without pathological findings. Lungs: severe obstruction positive broncho-spasmodic test, hypoxemia. A CT-guided puncture revealed Fibrotic Leiomyoma with paucicellular central necrosis. Isolated mitoses raise the suspicion of high (well) differentiated leiomyosarcoma. Due to increasing dyspnea, we put the indication for a surgical therapy, a pneumonectomy, had to be calculated because of the central position of the nodules. 8/1996: left posterolateral thoracotomy, removal of multiple peripheral rubbery grey-white nodules. Atypical stapler-wedge-resection of the upper lobe. Tangential stapler-resection of two nodules in the inferior lobe, tangential resection 3 nodules in the lingula (90-mm-stapler). Two nodules situated deep in the inferior lobe parenchyma were removed with thermocauter. The parenchymal wounds were let open. (RO-Resection!?). Postoperatively prolonged drainage due to increased exudation. The patient was discharged in good condition and no further treatment was necessary. Until today no new pathological growth is detected. No complains.

Case 2: Patient A. H., 44 y. In 1982 at the age of 29 underwent hysterectomy with removal of the right adnex for uterus myomatosa and suppurative adnexitis. These were complicated by signs of menopause that were relieved by substitution therapy with Estradiol. 11/1989: Bilateral multiple nodules, pleural effusion, treated as tuberculosis with anti-tuberculous drugs and steroid. Due to continued growth of the nodules, palliative resection of a fist-sized left intrapulmonary tumour (outward operation). Histology: differentiated, mesenchymal proliferative, multicellular, fibrotic leiomyoma. A correlation with the operated uterine myoma was discussed. The substitution therapy with Estradiol was discontinued. The size of the nodules was unchanged until 1994, when increasing growth of a left anterior mediastinal tumour was detected. 1/1996: Total tumour extirpation, tangential resection of the lower lobe, resection of the invaded *N. phrenicus*. Histology and histochemistry: revealed a highly differentiated Leiomyosarcoma. The pathologist stated that without knowledge of the origin of the specimen, he could have mistake it for benign leiomyoma. The tumour was hormonoreceptor-positive. The patient who was overanxious refused to continue the treatment with GNRH-Analoga. She was discharged in good condition the other nodules remained constant in size and no clinical pulmonary manifestations were noted up to 2/1997.

Discussion

Leiomyomas may occur in all organs with smooth muscle cells, including the trachea and bronchi. Solitary pulmonary leiomyomas are almost always primary. According to White et al. [6], they represent 50% of all pulmonary leiomyomas. The other half are multiple, and develop in peripheral sites considered typical locations for metastasis. Therefore they could

be considered secondary. About 6% of all lung tumours are benign tumours, from these, only 2% [4, 6] are leiomyomas. Leiomyomas are more frequent in females, with an average of 35 y., and a female to male ratio of 1.5 : 1; whereas leiomyosarcoma are more frequent in males with an average of 50 y. and a ratio of 2.4 : 1. The high frequency of multiple pulmonary leiomyomas in females who underwent hysterectomy is well documented since 1902 [5]. The time elapsed between hysterectomy and the development of the pulmonary leiomyomas is in average 10 y. in most cases. It should be noted that all women at the time of the hysterectomy were very young, this applies for our cases, 27 and 29 y. Macroscopically leiomyomas in the lungs appear as round-shaped well limited nodules, of hard consistency, grey-white in colour and with fibrillar concentric structure. Pulmonary leiomyomas may occur in a micronodular (diffuse) form, or as macronodules, mostly 3 to 4 in number and up to 3 cm in size reaching not rarely 10 cm. Until today, there is no way neither macro- nor microscopically, to strictly differentiate between primary and secondary pulmonary leiomyomas. Regardless of the location within the lung, P.L.M. are histologically highly differentiated, with isolated mitoses and minimal atypical nuclei. They are composed of palisading bundles of spindle-shaped cells containing oblong oval-shaped tubular nuclei. Disturbed trophic conditions induce central necrosis and pseudocysts formation. P.L.M. developing in females with uterine myomas, are characterised by the presence of estrogen-gestagen-receptors. These were put in evidence in our patient no. 2. Cramer *et al.* [3] studied the S-Phase-Fraction and Estrogen-Receptors in uterine myomas and P.L.M.; they found them identical. Furthermore elements of glandular-epithelial structures (leiomyomatous hamartomas) and fibrous tissular components (fibroleiomyoma), were found both in pulmonary and uterine leiomyoma. They present two different forms, a pure mesenchymal and a mixed one, the latter was in 90% found in women. The multiple pulmonary tumours of both histological entities correspond well with the uterine myomas, but not with solitary endobronchial leiomyomas. This raises the possibility of multiple pulmonary leiomyomas being a metastatic disease. The following observation supports this possibility; the time elapsed between hysterectomy and the diagnosis of P.L., the peripheral localisation of M.P.I., the extra pulmonary extension to pleura and mediastinum (Case no. 2) and subcutaneous tissue and the invasive character of growth observed in our cases. Horstmann *et al.* [4] described the presence of tumours in large veins, this could explain the mode of extension of these tumours. The minimal mitoses in correlation with the presumed metastasis raise the possibility of the tumour being a well-differentiated leiomyosarcoma with low malignancy grade. Lack of cellular pleomorphism and mitoses, in addition to the fact, that in most cases no metastases in other organs than the lungs was encountered, do not support the diagnosis of a sarcoma with a low malignancy grade [3]. Since the pulmonary leiomyomas have clinical features similar with those of benign tumours, they become distinguishable from the classical leiomyosarcoma during their course. Burghardt *et al.* [2] observed that the nodules occur just in alveolar interstitium, where smooth muscle cells are absent, providing evidence of "neoplastic diathesis". The nodules have a limited growth in size therefore any further progress of the disease is expressed by development of new nodules. Untreated M.P.L. have a slowly progressive course lasting in some cases over several decades. This was observed also in women in menopause. Schata *et al.* [5] described a fast progressive case of a 34-year-old woman, who died 4 years after a hysterectomy. All these open questions have no therapeutical consequence. Wherever possible a radical paren-

chyma-saving surgical extirpation, as in metastases, is the treatment of choice. The operation serving in the same time as diagnostico-differential procedure. Multiplicity, size and localisation of the nodules limit in some cases the radicality of the surgical resection as in our patient 2. Tumour mass reduction is in such situations a founded indication. Uterus myomas, has been known since long, as hormondependent; similar behaviour of the P.L. was the reason for initiation of hormon-therapy in inoperable cases. Among hormone-ablative measures, oophorectomy was the most effective. Horstmann *et al.* [4] observed regression of P.L. and uterus myoma during gravidity, explained by a high progesterone level. This observation contrasts with that of Evans *et al.*, that progression of the disease continues under progesteron-therapy despite a high progesterone-receptors density in the pulmonary nodules.

Conclusion

- Multiple pulmonary leiomyomas are rare, they occur in sexually mature woman in coincidence with uterus myomas. Both tumours are hormone-dependent, they are histologically identical.
- The mesenchymal origin from smooth muscle cells is known, even then, when beside the pure mesenchymal tumour structure a mixed form (glandulo-epithelial) indicates all Germ-layers as origin implicating the expression of "leiomyomatosal hamartomas".
- Several different entities, help separate the clinical features of multiple pulmonary leiomyomas from those of lymphangioleiomyomatosis, of leiomyosarcomas, of solitary tracheo-bronchial leiomyomas and fibroleiomyomatosal hamartomas.
- Even though, many authors assume against valid definition and medical experience that multiple pulmonary leiomyomas, are lung metastasis of a benign uterine tumour; the pathogenesis is still hypothetical.
- The ability of generally benign considered tumours, like uterine myomas (probable high differentiated sarcomas with low malignity grade) to metastasize in the lung, is supported by: the hormone dependence of both, the uterine and the pulmonary tumours by the peripheral location in the lung (typical for metastasis). In addition the time elapsed between the hysterectomy and the diagnosis of the multiple pulmonary leiomyoma, as well as the extrapulmonary extension (pleural, mediastinal) and the intravenous growth.
- Not in favour of this hypothesis are following: other extrapulmonary localisations are very rarely observed (characteristic for leiomyosarcoma); histologically identical solitary leiomyomas were documented apart from a uterine myoma, in women and in men and they never invade the mediastinum, or the loco-regional lymphatic nodes.
- Untreated, the disease is slowly progressive. In a small number of patients, a spontaneous regression can be observed in correlation with hormone-status changes (menopause, pregnancy).
- The still open pathogenetical question, has no therapeutical consequence. Whenever technically possible, a radical parenchyma-saving surgical therapy should be the first choice. This would slow the course of the disease in the majority of cases. If surgery is not indicated a hormone-ablative treatment (bilateral ovariectomy, radio-castration, LHRH-Analoga) may reduce regression.

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CATAMENIAL PNEUMOTHORAX — 3 CASE REPORTS AND VIEW OF LITERATURE

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Introduction. The unusual correlation between chronic recurring spontan pneumothorax and the menstrual cycle, was first presented by Maurer in 1958. In our clinic we had 3 cases in 5 years. The anamnesis shows that this syndrome is unknown to many of our colleagues. Not mentioned in several standard textbooks, warrants our attention.

Methods. In 5 years we had 3 cases of C.P., all of them had already on admission, at least one recurrence; all of them had right sided thoracic pain and dyspnoea. They undergone video-assisted thoracoscopy, with histological examination of diaphragm specimen. Gynaecological consultations was followed by hormonal therapy and follow up.

Results. In all 3 cases we found no signs of lung defects or bullae, instead, we identified diaphragm defects of different extension, even a liver prolapse in one of the cases. Endometriosis extra genitalis could be diagnosed in only one case which undergone a hysterectomy 8 years before.

Conclusion. A spontaneous pneumothorax which recurs in correlation with menses has a pathogenesis which concern only women, that is why is referred to as catamenial. Our experience supports the hypothesis, that air in the pleural cavity originates from the peritoneal one, arriving here via uterus and tuba. Beside the symptomatic therapy there is an etiological one, by inhibition the menstrual cycle. Thoracosurgical intervention could help preventing recurrence, and contributes in clarifying the pathogenesis.

Introduction

The correlation between the chronic recurring spontaneous pneumothorax and menstrual cycle was first described 1958 by Maurer [3]. But Lillington was who used in 1972 the expression "catamenial pneumothorax", deriving it from the Greek "catamenien" which means, the monthly. In 5 years, we had only 3 cases of catamenial pneumothorax; that is a modest number for a special clinic, but not when we consider the published cases in the literature. Patient anamnesis shows that many of our colleagues are not familiarized with this syndrome, which is still not considered in several standard textbooks of thoracic surgery. In so much that the publication of our experience is justified, even when a complete explication of the pathogenesis could not be presented.

Patients and methods

Case 1: Female patient S.B., 40 years, gravida 2, para 2, normal gynecological finding 4 months before. Since 5 years recurring dyspnea with right-sided thoracic pain. The symptoms led the patient to the chiro-practicer without long-standing amelioration. In 3 episodes a pneumothorax was identified on a chest radiograph. The correlation between the onset of the menstruation and the pneumothorax was finally noticed by the patient herself. On admission she complained of right-sided thoracic pain, emphasizing the onset of the menses. Considering the recurrence, we carried out a video-assisted thoracoscopy. No bullae or lung leakage was detected, instead we found several small-sized diaphragm defects which were resected and closed. No postoperative complication. No histological evidence of endometriosis.

Case 2: Female patient A.M., 39 years, gravida 0, para 0, normal gynecological finding, 6 months before. 3 years ago, the first episode of a right-sided pneumothorax. For recurrence she undergone thoracoscopy in a district hospital, where no pathological changes were detected. Due to a second recurrence the patient was admitted to our clinic. During the video-assisted intervention with adhesiolysis and partial pleurectomy, we found no pathological changes. After a primary smooth postoperative course, a basal right-sided pneumothorax has developed on the seventh p.o. day, 2 days after the menstrual cycle. Endoscopical we identified several small-sized defects of the centrum tendineum, occupying a surface of 2×2 cm. This area was resected and closed. No p.o. complications. No histological evidence of endometriosis.

Case 3: Female patient R.R., 51 years, gravida 0, para 0, hysterectomy 8 years before, due to persistent bleeding. 5 years ago, admission for thoracic pain and dyspnea with right-sided pneumothorax. Despite thorax-drain therapy no complete lung expansion; the patient undergone video-assisted endoscopic adhesiolysis, and pleurodesis by electrocoagulation. Intraoperatively we found small-sized water-clear blisters on the diaphragm surface, among other livid-coloured ones while the lung, was free of pathological changes. Most of the blisters were removed. Histologically: Evidence of endometriosis extragenitalis. The long-term therapy with gestagen, ordered by the gynecologist proved ineffective was replaced by GnRh-Analoga. 2 months later, undergone left salpingectomy due to endometriosis of the small pelvis. Danazol was given for 6 months. 2 years after the endoscopic operation right thoracal pain occurred. The chest radiograph revealed recurring pneumothorax 3×3 cm half-round opacity over the diaphragm, this was identified intraoperatively as liver prolapse through defect of diaphragm. No lung leakages or bullae were encountered. The diaphragm defect was closed. Histologically: no evidence of endometriosis.

Discussion

The syndrome of catamenial pneumothorax is characterized by its occurrence 24 hours before or 48 to 72 hours after the initiation of the menstrual cycle [2, 5]. During this period, a chest radiograph should be made, since the reabsorption of the pneumothorax during the symptom-free interval follows fastly. In the literature, we find cases with 40 episodes before

the diagnostic was made. The affected women (usually between 30–40 years old), complain uniformly of thoracic pain and dyspnea. Similar with the hydrothorax in Meigs-syndrome [5]. In more than 90% is the right side involved [5]. The diagnosis can be proved only through surgery. Maurer proposed in one of the first thesis about the pathogenesis [3] that air passes through the cervix uteri which is free of mucus plug during the menses, and the tubes, reaching the peritoneal cavity. From there air penetrates the diaphragm through preexisting congenital defects [3, 5]. Our first 2 cases support this thesis. This thesis looks plausible, since patients with catamenial pneumothorax after tube ligation or hysterectomy had no more complains. Additional support also is the fact, that in our cases no pulmonary changes could be identified. But Soderberg [4] described cases with pneumothorax after hysterectomy, as in our case 3. Downey et al. [1] described a case of pneumoperitonum seen on CT, during the third and the fourth episode of recurring pneumothorax, believing the air passes from the chest into the abdominal cavity through diaphragm defects. Van Schill et al. [5] believe that during the menses an elevated prostaglandin F₂ level in serum, producing vasoconstriction and bronchospasmus could induce alveolar rupture and pneumothorax. They believe also that hormonal changes can favour ruptures of existing bullae which usually could not be seen. As we know from our rare cases in the past, the thoracic endometriosis which involve lung pleura and diaphragm [5] could induce spontaneous menses-associated pleural haemorrhage, but they were never accompanied by pneumothorax. Knowing that the endometriosis even extragenital is a dynamical process, we consider its histological evidence in 1/3 as very relevant. Yeh [6] described 2 different groups: the pleural-diaphragmal, usually young nullipara women presenting most often an abdominal endometriosis, and a typical right-sided recurring pneumo- or haemopneumothorax [5], and the smaller group of older patients with anamnesis of gravidity, operative delivery and diagnostic or therapeutical interventions. The major symptom here is a cycle-dependent haemoptysis [5]. Unclear is also the pathogenesis of the extragenital endometriosis. Van Schill et al. [5] believe that menstrual blood passes through the fallopian tubes into the peritoneal subphrenical cavity, and suppose existence of diaphragmal defects, to explain the intrathoracic dissemination, not excluding hematogenous or lymphogenous disseminations after operative trauma of the uterus. New formation of endometrium from coelom-epithel rests is also discussed [5]. The thesis that endometriosis foci can result in diaphragmal defects [5] is supported by our intraoperative finding. Defects of the visceral pleura which could result from endometrial cell desquamation [5], were not identified. Therefore the occurrence of a pneumothorax in our case 3 remains mysterious. Generally well-known that a spontaneous pneumothorax is a symptom of lung or pleura disease and its treatment being principally symptomatic. This fact is also valid for the treatment of the catamenial pneumothorax: induction of a total pleural space obliteration (pleurodesis) with different means. Most reliable one is the open thoracotomy. Beside reliability in recurrence prevention, it helps clearing the pathogenesis and make it possible to close the diaphragm.

The endoscopical pleurodesis by initial partial pleurectomy or electro-coagulation, and the chemical pleurodesis, could not prevent the recurrence. They remain in some cases, any how accepted as alternative for the surgical intervention. Despite the uncertainty about the pathogenesis, the catamenial pneumothorax can benefit of a causal therapy: suppression of the cyclical activity of the endometrium with hormonal therapy (Danazol, oral contraceptive,

progesterone, GnRH-antagonists [5]), but recurrence occurs at the end of this hormonal therapy. We are convinced that this pneumothorax represent no life threatening disease; but its repeated occurrence is troublesome. A combination of causal and symptomatic therapy offers the best guarantee.

Conclusion

— A spontaneous pneumothorax, which reoccurs in correlation with menses, should be suspected to have a pathogenecity concerning only women.

— This disease is still unknown to many of our colleagues so that, the affected women describe on admission a long anamnesis and wrong tracks.

— Until today no definitive generally accepted pathogenesis is known.

— Our experience support the hypothesis that air, reach the peritoneal cavity per vias genitalis. From here it traverses the diaphragm disseminating in the pleural cavity.

— More indices lead to the conclusion, that an extragenital endometriosis could be the predecessor of the C.P., even when its evidence was not achieved in all cases. In so far, an additional causal therapy by suppression of the hormonal cycle could be of benefit.

— It is not known whether this therapy is enough, but a thoracosurgical intervention is reasonable. It can prevent recurrence and before all contributes to clear the pathogenesis. The disease is not life threatening, but the repeating thoracic complaints are in the foreground. When they occur, a chest radiograph should be ordered to obtain immediately the diagnosis.

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ISOLATED CHYLOTHORAX AFTER PENETRATING TRAUMA

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A case is presented with a left traumatic chylothorax, secondary to penetrating thoracic trauma, treated by conservative therapy. With this clinical report and the review of the literature, it is concluded that conservative management should be initially performed as alternative to surgical approach.

Introduction

Chylotorax is intrapleural accumulation of chyle, caused trauma or obstruction of the thoracic duct. Isolated penetrating thoracic duct injury is very rarely seen. Therefore, we aimed to present a case of traumatic chylothorax, who was treated conservatively.

Case report

A 9-year-old patient, was admitted to our clinic for suspected traumatic haemothorax. He had been hospitalized in the general surgery clinics of another hospital following bicycle accident, in which he had sustained a penetrating left supraclavicular wound. He had been discharged on the second day of the trauma and he came to the our clinics 5 hours after discharge.

On physical examination, he was tachycardic, tachypnoeic and cyanosed. A thorax radiography showed a massive left pleural effusion (Fig. 1). The pleural fluid was chylo-haemorrhagic. A thorax drain was inserted in the left seventh intercostal space and 1850 ml of pleural fluid was evacuated. Chemical analysis of a sample demonstrated that the fluid was chyle.

Total parenteral nutrition was started, allowing no oral intake. Prophylactic antibiotics (Cefoperazone) were continued until resolution.

Drainage which was 300 ml in the first day, decreased to 70 ml in the seventh day and stopped completely in the tenth day after pleural drainage. The tube was removed on the 13th day. The patient was discharged symptom free on the 17th day. There has been no fluid accumulation for more than three months (Fig. 2).

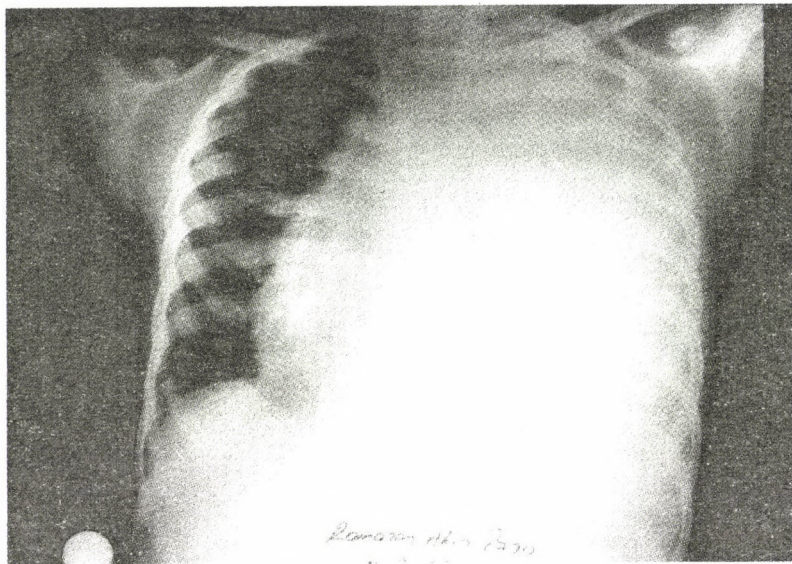


Fig. 1: Chest radiograph showed massive left pleural effusion with contralateral mediastinal shift

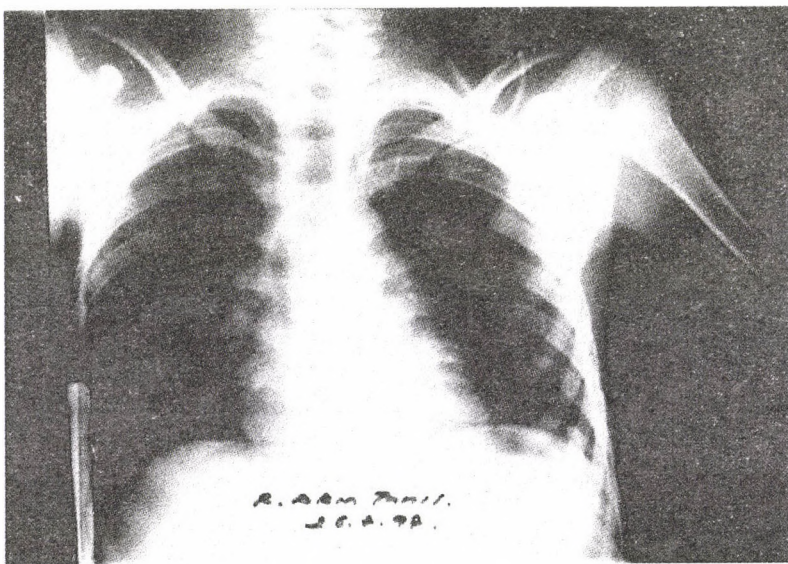


Fig. 2: Chest radiograph of the same patient after the tube was removed

Discussion

A chylothorax from injury to the thoracic duct can occur after penetrating, blunt or iatrogenic trauma. Iatrogenic chylothorax is noted in as many as 0.2% of thoracic interventions [1]. Chylothorax following blunt chest trauma very rarely occurs [2]. Chylothorax as a result of penetrating thorax trauma without any tracheoesophageal injury scarce are seen. It is usually masked by associated major visceral and vascular injuries [3]. Worthington et al. [3] reported 0.06% of isolated duct injury after penetrating trauma to the chest.

The diagnosis of chylothorax is based on the macroscopic appearance of the fluid. Measurement of the triglyceride levels in the fluid will distinguish chylous fluid from empyema. The primary method of treatment for chylothorax has been conservative. The approach including aggressive nutritional support and tube thoracostomy. With this therapy, 50% with patient of traumatic chylothorax would resolve spontaneously [4, 5]. If conservative therapy is not successful, surgical intervention is mandatory. Surgical ligation of thoracic duct is indicated when the daily chylous flow is over 500 ml after two weeks of medical treatment [6]. In our patient, conservative management was the definite therapeutic modality. Thoracotomy was not needed.

The other methods of treatment for chylothorax are pleurodesis, mediastinal radiation, pleuroperitoneal shunt and video-assisted thoracic surgery [7–10].

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THE VALUE OF ASAMURA–NARUKE TYPE MAIN BRONCHUS STUMP CLOSURE AND PLEURO-PERICARDIAL FLAP COVERING BY OWN METHOD TO AVOID BRONCHO-PLEURAL FISTULA (BPF)

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1. Authors present an "old-new" main bronchus closure procedure, which combines the Sweet's and Overholt's methods, recommended by Asamura–Naruke.
2. The A-N procedure decreased the prevalence of BPF from 2.8% to 0.09% in case of thoracotomy and from 9.5% to 2.4% in case of pneumonectomy compared 2 different stump-closing types.
3. There was not BPF in the "covered subgroup" (0% / 92 PN) recommended by us, independent of the closing types.
4. All bronchial stumps closed like A-N and covered by our method (0% BPF / 62 PN) healed.

Introduction

Among numerous surgical problems after pulmonectomy because of bronchial carcinoma, the broncho-pleural fistula may be one of the most serious complication for thoracic surgeons. Development of BPF is influenced by many factors such as TNM stage, lymph node status, cardiovascular diseases, bronchial circulation in stump after intervention, steroid administration, diabetes, neoadjuvant and adjuvant chemo- and radiotherapy, infection of the stump, etc. There are also technical factors, which can lead to BPF: too long stump, tensile closure, residual tumor at stump, hilar and mediastinal lymphadenectomy, extended operations and the type of the main bronchus closure [4]. The aim of this work was to reduce the prevalence and mortality of the BPF by the use of the modified A-N type [2] bronchus closure with addition of our wrapping method covered the bronchial stump with a pleuro-pericardial flap.

Methods

There are 2 different bronchus closure time-period compared in the relation of the BPF-ratio and BPF-related mortality.

1st period (1987–1991): the right main bronchus was closed by the Sweet's method with the approximation between the cartilaginous and membraneous portions of the stump [3].

The left main bronchus was provided by the Overholt's method by approximation of the cartilaginous ends of the partly manually (2–3/0 interrupted sutures, Ethibond or Vicryl) and partly mechanically (TA Premium 30, USSC).

2nd period (1996–1998): the majority of stumps was closed by A-N method: *the first Sweet-like, suture-like was machine-made (Proximate 30, Ethicon) and it was "overstitched" by hand after Overholt's method (2–3 interrupted sutures with 2–3/0 PDS) infolded the membraneous part of the stump. We worked out a covering procedure using the lateral part of the pericardium surrounding the main pulmonary artery and the mediastinal pleura.* The minor part of bronchus was closed mechanically (Proximate 30, Ethicon). In both periods mediastinal lymphadenectomy was made as a routine procedure.

Results

1st period: 832 thoracotomies (TH) were made, among them 241 pneumonectomies (PN) (29%). BPF occurred in 2.8% / 832 TH and in 9.5% / 241 PN (23 pts). The right/left BPF-ratio was 2.83 / 1.0. Mortality of PN was 3.7% (9/241). *Mortality related BPF was 2.1% (5/241).* There was not significant difference in prevalence of BPF between the hand-worked (13/146 PN — 8.9%) and machine-made bronchus closure (10/95 PN — 10.5%). These data were presented on the 7. Trilateral Symposium of Thoracic Surgery, in Bad Schandau, 1992.

2nd period: 660 TH were made, among them 177 PN (27%). BPF occurred in 0.09% / 660 TH and in 3.4% / 177 PN (6 pts). Mortality of PN there was 4.5% (8/177). *There was not BPF related mortality.* The right/left BPF-ratio was 1.66 / 1.0. BPF occurred on right side in 6.3% (5/79 PN) and in left side in 3.1% (3/98 PN). There was 2.4% BPF *after the recommended A-N closure (3/127 PN)*, and 6.0% BPF after the machine-made bronchial closure (3/50). Regarding to "covering subgroup" versus "no covering group" the BPF ratio were 0% (0/92 PN) and 7.1% (6/85 PN), respectively.

Conclusion

1. Considering the high incidence of BPF in the 1st period (9.5%) we had to change our bronchial closure policy.
2. The modified A-N type bronchial stump closure seems to be a simple and effective method to reduce the prevalence of BPF. Compared these values with the former, the incidences are 2.4% versus 9.5%.
3. Making an additional bronchial stump covering with a pleuro-pericardial flap recommended by us, can minimize the BPF prevalence (0% / 92 PN).
4. In the recent series all of bronchial stump healed, provided after modified A-N method and covered by our method (0% BPF / 62 PN).

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FIVE-YEAR STUDY ON THE INJURY OF THE GREAT THORACIC VESSELS AFTER PENETRATING CHEST INJURY

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In the cases of penetrating injury of the heart and the great thoracic vessels, 80% of the patients die before reaching the hospital care, nevertheless patients with sufficient vital functions can be rescued. Between 01. 01. 1994 and 31. 12. 1998 four patients were operated for penetrating injuries of the great vessels in the 2nd Department of Surgery, University Medical School of Debrecen. The left subclavian vein, arcus aortae and the pulmonary artery (2 cases) were injured. In this study authors report a detailed case operated for gunshot injury of the pulmonary artery. On the base of the situation of the projectile on X-ray picture and on the base of the entrance wound of the projectile on the skin we supposed the injury of the great thoracic vessels and we performed an urgent operation. After thoracotomy we found haemopericardium, bleeding wounds on the anterior and posterior haemorrhagic wall of the left pulmonary artery. We found the projectile inside the wall of the bronchus impacted. The bleeding wounds were finger-tamponaded and sutured. On the tenth postoperative day the patient was discharged from our clinic without complaint. The surgical approach to specific thoracic great vessels is also described.

Introduction

In the cases of penetrating injury of the heart and the great thoracic vessels, 80% of the patients die before reaching the hospital care, nevertheless patients with sufficient vital functions can be rescued [4, 5]. The gunshot injuries have the highest mortality rate [2, 3]. Tódor et al. reported a successful treatment of a patient with stab injury of the intrapericardial section of the pulmonary artery [6]. There are no available Hungarian data regarding successful treatments of the gunshot injury of the pulmonary artery. In our study we report a case of a successful treatment of a young female patient operated for gunshot injury of the pulmonary artery and we investigate the treatment of this patients, in details.

Case report

The 34-year-old female patient was taken to our clinic by ambulance after her examination in the traumatological department. She was shot by her husband accidentally with a special air rifle from a short distance. There was about one hour between the trauma and her arrival at our clinic. On admission we observed clear consciousness and the patient had complaints about left thoracic pain, mild dyspnoea. Her blood pressure was 80/0 Hgmm with a

filiform pulse of 130/min and with engorged neck veins. Respiratory movement on the left side was smaller. Beside the tachycardic, rhythmic heart sound we observed weaker respiratory sound and dullness on the left side of the chest up to the scapular apex.

The entrance lip of the projectile was a 8 mm long wound on the left third intercostal space parasternally that was not bleeding.

On the thoracic X-ray picture we could notice a covered region on the left side and the position of the diaphragm on the left side was higher with obscured contour. The contour of the heart was enlarged towards both directions. On the level of the VII thoracic vertebra we could notice a 7 mm large projectile with a projection on the left main bronchus.

On the base of the situation of the projectile on the X-ray picture and on the base of the entrance wound of the projectile on the skin we supposed the injury of the great thoracic vessels and we performed an urgent operation. The anesthesiologists began the anti-shock therapy of the patient ensuring also central vein. After performing anterolateral thoracotomy in the fourth intercostal space we evacuated 600 ml coagulated blood from the pleural cavity. We noticed that the pericardial sac was bluish and was expanded suggesting heart tamponade. We observed haematoma through the bundle of the phrenic nerve. The injury of the mediastinal pleura and the pericardium situated medial to the phrenic nerve at the region of the pulmonary artery. After the wide exposure of the pericardium the blood was evacuated that made the dark anterior haemorrhagic wall of the intrapericardial part of the left pulmonary artery visible. The lacerated, bleeding wound on the anterior wall was finger-tamponaded and was sutured using 4.0 Prolene suturing material. Nevertheless, we noticed further bleeding into the pleural cavity and into the pericardium, as well. So as we managed to expose the posterior wall of the pulmonary artery, we prepared the upper pulmonary vein and softly pulled it to distal direction and we also elevated the phrenic nerve. After this we could notice the haemorrhagic posterior wall of the pulmonary artery with surrounding haematoma around the main bronchus. We found the projectile inside the wall of the bronchus impacted, but the injury was not a penetrating one. Because of continuous bleeding from the pulmonary artery the left pulmonary trunk was compressed centrally by tourniquet and the pulmonary artery was completely mobilized on its posterior region at the pleuropericardial bend. Turning over the posterior wall of the artery we noticed the 7 mm large wound that was sutured by 4.0 Prolene suturing material that eventually stopped the bleeding.

The pericardial cavity was drained and the pericardium was sutured. When blowing up the lungs we could not notice any air coming through the wall of the bronchus. The thoracic cavity was drained with two tubes.

After the operation the patient was observed in the intensive care unit where she received 3 units of blood and had proper circulatory parameters afterwards. The postoperative period was free of any complication and we were able to cease the drainage on the fourth postoperative day. On the tenth postoperative day the patient was discharged from our clinic without complaint.

Discussion

Depending on the country, the public security, the handguns available, the development of high-speed transportation, the increasing number of the iatrogenic medical interventions,

there is a high variety regarding the number, the types and the treatment of blunt or penetrating chest injuries.

The overall mortality of thoracic aorta injuries is higher than 90% and in cases of injuries of other great thoracic vessels it is higher than 65% [2]. Because of the high mortality rate, in the prehospital phase, "scoop and run" policy offers the best chances of survival and no attempts should be made for any form of stabilization. This aspect together with urgent treatment in hospital can lead to good results [2, 3, 5].

The patients who are taken to hospital in time have got a better survival, though examinations (chest X-ray, angiography, color flow Doppler, transesophageal echocardiography) can be rarely performed in these cases. Patients in circulatory arrest or imminent cardiac arrest may benefit from an emergency room thoracotomy.

In our clinic in the last 5 years 122 patients were treated for penetrating chest injuries, in 77 cases (63%) surgical interventions were performed. In 4 cases (3.2%) we observed injury of the great thoracic vessels, in all of these cases urgent thoracotomies were performed. Beside the patient discussed with the gunshot injury of the pulmonary artery we treated a 44-year-old male patient with a stab injury of the left subclavian vein that was sutured. We also treated a patient with stab injury of the thoracic aorta that was closed using a purse-string-like suture after standard thoracotomy and also a 50-year-old patient with a stab injury of the pulmonary trunk. Jain [1] reported a successful treatment of air rifle shot injury of the pulmonary artery similar to our patient discussed.

These patients were in severe shock on admission except for the case with the injury of the aorta. In both of the two injuries of the pulmonary artery we observed haemopericardium. According to Mansour et al. [3] the rate of haemopericardium was 50% in the cases of stab and 12.5% in the cases of shot wound from the patients with penetrating injuries of the great thoracic vessels. In our reported case with gunshot injury the haemopericardium was smaller because the projectile made a hole on the posterior wall of the pericardium and so the blood could flow out of the pericardial sack towards the pleural cavity.

The period between the trauma and the admission ranged from 15 to 90 minutes. In two cases the patients were examined in the traumatology before they were taken to our clinic, which is a waste of time in these cases. This fact emphasizes the importance of the adequate transportation of the patients and of the thoracic surgical practice of the traumatological departments.

The average age of the patients was 38 years, the average period of hospitalization was 9 days and there was not any casualty from the patients with injuries of great thoracic vessels in the period examined.

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VIDEOTHORACOSCOPY AND MUSCLE FLAPS IN THE TREATMENT OF BRONCHIAL STUMP FISTULA

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The aim of the paper is to report our surgical technique applied for treatment of broncho-pleural fistula (BPF) as well as the results of the treatment.

From 1992 to 1998 we performed 127 pneumonectomies for lung cancer. In 5 cases (3.9%) bronchial stump insufficiency developed postoperatively. Three patients were treated by means of videothoracoscopy (the Multifire Endo Hernia Stapler was used to clipped the fistula). Rethoracotomy with myoplasty was performed four times in 3 patients. In one patient both the methods were employed.

In 2 out of 3 cases videothoroscopic treatment was successful and the patients were discharged without signs of BPF and pleural empyema. In one case the recurrence of the fistula occurred and the stump of the bronchus was successfully covered with the pectoral muscle flap 3 days later. In two cases after rethoracotomy and myoplasty (one of them was reoperated twice) the recurrence of BPF occurred and both the patients died due to cardiopulmonary failure.

Despite the limited experience, we think videothoracoscopy is worth considering as a tool for treatment of BPF.

Introduction

Bronchopleural fistulae (BPF) following pneumonectomy are mainly a surgical problem but seem to be favored by factors like local inflammation, preoperative irradiation and intraoperative devascularization of the stump [1]. This always means long hospitalization and uncomfortable therapies for the patients. Mortality rates range from 20% to 70% in the literature, the most common cause of death being aspiration pneumonia with subsequent adult respiratory distress syndrome [2]. The aim of the paper is to report our surgical technique applied for treatment of BPF as well as the results.

Methods

From 1992 to 1998 we performed 127 pneumonectomies for lung cancer. The main bronchus was closed according to the technique accepted in our department as a standard (TA 55 stapling line with 4,8 disposable unit was oversewn with 1-0 catgut continuous suture and

covered with a pleural pedicle flap). In 5 cases (3.9%) bronchial stump insufficiency developed postoperatively. After initial chest roentgenogram bronchoscopy was the next step to confirm the diagnosis. The chest tube was inserted immediately into the pleural cavity to preserve the contralateral lung from aspiration the fluid and to avoid tension pneumothorax. There were two groups of patients according to the operative approach: I group — treated by means of videothoracoscopy (3 cases), and II group — in whom rethoracotomy with myoplasty was performed (four times in 3 patients). In one patient both the methods were employed.

During thoracoscopy the site of the fistula was identified where air bubbles appeared. To visualize the fistula strong suction was used to remove fibrinopurulent deposits lying over the bronchus stump. We used the Multifire Endo Hernia Stapler (Auto Suture) and clipped the fistula step by step to obtain intraoperative airtight closure [3].

In 2 patients the sternocostal part of the ipsilateral major pectoral muscle was mobilized subcutaneously as a pedicle flap and transferred into the thoracic cavity through the opening made in the second intercostal space. In the third patient an intercostal muscle flap and 5 days after a latissimus dorsi muscle flap were employed to treat BPF. The muscle was sewn onto the stump and its circumference with interrupted absorbable sutures without any tension.

Results

In all the cases BPF occurred in males after right pneumonectomy. The most frequent signs of the fistula were: subcutaneous emphysema, expectoration of sputum and serothorax.

The mean age of patients in group I was 64 ± 5 years, staging: T_3N_2 , T_3N_1 , T_2N_2 . All of them were presented with symptoms of fibrinopurulent pleural empyema. In one of them postoperative chemotherapy was administrated. The interval between operation and fistula formation was 28 ± 9 days and between the first signs of fistula and reoperation 5 ± 2 days. The sizes of the fistulas recorded at the time of bronchoscopy were less than 4 millimeters. In two cases the treatment was successful and the patients were discharged (after 18 and 25 days) without signs of BPF and pleural empyema. In one case the recurrence of the fistula occurred 3 days after repair. In this patient rethoracotomy was performed and the stump of the bronchus was successfully covered with the pectoral muscle flap. This patient was discharged after 22 days and subsequently treated in the outpatient department due to chronic empyema.

The mean age of patients in group II was 70 ± 4 years, staging: T_3N_2 , $2 \times T_3N_1$. The interval between operation and fistula formation was 6 ± 3 days and between the first signs of fistula and reoperation 3 ± 2 days. In one case the signs of empyema were present. The sizes of the fistulas were between 5 and 7 millimeters. Two patients from this group died after surgery (total mortality rate 40%). Although one of them was reoperated twice and always intraoperative airtight closure of the bronchus stump were obtained, the recurrence of BPF caused a pleural empyema, septicaemia and cardiopulmonary failure. In one case a malignant microinfiltration was found in the stump margin.

Discussion

The current methods of management of BPF include endoscopic sealing, reclosure of the bronchus, even through contralateral access, coverage of the stump with omental pedicle flap or muscle flaps [1, 2, 5]. The treatment of choice depends on the state of the patient, on the interval which has passed since lung resection and on whether the pleural space is already infected or not [1]. However, the management of BPF has been enhanced by introduction of thoracoscopic techniques [3, 4]. Despite the limited experience, we think this technique is worth considering especially in patients presented with small, late BPF.

We agree with the opinion that mortality is the highest during the first 2 postoperative weeks [2] and repeat thoracotomy should be performed as soon as possible in early BPF [2, 5]. Fistula closure can be achieved by endoscopic or surgical intervention [2, 5] but we would like to recommend videothoracoscopic approach as well.

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ANTERIOR TRANSSTERNAL APPROACH TO THE UPPER THORACIC SPINE

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Cervicothoracic junction and upper thoracic spine down to T4 can be reached through anterior approach via sternotomy. Transsternal approach is the best route to gain access to lesions localized within vertebral bodies of the upper thoracic spine allowing for their resection, interbody fusion and replacement with bone cement. Consecutive modifications of transsternal approach evolved towards less extensive osteotomy from full median sternotomy, through manubriotomy with clavicle resection to partial lateral manubriotomy. Less extensive modifications provide limited lateral exposure of the spine and are more demanding technically. We present two cases of the upper thoracic spine tumours operated on through full medial sternotomy. We believe that median sternotomy has several advantages over less extensive modifications: it is technically simple to perform approach for trained thoracic surgeon, safer as it provides better exposure of the mediastinum and thus sufficient control of great vessels including subclavian ones, gives better exposure of T3, T4 and even T5 vertebral bodies, allows perpendicular sight and attack to anterior surface of the upper thoracic spine and therefore good visualizing of the posterior longitudinal ligament and dura, do not destabilize shoulder girdle nor affect function of the upper limb. Additional caudal exposure of the thoracic spine as down as T5 can be obtained by dissecting a plane between the brachiocephalic vein, vena cava superior and ascending aorta.

Introduction

Spinal surgery at the cervicothoracic junction and upper thoracic spine poses significant clinical challenges, especially when pathology involves vertebral bodies. Of the various spinal levels, exposure of the upper four vertebrae remains technically the most challenging. Posterior approach through laminectomy most often used in spinal surgery provides only limited access to vertebral bodies of the upper thoracic spine. This limited exposure from posteriorly can be partially improved by resection of a portion of rib and transverse process (costotransversectomy), an operation first described in 1894 by Menard. Later Capener extended this approach by resecting a longer segment of rib to allow anterolateral decompression of the spinal cord [1]. Anterior transthoracic transpleural approach is the best route to gain vertebral bodies of the thoracic spine. This approach allows wide exposure of the anterior column of the spine and thus makes vertebral body resection, instrumentation (stabilisation) and fusion feasible. However this is not a case with first three thoracic vertebrae especially when a lesion extends rostrally and involves lower cervical spine. Posterola-

teral thoracotomy even when associated with third rib resection may not give adequate exposure of the upper three thoracic vertebrae since they are roofed by the chest wall. The acute angle of the line along which surgeons has to do bone work may severely restrict removal of the affected vertebral bodies. It is generally believed that the upper three thoracic vertebrae can be best exposed by direct anterior approach, which may or may not require median sternotomy. Transsternal approach to the upper thoracic spine was first described in literature by Cauchoix and Binet in 1957 [2]. They combined cervical approach as for exposure of the cervical spine and a full median sternotomy. Since this early publication, many authors have advocated various extensive techniques to approach the upper thoracic spine. Some of them combined limited sternotomy with osteotomy of the clavicle or resection of the sternoclavicular junction, head of the clavicle, and a portion of the manubrium [3, 5]. Others used manubriotomy from sternal notch to the level of the second intercostal space [4]. Majority of authors believe that more extensive transsternal approaches improve degree of lateral exposure, but all are limited to T3 or above in the degree of caudal exposure achieved. We suggest that full medial sternotomy do allow greater caudal exposure of the upper thoracic spine and present advantages of this simple approach over its less extensive modifications.

Material and surgical technique

Here we present two illustrative cases operated on through median sternotomy for tumours of the upper thoracic vertebrae.

Case 1. A 65-year-old male patient presented with symptoms of the thoracic spinal cord compression on admission. He suffered from back pain radiating round the chest and weakness of lower extremities (Frankel grade D – weakness but functional motor power preserved). MRI scan confirmed tumour of T2 and T3 invading vertebral canal from anteriorly. The patient underwent T2 and T3 corpectomy (vertebral body resection) via right-sided anterior cervical approach combined with full median sternotomy. Skin incision extended from the neck along the medial margin of the right sternocleidomastoid muscle down to xyphoid process. The approach was performed by mixed team of neurosurgeon and thoracic surgeon with the latter performing sternotomy and first doing cervical approach. Both lower cervical and upper thoracic spine were exposed. The most caudal vertebra exposed through this approach was T4. Great vessels of the mediastinum constituted caudal limitation of the spinal exposure. Specifically it was brachiocephalic trunk and the right brachiocephalic vein that limited the degree of lower exposure. Both vessels were dissected and pulled away caudally with bands. The anterior surface of the cervical and thoracic spine was approached on the right side in the plane between trachea and oesophagus medially and carotid sheath and brachiocephalic trunk laterally. Care was taken not to injure the right recurrent laryngeal nerve that crosses the operating field under subclavian artery to reach its medial position ascending in the tracheoesophageal groove. Vertebral bodies from C7 to T4 were finally exposed with periosteal dissection of paraspinal muscles. The bone work that is resection of the middle parts of vertebral bodies, spinal cord decompression and interbody fusion with strut bone graft was performed by neurosurgeon. At this stage of operation surgical microscope was

used providing superior illumination and magnification as well as simultaneous visualisation by the surgeon and assistance essential for safe approach through the deep surgical corridor. The wound was typically closed with two suction drains left in situ within the upper mediastinum and underneath the sternum. The postoperative period was uneventful, the wound healed nice and the patients motor power gradually improved. Histopathological examination confirmed myeloma. Following operation he underwent a course of chemotherapy. On follow-up one year after the operation he presented with normal strength and his pain completely resolved.

Case 2. A 74-year-old female presented to the neurosurgical service with progressive intractable back pain and weakness of Frankel grade E in lower extremities. The patient was bed-ridden at least for two months due to severe back pain aggravated at every attempt of mobilization. Evaluation with magnetic resonance imaging demonstrated destructive lesion of T3 and T4 with cord compression. Surgical approach was performed the same way as in case one with exception of spinal exposure in the mediastinum. The lower cervical and upper thoracic spine were approached via three corridors between great vessels of mediastinum. The upper corridor was created above the brachiocephalic trunk, the middle run between the brachiocephalic trunk and the right brachiocephalic vein, the lower in the plane between the right brachiocephalic vein superiorly, the vena cava superior laterally and ascending aorta medially. This modification allowed for additional exposure of one more vertebra caudally. Therefore the most caudal vertebra exposed was T5. Medial corpectomy of T2, T3 and T4 was performed with interbody fusion. An autogenous strut bone graft harvested from iliac crest was interposed and tapped between T1 and T5 vertebral bodies. The postoperative period was complicated in fourth week after surgery by sudden cardiorespiratory insufficiency and death.

Conclusions

Modifications of transsternal approach to the upper thoracic spine evolved toward less extensive osteotomy. Although elegant and more cosmetic they provide limited lateral exposure of the spine and are more demanding technically. We believe that median sternotomy has several advantages over less extensive modifications: (1) it is technically simple to perform approach for trained thoracic surgeon, (2) safer as it provides better exposure of the mediastinum and thus sufficient control of great vessels including subclavian ones, (3) gives better exposure of T3, T4 and even T5 vertebral bodies, (4) allows perpendicular line of sight into thoracic spine and putting surgical instruments perpendicularly to the anterior surface of the vertebral bodies, (5) therefore gives good visualizing of the posterior longitudinal ligament and dura and thus good control of spinal cord, (6) do not destabilize shoulder girdle nor affect function of the upper limb. Additional caudal exposure of the thoracic spine as down as T5 can be obtained by dissecting a plane between the brachiocephalic vein, vena cava superior and ascending aorta. To our best knowledge no author has ever reported the use of this plane to gain access to vertebral bodies of the thoracic spine.

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HOW SHOULD WE TREAT MALIGNANT PLEURAL MESOTHELIOMA (MPM)?

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MPM is an occupational disease with increasing incidence. From 1986 to 1998 we operated 59 patients for MPM: in 11 cases only biopsy or exploration, 23 (stage T1a and T1b) Pleurectomy/Decortication, 22 (stage T2/3) extended pleuropneumonectomy (PPE) with resection of pericardium and diaphragm. In 3 cases we did additionally a chestwall resection. One patient in the PPE-group died postoperatively. Median survival time in the diagnosis/exploration group is 6 months. In the pleurectomy group (earlier stages) 14 months, in the PPE-group 16 months. One patient in the PPE-group survived 68 months, in the pleurectomy group the longest survival was 39 months. Up today 20 patients in the PPE-group died, 12 without any evidence local recurrency. Despite the fact that patients in the pleurectomy group are operated in earlier tumor stages they do not have a longer median survival time. In more than 50 percent only local disease control can be achieved by ePPE. Therefore in my opinion the first operative step must be followed by a second therapeutic step as immune- or gene therapy.

Introduction

MPM is a highly malignant occupational asbestos related disease with an increasing incidence [3]. When diagnosis is established, the remaining life span is usually short (months). The results of surgical treatment are disappointing, whether we do extended pleuropneumonectomy (ePPE) or we do Pleurectomy/Decortication. There are only sporadic long-term survivors for 5 years and more. Despite that it is necessary to make a precise decision, for the appropriate surgical procedure for each stage of the disease. For a long period there did not exist a real useful surgical classification, which could enable us to make a true comparison between the results of ePPE and Pleurectomy/Decortication. That gap is now filled by the classification of The International Mesothelioma Interest Group [7].

Material and Methods

Between 1986 and 1997 we operated 53 patients, 8 female and 45 male, for malignant pleural mesothelioma. In 11 cases we could do only diagnostic/explorative procedures for too far advanced tumorspread into the chestwall. In 19 cases, stage T1a and T1b we performed Pleurectomy/Decortication. Pleurectomy could be established in 4 cases via VATS-

technique. In 21 patients, stage T2/3 we performed after mediastinoscopy and laparoscopy (exclusion N2 and peritoneal spread) an extended pleuropneumonectomy enblique with resection of pericardium and diaphragm (P3D-resection), in 2 additional cases combined with chestwall resection. Pericardial replacement was made usually by lyophilized dura mater. For replacement of diaphragm we used mostly Goretex® STP 1 mm, less frequently Prolene® and Marlex®-Mesh. From the very beginnings we assigned patients to pleurectomy/decortication or to ePPE according the outlined eligibility criteria: Stage — Age — Risks — Function.

Selection criteria for ePPE

-
- Stage T 2/3 pleural obliteration
 - Exclusion of N2 lymphnode involvement by mediastinoscopy
 - Exclusion of peritoneal tumorspread by laparoscopy (simultaneous operation)
 - Age < 60 years
 - No cardiac risk
 - Volume loss of the involved hemithorax
 - FEV1 < 50%
 - Quantitative perfusion < 20%
 - Rather chestpain than dyspnea
-

Selection criteria for Pleurectomy/Decortication

-
- Stage T1a and T1b (massive) pleural effusion
 - Any N-stage
 - Any age
 - Low to moderate cardiac risk
 - Relief of dyspnoea after evacuation of pleural space
 - Increase of FVC, FEV1 and quantitative perfusion > 20% after thoracocentesis
 - Rather dyspnea than chestpain
-

Results

There was no postoperative death neither in the exploration group nor a postoperative death in the pleurectomy group. One patient (4.2%) died postoperatively in the ePPE group from respiratory failure caused by postoperative pneumonia. Histopathology revealed in only 4 cases MPM from sarcomatous type. Survival is poor in all three groups of our patients: After exploration only, the median survival time was 6 months, after Pleurectomy/Decortication the median survival time was 14 months and after ePPE 16 months. In the Pleurectomy group the longest survival time was 38 months, in the ePPE group there was a nearly "long-term-survivor" with 68 months. In the Pleurectomy group about all patients complained about marked pain beginning around half a year after the operation, while patients in the ePPE group did not do so. In the ePPE group up today 20 patients died, 12 of them without any evidence of local tumor recurrence, proved either by HR-CT-scan or by necropsy.

Discussion

Treatment of mesothelioma remains an unresolved problem up today. As surgeons we cannot offer surgery for cure. Dealing with malignant pleural mesothelioma we have the choice between a total (ePPE) or partial (pleurectomy/decortication) local tumor removal. Completeness of resection is depending too from the tumor-type epithelial, mixed or sarcomatous.

Unfortunately we get unsatisfying results with both types of surgery alone, which can be ameliorated only negligibly with additional radio-chemotherapy [9]. At first sight there seems to be no real advantage for patients who undergo ePPE compared to those undergoing Pleurectomy/Decortication. In some reports survival time is better for patients undergoing Pleurectomy/Decortication [5]. In my opinion the advantage of Pleurectomy/Decortication is not exactly proven caused by the lack of appropriate staging systems. What looks like a life span advantage for patients could be probably the advantage of an operation done in an earlier tumorstage. Only the recently proposed staging system of the International Mesothelioma Interest Group [7] enables us to compare precisely our results treating malignant pleural mesothelioma in different stages with different methods.

One argument frequently used against the ePPE was the high postoperative mortality up to 30% [2]. These reports have more or less historical interest, like Butchart's report, published in 1976. With an appropriate patient selection, the mortality rate is actually around or less than 5% [6], not more or well in the range as for a simple pneumonectomy. That can be explained easily: performing an ePPE we take away a trapped lung with a very poor function. In some cases the preoperative lung function is nearly the same as postoperatively. That enables us to perform also such an extended operation with appropriate risk for the patient. But we can get these results only in case of a markedly impaired lung function and in absence of other grave risks. In all other cases we should look to the minor, effective procedure removing effusions and relieving dyspnoea, avoiding overtreatment in all cases.

In the future eventually multicenter studies, based on the International Mesothelioma Interest Group Staging System, could evaluate whether we could get better results with ePPE as with Pleurectomy/Decortication, also in stage T1a and T1b of the disease.

According to our experience we can achieve a local tumor control in about 60% of our patients performing an ePPE. So ePPE seems to be the first successful, but not the only step in the treatment of the more advanced stages of the diffuse malignant pleural mesothelioma. We should have a look for some additional treatment, which attacks mesothelioma cells from inside as gene transfer [1, 4] achieved either by adenovirus or by a replicant gene transmitter the herpes virus, may be in combination with immunotherapy. The basic work is in progress. We should put a hopeful glance at gene therapy either as a support of surgery in more advanced stage (T2, T3) or eventually as replacement for surgery in early stages (T1a, T1b) of malignant pleural mesothelioma.

In our personal work we could demonstrate, that ePPE can be offered to the patients as a moderate- or low risk operation, which opens up the chance for a survival more than five years for single patients. For the future I am convinced, we will need that operation as part of a multimodality treatment, which should include gene therapy.

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THE POSITION OF SPIRAL CT IN THE COMPLEX DIAGNOSTICS SYSTEM FOR PULMONARY EMBOLISM

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The development of CT technology, the more widespread use of spiral CT and the application of contrast injection techniques now enable such levels of contrast intensity in the segmental and larger pulmonary arteries to be attained as to allow the minimally invasive, direct detection of emboli. This technique has a role to play in the strategy for check-up examinations for pulmonary embolism. By providing a realistic alternative the spiral CT examination serves to reduce the number of scintigraphy examinations to be performed. At the same time, the role played by invasive pulmonary angiography examinations is now shifting towards intervention.

Objective

The thoracic helical CT examinations performed at the Diagnostics Centre since 1994 have revealed pulmonary embolism through 10 incidental and 2 directed examinations. The possibilities for diagnostics offered by spiral CT were pooled in this group of patients, and endeavours were made to determine the position of the technique within the strategy for check-up examinations for pulmonary embolism.

Patients and method

The examinations were performed by means of SIEMENS Somatom Plus 40 equipment with spiral operational mode.

The patients were aged between 49 and 78 years, 7 being women and 5 men. Thoracic X-ray preceded the CT examination in each case, 3 patients also being examined by means of perfusion scintigraphy.

Results

In segmental and larger arteries uni- or bilateral emboli were detected in the pulmonary vessels. Emboli were located in the pulmonary vessels on both sides in 5 patients, on the left

in 4 cases and on the right in 3. Emboli were found in the central great vessel in 7 patients, in the lobar artery in 9, and in the segmental branch in 4. Pulmonary infarct or other parenchymal changes which could be related to embolus formation were found in 7 patients. The scintigraphy examination was of no diagnostic value in two of the three cases in which it was used, yielding a positive result in the remaining case.

Discussion

In cases of severe haemodynamic instability *echocardiography*, which can be performed easily and quickly at the patient's bedside, assists in the direction of acute burden and increased pressure in the right ventricle, and also for the purposes of excluding insufficiency of the left-hand portion of the heart and other acute life-threatening conditions (e.g. pericardial tamponade or aorta dissection).

It is of fundamental importance to perform *traditional thoracic X-ray examination* in each case; although this often yields a negative result, it may be of great significance from the aspect of differential diagnostics.

In cases of milder forms not accompanied by haemodynamic disturbance, with respect to the various imaging examinations available it is expedient to proceed with *duplex Doppler ultrasound* examination of the lower limbs. It is known that over 95% of cases of pulmonary embolism originate from thrombosis in the deep vein system of the lower limbs, complications of this and deep-vein thrombosis or pulmonary embolism being different manifestations of the same disease. Detection of deep-vein thrombosis of the lower limbs, alongside appropriate clinical diagnosis, corroborates the diagnosis of pulmonary embolism, while lack of this does not exclude such a diagnosis.

Where pulmonary embolism is suspected *ventilation-perfusion scintigraphy* is the examination most generally used at present. Examinations giving negative or low probability bear a high negative predictive value, while those giving high probability are of high positive predictive value. The two groups outlined above have been found to account for approximately 30% of cases. In the other 70% of cases the examination is intermediate probability or no diagnostic value. Doppler ultrasound examination of the lower limbs in such patients is positive in approx. 50% of cases; in joint application for patients given anticoagulant treatment approx. 70% are diagnosable [1, 4].

In dubious cases *pulmonary angiography* is the definitive examination to be performed: it provides high degrees of specificity and sensitivity, although invasive and entailing relatively high morbidity and mortality. The advantage of this procedure over spiral CT is that it is also of diagnostic value at the level of the subsegmental arteries.

An increasingly widespread practice is for *spiral CT* examination is performed as the following stage if preceding ultrasound has produced a negative result and ventilation-perfusion scintigraphy findings are intermediate probability. Large-scale comparative evaluations indicate that in the segmental and larger arteries sensitivity and specificity above 90% may be anticipated from this method with respect to the detectability of emboli, this degree of sensitivity falling between that of isotopic examination and that of angiography [2, 3].

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PREDICTIVE VALUE OF MRI IN LUNG CANCER*

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Pathologic results of 543 lymphnodes removed during 164 radical surgery for lung cancer is compared with the expected findings based on preoperative MRI imaging. Specificity of T2 weighted MRI images were 95.5% for individual lymphnodes and 88.1% for TNM staging, respectively. Sensitivity was found to be 89.4% for lymphnodes and 94.6% for TNM staging of the patient. The accuracy of the MRI imaging was 84.7%. Properly choosed MRI imaging and interpretation sounds to be no inferior to more invasive methods as collar mediastinoscopy, Chamberlain procedure or VATS exploration.

Introduction

In spite of increasing number and quality of preoperative diagnostic modalities and hardware no breakthrough in the accuracy of preoperative staging of lung cancer was achieved. As neoadjuvant therapy offers the best chances in operable advanced diseases especially in the N2 group of lung malignancies, correct staging is mandatory. Collar mediastinoscopy is declared as the gold standard of the preoperative stadium identification. Limitations of mediastinoscopy are usually ignored. Significant areas of the mediastinum remain hidden. No complete mapping is possible even in the visualised area. Mediastinoscopy does not fulfil the basic requirement that a diagnostic procedure should be free of mortality and even morbidity. Risks are increased as re-do diagnostic operations concerned. One has to keep in mind that the question of the role of the lymphnode dissection remains to be open in the aspects of the diagonally opposite opinions of its aim. Is it a diagnostic procedure exclusively or do we perform it to increase the radicality of the resection and the survival?

With the advent of the computer tomography (CT) hopes emerged that lymphnode size could predict the pathological involvement of the stations. Expectations did not fulfil as sensitivity and specificity concerned. Overemphasizing the mythical 1 cm size for positivity led to the disqualification of the CT as a really useful and reliable preoperative tool [1]. Magnetic Resonant Images (MRI) and Positron Emission Tomography (PET) are recently evaluated [2, 3]. In spite of some promising preliminary reports no obvious breakthrough can be experienced.

* This article is dedicated to the memory of the unforgettable colleague, and brilliant chest physician, Dr. Ildikó Zoltán.

Aim of study

The main goal of the present project was to conduct a prospective study comparing the preoperative CT and MRI findings with the surgical specimens. Certain attention was paid to the validity of the comparative iconographic findings on inoperability criteria of the local involvement of the surrounding structures.

Material

Preoperative results of CT and MRI examinations of 164 patients referred to lung cancer surgery between 1st January 1996 and 31st June 1998 were included in the study. No special selection criteria were applied. All of the 164 patients (sex ratio: 108 male / 56 female) with an average age of 58.7 years (34–81) underwent radical surgery (RO) for lung cancer. Table 1 shows the distribution of the pathologies of the tumours. All the surgeries included the clearance of certain lymphnode stations. At surgery the extended lymphnode sampling policy was followed. No complete mediastinal clearance was performed.

Table 1
Material

Type	Pathological types of lung cancer				
	Adenocarcinoma	Squamocell ca	Adenosquam.	Other NSCLC	SCLS
no.	81	38	17	9	19
%	49%	23.6%	10.3%	5.5	11.6%

Lymphnode was removed if any of the criteria was met.

1. patho-anatomical unit (locoregional lymphnode-lobe and bronchial lggl)
2. specifically mentioned in the pre-op radiologist report
3. macroscopically suspect (localisation, size, consistency, colour)
4. at hand (usually pulmonary ligament)

Cluster lymphnodes were separated and counted as one in the aspect of lymphnode station but measured independently. 3.3 stations were removed or sampled per patient (2–9). Distribution of lymphnode stations sampled is presented in Table 2. Nomenclature and scheme of lymphnode mapping was in accordance with the suggestions of the Japan Lung Cancer Society [4] as this is the standard operational procedure (SOP) in our practice dealing with lung malignancies.

The MRI pictures were taken using the Magnetom Impact 1 T / SIEMENS type machine. T1 weighted spin ECHO and turbo spin ECHO sequences were applied. Axial, sagittal, coronal directions and T2 weighted expositions were taken for imaging. The radiologists' written report detailed on all the aspects of the following factors: tumour size T1/2, lymphnode size and localisation in both of the T weighted expositions (1 and 2). The radiologists opinion

based on the CT and on the MRI imaging. Positivity of the T2 weighted imaging was "sine que non" of an overall positive opinion regarding malignant involvement of the certain lymphnode.

Table 2
Distribution of stations sampled

No. of lymphnode station: 543			
No. of patient: 164			
Paratracheal:	4	Pre- and retrotracheal:	13
Trach. Bronch:	6	Subaortic:	35
Subcarinal:	52	Paraesophageal:	41
Hilar:	164	Interlobar fissure:	21
		Mediastinal:	129
		Paraaortic:	14
		Lig. pulmonale:	29
		Lobar:	51

The present study deals with the MRI findings only as the main focus is on this modality as the CT was proven to be unreliable in our previous experience also as far as N staging concerns. Localisation and extent of the tumour in the parenchyma was judged primarily using CT. No report was given regarding a possible lymphnode involvement or negativity.

Results

In the present series no negative lymphnodes were larger than 20 mm. There were 8 out 89 positive lymphnodes below 10 mm (8.9%). The lymphnode size-range between 10 and 20 mm is a field of misinterpretation. 81 positive lymphnodes and 42 out of the 454 (9.25%) negative lymphnodes fall in this group. Table 3 summarizes the main results of the study. Pathologist's opinion was different from the radiologically expected diagnosis as dignity concerned in cases of 33 lymphnodes out of the 543 (6.1%).

Table 3
MRI (based on size and T2 weighted imaging)
vs. pathological diagnosis

Outcome	Lymphnodes	TNM
True positive	78/543	
True negative	432/543	
Accuracy	510/543	139
Fals positive	22	18
Fals negative	11	7

Modification of TNM staging of the patient was needed in 25 cases (15.2%). No correlation with the pathological type of the tumour was found regarding the frequency of inaccu-

racy of TNM staging. MRI had a tendency to overdiagnose the lymphnode involvement in a ratio of 2:1 against underdiagnosing (Fals negativity). The same tendency was experienced in TNM staging. Table 4 contains the specificity and sensitivity data. Unfortunately only limited data ($n = 4$) are available on MRI opinion on expected local irresectability or need for extensive chest wall resection which were not confirmed at surgery. 2 out of 12 cases, aortic wall involvement, 4 out of 12 cases pericardial involvement and 6 direct chest wall involvement expectations were not fulfilled. No fals negative MRI result was found in the present series. As the surgical decision making was based on multifactorial approach regarding the preoperative resectability expectations these limited experiences does not allow to draw further consequences.

Table 4

	Individual Lymphnodes n: 543	TNM staging of patient n: 164
Specificity	95.5%	88.1%
Sensitivity	89.4%	94.6%

Conclusions

The T2 weighted lymphnode staging is comparable to the contrast enhanced method [5]. Size of lymphnode alone seems to be highly unreliable as characteristic feature with hardly any positive predictive value. However adding the functional examination as of the T2 weighting to the measured extension then an acceptable prognostic value is achieved. Anamnesis offers a valuable auxiliary source of information on interpretation of CT/MRI. Further investigations must follow to clarify what length of history and extent of previous pneumonia is relevant in order to exclude or reinforce the hypothesis of lymphnode involvement. The same refers to the sporadic but not negligible observations taken in the present series of 164 cases regarding the fals-inoperability due to direct tumour invasion to the surrounding structures. Authors have the impression that in slim patients the radiological opinion on chest wall and great vessel involvement is irrelevant. In patients with less than average normal fat and connective tissue (asthenic type) easy resection were performed in spite of preoperatively declared local inoperability. When patients had normal or more than average bodyweight the radiological opinion was accepted as previous experience proved the validity of this attitude.

Mediastinoscopy has a sensitivity of 85–90% and a specificity around the same value [6]. The reported 85–90% accuracy of the collar mediastinoscopy is comparable to our data. T 1 and T2 weighted imaging has a decisive role in our SOP in preoperative staging for non-small-cell lung cancer. In SCLC the present data seem to be too small for the time being and in our practice the preoperative evaluation in these cases includes collar mediastinoscopy or Chamberlain procedure.

Based on the Pécs experience it is felt that size and T2 weighted images of the lymphnode completed with anamnesis regarding inflammatory process in the ipsilateral hemithorax could offer a predictive value not inferior to invasive methods.

One should not forget the fact, that all of the values for sensitivity and specificity were calculated from collected data of patients who were referred with the diagnosis of lung cancer. Unfortunately we have to keep in mind that some bias can emerge from the pre-trial inclusion criteria of the patient selection. Actually we carry on our investigations extending the numbers of the present series.

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MAGYAR
TUDOMÁNYOS AKADÉMIA
KÖNYVTÁRA

RISK OF LUNG RESECTIONS IN PATIENTS AFTER INDUCTIVE CHEMOTHERAPY OF NON-SMALL CELL BRONCHOGENIC CANCER

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Results of 43 patients who were operated on after chemotherapy in the period 1986–1998 are presented. Authors evaluate the morbidity, mortality and survival. Relatively low mortality and good survival rate is considered to be success. In many patients, without the combination therapy their tumors would have been inoperable and quality of life would be poor.

Aims

Authors present a series of 43 patients who were operated on after chemotherapy for NSCLC Long Cancer in the period of 1986–1998.

Methods

Cases of 35 men and eight women of the average age of 57.9 years (median 57.6 years) are presented. TNM classification before chemotherapy were: stage I — four patients, stage II — two patients, stage IIIa — eight patients, stage IIIb — 28 patients, stage IV — one patient. The TNM classification before surgery and after chemotherapy: stage I — 20 patients, stage II — 17 patients, stage III — six patients, stage IV — no patient. The reasons for inductive chemotherapy were patients refusing surgery — three patients, effort to devitalize the tumor — three patients, effort to decrease the stage — 37 patients. 2.5 cycles of chemotherapy were used (2–10) in average. 14 different combinations were used: in most cases double combination of gemcitabin+cis platinum.

Procedures were as follows: lobectomy 23, lobectomy + wedge bronchoplastic operation 1, bilobectomy 6, bilobectomy + sleeve plastic operation one, bilobectomy + thoracic wall resection (1st–4th ribs) one, pneumonectomy nine, extensive pneumonectomy one, and one explorative thoracotomy.

Results

The pathologies prior to operation were: epidermoid cancer 28, adenocarcinoma eight, anaplastic carcinoma six, unclassified one. Following surgery complete tumor remission was

observed in five patients. In 36 patients decreasing of stage was noted. One patient did not respond. In one case tumor progression was observed.

30 days mortality: two patients (4.7%) — one patient due to contralateral bronchopneumonia, one due to myocardial infarction. In the period of 1995–1998 the mortality was 4.2%. Global mortality in our surgical department in 355 patients in the period of 1990–1998 was 0.8%.

Survival: 17 persons died (survival 1–42 months). 26 patients are living (survival 1–127 months), average period of follow up — 23 months). Stage III (n = 37/43): 2 years survival 50%, 3 years survival 39%, average survival 18.8 months.

Discussion

Authors evaluate the rate of complications and their prevention. They emphasize the difficult preparation in the pulmonary hilus and faced with many types of intrathoracic and extrathoracic complications. Immunocytometry, antibiotic prophylaxis, heparinisation, peri- and postoperative bronchoscopic sanitation, rehabilitation and other types of prevention of complications are necessary [1–3].

Conclusions

Our method revealing relatively low mortality and good survival rate is successful in many patients. Without the combination therapy their tumours would have been inoperable and quality of life would be poor.

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THE IMPROVEMENT OF ARTERIAL OXYGENATION DURING ONE-LUNG VENTILATION – EFFECT OF DIFFERENT CPAP LEVELS

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Authors studied different continuous positive airway pressure (CPAP) levels and their effect on arterial oxygenation during thoracic surgery. Surgical interference of CPAP was studied as well. No significant difference has been found at 4 cm, 7 cm and 10 cm H₂O in the improvement of oxygen content during one-lung ventilation. In contrast to the lowest CPAP level, 7 cm and 10 cm H₂O made the surgical conditions significantly worse.

Introduction

The patients undergoing thoracic surgery are at increased risk of perioperative pulmonary complications. The impaired function of collapsed lung and increased shunt are the main causes of potential hypoxia. The optimal intraoperative management with emphasis on ventilation is essential to enable intrathoracic surgery while assuring adequate patient's oxygenation. Commonly used ventilatory management of one-lung anaesthesia includes increased FiO₂, dependent lung positive end expiratory pressure (PEEP) and selective nondependent nonventilated continuous positive airway pressure (CPAP). There are several clinical trials proving that 2–10 cm H₂O CPAP applied to nonventilated lung improves significantly arterial oxygenation [1–4]. Unfortunately there are few data specifying the optimal value of CPAP and its negative effect on surgical conditions. We try to contribute to more detailed data about one-lung ventilation (OLV) by a study comparing the different CPAP levels.

Methods

Subjects and Material. We studied 45 patients (33 men and 12 women, aged 44.15 ± 14.8 years), after obtaining the informed consent. The patients were scheduled for thoracoscopy and were similar in their physical status (ASA I–II). The commercial nondependent nonventilated lung CPAP device made by Mallinckrodt Medical Comp. was available for the purpose of our study.

Inclusion and Exclusion Criteria. The patients aged > 18 years were included. Exclusion criteria were the missing consent, preexisting ischemic heart disease or history of lung resec-

tion. The drop of oxygen saturation below 89% measured by pulse oxymetry was the indication for the interruption of the trial and change in ventilation.

Anaesthesia and Study Design. Each patient was assigned randomly to one of three groups depending on the level of applied CPAP in cm H₂O (CPAP₄, CPAP₇, CPAP₁₀). All the patients were premedicated orally with benzodiazepins. We placed an arterial catheter before induction into general anaesthesia. We used thiopental and atracurium intravenously for the induction. All the subjects were intubated endobronchially left by the fiberoptic control to avoid hypoxia from the tube malposition. The patients were ventilated with 7–8 ml/kg during OLV, with respiratory rate to maintain PaCO₂ in the normal range (4.2–4.4 kPa). We used FiO₂ 40% and no PEEP to clear the role of CPAP as much as possible. Anaesthesia was maintained with O₂/N₂O mixture, halothane and sufentanil. After 15 minutes two-lung ventilation (TLV) the first blood sample was obtained and the operated lung was collapsed for 20 min when the second blood gas analysis was performed. Then we instituted 4 cm, 7 cm or 10 cm nondependent nonventilated lung CPAP. The rest two samples were collected after 10 and 20 minutes. We asked the same experienced surgeons to assess the conditions in operating field by numerical rating score (1 – excellent, 2 – good, 3 – poor).

Statistical Analysis. In each group we compared arterial oxygenation before and after CPAP by Student's paired *t*-test. The Kruskal–Wallis test for the comparison of differences between groups and chi-square test for categoric data were used.

Results

The trials of three subjects were interrupted because of decline in oxygen saturation below 89%. Other four patients (3 ... CPAP₁₀, 1 ... CPAP₇) were eliminated due to unacceptable operated lung overdistension during CPAP. The application of 4 cm H₂O improved PaO₂ from 11.13 ± 1.64 kPa to 14.88 ± 2.36 kPa; 7 cm H₂O from 11.4 ± 1.81 kPa to 14.36 ± 2.46 kPa and 10 cm H₂O improved PaO₂ from 10.81 ± 1.21 kPa to 13.46 ± 2.51 kPa.

There were no significant differences among the groups in the improvement of arterial oxygen tension. The surgical conditions were significantly worse in groups CPAP₇ and CPAP₁₀.

In summary, we have found that CPAP led rapidly to the improvement in arterial oxygenation independent on its value; CPAP₇ and CPAP₁₀ made the surgical conditions progressively worse in contrast to group CPAP₄.

Discussion and Conclusions

There is no doubt that nonventilated nondependent CPAP dramatically improves arterial oxygenation during OLV [1]. Different observations raise the question of its mechanism. Finally it was concluded that CPAP accounts for better PaO₂ either by permitting oxygen uptake in the nonventilated lung or by diverting blood flow to dependent site (high levels CPAP). However, the higher value of CPAP applied are more likely hemodynamic implications and surgical interference. The supposed compliance of a collapsed lung is about 10 ml/cm H₂O thus 4 cm, 7 cm and 10 cm CPAP should not distend the lung significantly [5].

But this was not that what we observed during our study. If the benefit of low CPAP levels were similar to that of high levels it would be logic to use the lowest still efficacious CPAP which means 4 cm H₂O in our study. Certainly in common clinical practice different ventilatory maneuvers are combined to provide the most efficient management of one-lung anaesthesia.

Nonventilated nondependent lung CPAP has been estimated as cheap, simple and nonaggressive ventilatory management leading rapidly to dramatic raise in PaO₂. No significant difference has been found in that effect among CPAP levels studied. On the other hand in contrast to 4 cm, the other two levels CPAP (7 cm and 10 cm H₂O) significantly interfered with surgical condition. In our study 4 cm H₂O was concluded to be the optimal level of CPAP.

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PENETRATING THORACO-ABDOMINAL GUNSHOT WOUNDS PROCEDURE

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Gunshot injuries of the trunk in the peace time are rare, but always represent great therapeutic and organisational problems. It concern especially thoraco-abdominal injury. Aim of this report is to present our treatment experiences with 19 wounded patients. Different procedure was applied. In 16 cases wounded laparotomy was done, in 4 cases following pleura cavity drainage. After that in 4 wounded thoracotomy was performed. In the 3 rest wounded thoraco-phrenolaparotomy was done. All of them had lung injury and a few of them have had great vessel and heart lesions. In the abdomen we found 1–4 organs injury. 7 (37%) wounded died, among these 6 after abdominal complications. Injuries mentioned above are severe, complicated and required individual and differentiated procedure. Above all severity of abdominal organs injury determined prognosis. Not enough experienced thoracic surgeon can cooperate with abdominal specialist surgeon during treatment procedure such a patients.

Gunshots of the trunk during wars represent about 15–25% all of injuries, but in the peace time they are rare. They have always present surgeons great organisational and treatment problems. It concern thoraco-abdominal or abdomino-thoracic injuries especially. Treatment procedure is difficult and complicated due to variety of organs in the chest, abdomen and diaphragm injuries [1–4].

Aim

The aim of this report is to present our experiences with gunshot penetrating thoraco-abdominal wound treatment procedure.

Methods

80 gunshots wounded of the chest were treated. 19 of them have had diaphragm and abdominal organ injuries. The age of wounded was between 18 and 28 age. They have been delivered to the hospital after 20 min to 2 hour after wounding (average 40 min). All of them have had single gunshot wound. 3 of them have had blind gunshot wounds and the rest 16 have had bullet-wounds. Inlet wounds in the 11 patients were placed in the abdomen and

other 8 patients have had gunshot wounds on the chest. 10 patients have had gunshot wounds on the right side of the chest and 9 on the left-side of the chest. All of them during hospital reception presented traumatic shock and peritonitis symptoms. X-ray of the chest was done in the 19 patients which revealed in the all wounded lung haematoma, blood and air in the pleura cavity. Concerning clinical symptoms all wounded have been qualified to the operation urgently. Treatment procedure was different. 4 of them have had in the first pleural cavity drainage after laparotomy. Thoracotomy was unnecessary in the wounded mentioned above after such a procedure. 12 patients have had at first, laparotomy and after that 4 have had thoracotomy and in the rest 8 wounded after laparotomy drainage of the pleural cavity was done only. In the 3 rest wounded thoraco-phrenolaparotomy was done. 2 right-sided and in one case following left-sided laparotomy, thoraco-phrenolaparotomy was necessary.

In the 15 wounded during thoracotomy lung injury and blood in the pleural cavity (1000–2000 ml) have been found. Moreover 6 wounded have had chest wall vessels lesions, 2 of them have had heart contact lesions. All of them have had diaphragma injuries 4 wounded have had suture of the lung. 8 have had mechanical parenchyma sparing resections. 3 of them had lobe resection. 11 wounded have had small bowel intestine injuries, 9 large bowel intestine injuries. 7 of them have had liver, and 7 of them stomach, 6 — kidney, 4 — spleen and 2 — pancreas injuries. 6 wounded have had 4 organs injured simultaneously, 6 wounded have had 3 organs, 5 — have had 2 organs, and 2 — 1 organ injuries.

Above-mentioned injuries have been treated according to abdominal surgery rules and depending on the type and grade of the injury. Among the 80 cases, 19 wounded died (37%), one due to many chest and abdomen injuries direct after operation. Rest of the wounded died in the late period, all of them due to abdominal and general complications. Serious complications in the chest revealed in the 4 wounded. 2 of them have had fibrothorax, 1 has had lobe cirrhosis, and 1 — pyothorax. None of them required early rethoracotomy.

Conclusion

Thoraco-abdominal gunshot injuries are especially severe, complicated and they are prognostically very bad. They have connected injury problem of the chest and abdomen, and creating other problems with necessity determination priority of the operation on both sides of the diaphragm and alternative their performance [2, 4].

Our treatment results revealed that wounded delivered to the hospital in time have chance to survive. Abdominal gunshot injuries are life threatening and they have priority to be treated first. They are decisive about treatment outcomes and prognosis. Laparotomy is the best way to treat abdominal injuries, but in the same patients thoraco-phrenolaparotomy is the best way to treat combined injuries. In contradiction to laparotomy, thoracotomy required only few patients. With regard of the complicated cases each patient should be treated individually [1, 3].

Summary

Thoraco-abdominal gunshot wounds are very serious and complicated. The treatment procedure depends on injuries of abdominal organs. Thoracic surgeon has to be experienced in abdominal surgery or he/she has to ask for help or cooperation of adequate specialist.

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NONEPITHELIAL NEOPLASMAS OF THE ESOPHAGUS

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Nonepithelial neoplasms of the esophagus are rare and represent only 1–3% of the treated tumor of the esophagus. Aim of this report is to present our experiences with treatment patients suffering from that kind of neoplasm. During the last 12 years we treated 12 patients: 6 males and 6 females in the age of 23–65 years (average 41 years). The basic symptom was long-duration dysphagia. Esophagoscopy, radiopaque contrast, CT examinations in the all of our patients were done. Correct recognition before operation (only 1 patient — leiomyoma) was done. The tumors were removed in 6 patients by right-side thoracotomy, in 5 patients by left-side thoracotomy and 1 has had right-side thoracoscopy. The lumen of the esophagus was opened in 3 patients. Definitive recognition was as follow: 6 — leiomyoma, 3 — fibroma, 1 — fibroleiomyoma, 1 — lipoma, 1 — cystis lymphomatosa. Operative treatment was done by enucleation of the tumor and in the postoperative period we did not observe complications. Early and late results were very good as well.

Introduction

The most frequent neoplasms of the esophagus are malignant origin epithelial tumors. Nonepithelial neoplasms are rare and represent only 1–3% of the treated esophagus tumors. They are able to develop in different tissue of the esophagus and they are almost always benign. These tumors most frequently revealed as leiomyoma or rather rare as fibroma, myxoma, lipoma, angioma and cysts. They are placed intramurally. Their slow and long-term growth do not create any symptoms. Correct diagnosis of the neoplasm is rather difficult and it is not always possible with radiopaque contrast esophagus examination, esophagoscopy with thin-needle biopsy of the tumor. Treatment of choice is operation which gives very good result [1–4].

Aim

Aim of this report is present our experiences with treatment patients suffering from nonepithelial neoplasmas of the esophagus.

Methods

During the last 12 years 12 patients were treated with nonepithelial neoplasms of the esophagus. Among the treated were 6 females and 6 males from age of 23–65 years (average 41 years). All of them had dysphagia as main symptom with 1–8 years duration. All patient had radiopaque contrast examination, esophagoscopy and CT. Intramural benign tumor of the esophagus was recognised in all cases. Exact recognition (leiomyoma) was established before operation only in one case. In 7 patients tumor was placed in medium 1/3 part of the esophagus. In 6 patients tumor was removed by right-side thoracotomy, 1 by right-side thoracoscopy. In 5 patients tumors were in the 1/3 lower part of the esophagus and were removed by left-side thoracotomy. Lumen of the esophagus was opened in 3 patients with big tumors. 2 patients after tumor placed in 1/3 lower part of esophagus required esophagus wall reconstruction by pedunculated flap of diaphragm. After that 2 patients required gastrostomy and 1 jejunostomy for decompression of the esophagus.

Results

All operated patients survived and postoperative complications did not revealed. Postoperative findings were as follow: in 6 cases — leiomyoma, 3 — fibroma, 1 — fibro-leiomyoma, 1 — lipoma, 1 — cystis lymphomatosa. In 8 patients dysphagia disappeared after operation, in one case (after lipoma removed) persisted during 3 weeks due to narrowing and inflammation of the esophagus in the region tumor removed. All patients before being discharged from the hospital have had radiopaque contrast study and esophagoscopy examination which revealed good status of the esophagus. They are under medical control from 12 to 2 year and their health status is good.

Conclusions

Nonepithelial neoplasms of the esophagus not are frequent. They require differentiation from cancer of the esophagus. Malignant changes could be suspected especially when they are revealed in young people without cachexy symptoms and when history of the disease was long what frequently happened. Exact diagnosis is easy when tumor is large, destroys lamina mucosa covering tumor and is possible to get material for microscopic examination from the surface of the tumor. When the tumor is placed deeper biopsy is difficult and dangerous [1–3]. Benign tumors, mentioned above requires unconditionally operational treatment. When they are growing, having made swallowing troubles and destroying esophagus. Theoretically malignancy and cancer overlooked is possible as well. Our experiences proved that the operative procedure is easy, the lumen of the esophagus is not opened and outcomes are very good. Thoracoscopically removing some tumors what have been done in one case was very inviting for such a procedure.

Summary

Nonepithelial neoplasms of the esophagus are rare, most frequently are leiomyomas. Increasing dysphagia is main symptom. Exact preoperative diagnosis is difficult. We may suspect it, when such a symptoms as long-term history of disease, intramural position, intact mucosa covered tumor are confirmed. They are almost always benign tumors, but require removing. Surgical treatment when the tumor is enucleated is merely way to treat them. Outcomes of such a procedure are very good.

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EXTENSIVE MULTIPLE AND LOBE-SPARING PULMONARY RESECTIONS WITH THE ND: YAG LASER AND A NEW WAVELENGTH OF 1318 NM

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Aims. Analysing the results of extensive parenchymal resections in 110 patients we want to demonstrate the safe usage and the superiority of the second Nd: YAG laser wavelength (1318 nm) which shows significantly better lung tissue determinants.

Methods. Between 3/96 and 11/97, 110 patients (66 men and 44 women, mean age 60 years) were integrated prospectively in three groups and underwent pulmonary surgery with the Nd: YAG laser of the 1318 nm wavelength. 78 patients had suspected lung metastases of known primary malignancies (group 1); 20 patients with poor lung function had peripheral T1 or T2 lung primaries (group 2) and 12 patients had multiple pulmonary nodules but unknown malignancies (group 3).

Results. In group 1 we resected 353 nodules or 4.6 nodules per patient, between 5 and 60 nm. Although 41% of all lesions were deep-seated and only 28% solitary, it was in 97.5% possible to perform precision resections. In two patients (2.5%) lobectomy was necessary which demonstrates a drastic decrease of the lobectomy rate — reported between 20 and 30% in the literature. There was no mortality in all groups, and only two complications were treated conservatively.

Discussion. The technical improvements in this special laser (1318 nm) allow extensive parenchymal resections and should make the long-discussed advantages of lasers in open lung surgery applicable to a broad clinical usage.

Objectives

Although endobronchial laser coagulation and vaporisation of obstructing tumors with Nd: YAG lasers of the standard wavelength of 1064 nm has been well established since the early eighties, it was not yet possible to apply this success in open thoracic surgery. The main reason is that the same laser devices with the standard wavelength of 1064 nm are used by the thoracic surgeons. Analysing the results of extensive parenchymal resections we want to demonstrate the safe usage and the superiority of the second Nd: YAG laser wavelength (1318 nm) which shows significantly better lung tissue determinants [2].

Methods

Between March 1996 and November 1997, 110 patients (66 men, mean age 60 years, and 44 woman, mean age 61 years) were integrated prospectively into three groups and under-

went open pulmonary surgery with the Nd: YAG laser of the 1318 nm wavelength exclusively. Group 1 consisted of 78 patients with suspected isolated lung metastases of known primary malignancies elsewhere; in group 2 we operated on 20 patients with peripheral T1 or T2 lung primaries who had poor lung function; and 12 patients were included in group 3 because they had multiple pulmonary nodules on chest X-ray or CT scan but unknown malignancies elsewhere.

Results

In 78 patients with suspected isolated lung metastases we resected 353 nodules (4.6 nodules per patient), between 5 and 60 mm. In 78.2% of the cases the diagnosis of malignant secondaries was confirmed histologically; in another 7 patients (9%) the pulmonary lesions turned out to be second and third lung primaries. This indicates that in nearly 90% of patients with known malignancies newly discovered pulmonary lesions are malignant again. On the other hand this leaves about 10% of benign nodules in these cases.

The primary tumor of the confirmed metastatic lesions was in 53% a kidney or colorectal carcinoma. Further there was a fair distribution of primary sites (mamma, thyroid gland, melanoma, sarcoma, bladder and others).

Although 41% of all lesions were deep-seated and only 28% solitary, it was in 97.5% of the cases possible to perform oncologically safe precision resections with the 1318 nm wavelength. In two patients only (2.5%) lobectomy was necessary (1 lower lobe with 13 metastases and 1 middle lobe with a single tumor of 50 mm).

Conclusions

These results demonstrate the technical superiority of the new laser wavelength by the drastic decrease of the lobectomy rate — reported between 20 and 30% in the literature [1, 3, 4]. Associated was a very low mortality rate of 0% in all groups. Only two complications (one postoperative haemorrhage in a case of additionally necessary decortication and one pneumothorax) were treated conservatively.

With this special laser equipment especially consisting of a high performance laser which is able to emit the 1318 nm wavelength it becomes possible to perform extensive parenchymal resections without haemorrhage on the completely collapsed lung. These technical improvements should make the long-discussed advantages of lasers applicable to open lung surgery and to a broad clinical usage.

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MANAGEMENT OF CORROSIVE INJURIES OF THE ESOPHAGUS

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During a 5-year period from 1993 to 1998, 22 cases of caustic esophageal injuries were referred to our clinic, caused by acid consumption as suicidal intentions or as an accident. Four out of 10 cases where acute exploration was performed the corrosion was so extended that no further intervention could be done, and all of them died within 24 hours. In the remaining 6 cases acute esophagogastrectomy, or total gastrectomy with esophageal exclusion was performed. Three out of 6 patients survived primary surgery, who later underwent esophageal reconstruction with a colon substitute. In 12 patients no indication for acute surgery arose, but later during the follow-up in 5 of them dysphagia and corrosive stricture developed. All underwent successful esophageal reconstruction with colon substitute. Case reports, acute management, indications for surgery and prognostic factors are also discussed.

Introduction

Caustic material ingested accidentally or in a suicide attempt produces a wide spectrum of injury to the proximal gastrointestinal tract. Therefore, the immediate medical therapy for patients with caustic chemical injury has never been definitive or clear cut. Clinical experience and animal experiments have provided a few specific guidelines for therapy. However, even these must often be modified for various reasons, mainly for the different types of the ingested corrosive material. To overcome this bias we deal with the emergency treatment of HCI injury exclusively.

Material and methods

From January 1993 to December 1998, 22 adult patients were treated with emergency for upper gastrointestinal HCI injury. All patients drank concentrated (28%) acid, which is widely used as a household cleaner. The caustic ingestion was accidental in 3 patients. In the other 9 patients it was a suicide attempt. Several of the patients were influenced by alcohol.

Immediate treatment comprises prevention of shock, fluid and electrolyte therapy, appropriate doses of antibiotics, and in cases of airway obstruction, orotracheal intubation. After resuscitation, the most important task is to assess the severity of the caustic burn. The following investigative studies were performed in our patients:

1. Questioning of the patient and family to determine the nature and concentration of the caustic substance, the approximate amount ingested, the time of ingestion, and the circumstances.
2. Thorough examination of the mouth, tongue, and larynx.
3. Clinical signs: circulatory disorders (assessed by shock index [pulse rate/systolic blood pressure]); disturbance of consciousness; and upper abdominal tenderness.
4. Arterial blood pH.
5. Chest and abdominal radiography and contrast X-ray.
6. Endoscopy.

Based on these data, severe gastric necrosis was suspected in 10 patients, and acute exploration was indicated. In 4 patients the corrosion was so extended that no further intervention could be done, and all of them died within 24 hours. In the remaining 6 cases acute esophagogastrrectomy, or total gastrectomy with esophageal exclusion was performed. 3 patients survived primary surgery, who later underwent esophageal reconstruction with a colon substitute.

In order to assess severity of injury we looked for prognostic factors and investigated them in 3 patients groups:

1. Patients cured by esophagogastrrectomy (3 cases)
2. Patients who died after esophagogastrrectomy (3 cases)
3. Patients judged as hopeless at diagnostic laparotomy (4 cases).

The following prognostic factors were studied: age, amount of HCl ingested, time frame between injury and operation; abdominal pain (mild-1, medium-2, severe [muscle guarding]-3), circulatory disorders (shock index < 1-1, shock index = 1-2, shock index > 1-3), disturbance of consciousness (mild-1, medium-2, severe [unconscious]-3), arterial blood pH.

Results

The mean age appeared to be the lowest in patient group I (31.8 years) the differences between the groups were significant. The amount of HCl ingested was found the highest in the laparotomized patients (group III), 2.5 dl in average. The interval between injury and operation among those who have recovered figures at 4.2 hours, while it was more than twice as much in the other two groups. None of the patients operated on beyond a 6 hours' delay survived. As regards abdominal pain there was no demonstrable difference between the groups compared. The vast majority of unconscious patients and lowest pH values were found in patient group III. Similarly, the shock index showed the most serious circulation disturbance also in this group.

Between the successfully treated group (I) and the other unsuccessfully treated groups (II, III) a significant difference was found in 4 variables (age, amount of HCl, time and arterial pH), while between the groups (II, III) where all patients died, there were no significant differences.

Discussion

Caustic injury to upper gastrointestinal tract remains a challenge to the surgeon, as indicated by the mortality rates exceeding 10% [1, 2]. By far the greatest number of deaths are due to complications (peritonitis, mediastinitis, laryngeal edema) occurring in the early phase of the injury. With improvement in early management, the high mortality rate can certainly be lowered.

In order to improve treatment results we established and evaluated several prognostic factors.

Massive ingestion (>2.5 dl) and a delay of 6 hours after injury were always fatal in our experience.

Concentrated acids do not harm the esophagus too severely and produce coagulation necrosis of the stomach as in a thermal burn. The esophagus remains relatively intact because of the relative resistance of the squamous epithelium to acid damage and the short duration of contact as a result of the rapid transit of the acid through the esophagus [3].

Consequently, in cases of acid ingestion, esophageal necrosis is unlikely and increased attention must be paid to the stomach. In our practice the prognostic value of epigastric pain is low. There was no difference between the 3 groups in this respect. On the contrary, it occurred that patients with total gastric necrosis 12 hours following the caustic injury had only a moderate epigastric tenderness. Acute cerebral confusion is a good indicator of severe gastric injury. The depth of unconsciousness was proportional to the amount of ingested acid. In general also arterial pH values paralleled with the amount of ingested acid. Values lower than pH 7 on admission suggest a poor prognosis and necessitate an emergency operation. The shock index was helpful in establishing the indication for emergency operation because all patients sustained serious or moderate circulatory disorder. Emergency endoscopy is required if the indication cannot be established for emergency operation on the basis of clinical and laboratory data. Emergency endoscopy was carried out in 4 out of 10 cases subjected to surgery and in all cases severity stage III were found. Endoscopy was performed also in 6 patients who had a viable stomach and no exploration was needed.

Five out of 12 patients who evaded acute exploration, had to be operated on later due to esophageal or antral stenosis. All underwent successful esophageal reconstruction with colon substitute.

X-ray studies usually do not reveal abnormalities initially, even when the stomach or the surrounding organs are completely necrotic.

Exploration offers the best prognosis in our practice. When the duodenum or surrounding organs or both are seriously injured, the chances for survival are minimal.

Damage to the stomach is generally observed in the antrum and fundus, but acute necrosis usually affects the major part of the stomach and is rarely cured by esophagostomy and feeding jejunostomy is always performed. The thoracic part of the esophagus is removed even if it has not been seriously injured, as the other possible method (blind closure of its distal end around a tube) does not seem to be a reliable intervention in our experience for two reasons. Mediastinal abscess can develop around the distal esophageal stump, and large amount of HCl caused stomach necrosis leads to a grades II or III esophageal burn in most cases. After such an injury it can be expected that a stricture will develop later, which increases the

risk of reconstruction (and makes a thoracic anastomosis necessary), and it can be accompanied by many late complications [5, 6]. The esophagectomy is performed without a thoracotomy. Emergency esophagectomy is usually easy to do, because of the thrombosis of periesophageal vessels and the lack of adhesion to the mediastinum.

Based on our experience, we think that the final outcome is significantly influenced by two factors: the amount of the ingested acid and the time elapsed between initial injury and subsequent surgery.

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CONTENTS

Surgical aspects of gastro-esophageal reflux disease – Indication for surgery – An update. <i>A. Bálint, M. Máté, K. Szabó and L. Romics Jr.</i>	123
Treating morbid obesity with laparoscopically placed, adjustable gastric band. <i>J. Bende, M. Ursu, M. Csiszár and L. Ungar</i>	127
Palliative treatment of malignant pleural effusions by video-assisted thoracoscopic surgery. <i>I. Benkő, T. F. Molnár and Ö. P. Horváth</i>	131
Laparoscopic cholecystectomy in acute cholecystitis. <i>Sz. Bodnár, O. Kelemen, A. Füle, Gy. Kolonics, É. Simon and J. Bátorfi</i>	135
Video-choledochoscopy in bile duct surgery. <i>G. Csáky, J. Bezsilla and D. Tóth</i>	139
Sedation for ambulatory endoscopy. <i>K. Darvas, M. Tarjányi, Zs. Molnár, M. Borsodi, Zs. Éles and P. Kupcsulik</i>	143
Sequential treatment of the common bile duct stones and cholecystolithiasis. <i>I. Farkas, Á. Pap and J. Kamuti</i>	147
Video-assisted thoracic surgery (VATS) for the treatment of primary pneumothorax (PTX): Early indications and “blind resection”. <i>J. Furák, I. Troján and T. Szőke</i>	151
Video-assisted thoracoscopic pleurodesis for malignant pleural effusions. <i>Á. Füredi, L. Kecskés, P. Gehér and B. Kiss</i>	155
The history and the future of teaching and training of laparoscopic surgery in Hungary. <i>I. Furka, E. M. Gamal, I. Mikó, P. Metzger, J. Sándor, I. Rózsa and J. Kiss</i>	159
Laparoscopic gastric surgery – Early experiences. <i>I. Gál, J. Szívós, A. Bálint, L. Hejjel, I. Győry and B. Nagy</i>	163
Laparoscopic wedge resection of the gastric wall for gastric benign tumour. The collaboration of the laparoscopic surgeon and the endoscopist. <i>E. M. Gamal, Á. Altorjay, I. Szántó, J. Garcia and J. Kiss</i>	167
The judgement of adhesion formation following laparoscopic and conventional cholecystectomy in an animal model. <i>E. M. Gamal, P. Metzger, I. Mikó, Gy. Szabó, E. Bráth, J. Kiss and I. Furka</i>	169

The importance of intraoperative endoscopy. <i>I. Győri, I. Gál, B. Nagy and Gy. Lukács Tóth</i>	173
Jejunal feeding in necrotising acute pancreatitis – A retrospective study. <i>J. Hamvas, R. Schwab and Á. Pap</i>	177
Laparoscopic surgery of focal lesions of the liver. <i>L. Kánya, Á. Botos, J. Bezsilla, I. Szederkényi and D. Tóth</i>	187
Successful thoracoscopic surgical treatment of oesophageal cyst. <i>Gy. Lázár, K. Szentpáli, I. Szántó, Zs. Palásthy and Á. Balogh</i>	191
The role of diagnostic laparoscopy in staging of pancreatic cancers. <i>A. Nagy, G. Pardavi and A. Oláh</i>	193
The laparoscopic technique for bilateral inguinal hernias. <i>A. Petőházi, É. Simon, O. Kelemen, I. Székely and J. Bátorfi</i>	197
New surgical procedures in postgraduate medical education. <i>E. Róth</i>	201
Synchronically performed laparoscopic cholecystectomy and hernioplasty. <i>É. Simon, O. Kelemen, J. Knausz, Sz. Bodnár and J. Bátorfi</i>	205
Laparoscopic adrenalectomy – New experiences. <i>R. Szlávik, J. Horányi, T. Tihanyi, R. Bukovác and K. Darvas</i>	209
Effect of laparoscopic antireflux operation on esophageal manometry, 24 hours pH-metry and quality of life in gastroesophageal reflux disease. <i>G. Varga, Á. Király, M. Moizs and Ö. P. Horváth</i>	213
First Hungarian, internet-based prospective, multicenter study: The hernia-project. <i>G. Weber, M. Kassai, Zs. Csontos, Cs. Czuczor and P. Ö. Horváth</i>	219
The laparoscopic treatment of non-parasitic liver cysts – Five years experience. <i>Z. Zalaba, T. F. Tihanyi, T. Winternitz, L. Nehéz and L. Flautner</i>	221

SURGICAL ASPECTS OF GASTRO-ESOPHAGEAL REFLUX DISEASE – INDICATION FOR SURGERY AN UPDATE

A. Bálint, M. Máté, K. Szabó and L. Romics Jr.
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Gastro-esophageal reflux disease is regarded as the single most common foregut disorder mainly in Western countries. The pathophysiological background of the disease is multifactorial. The primary aim of the management of gastro-esophageal reflux disease is relieving heartburn and healing esophagitis. The therapeutic objectives are alleviating symptoms, preventing complications and avoiding recurrence. Besides the effective medical treatment nowadays we possess the minimal invasive anti-reflux surgery which gives comparable, even better results than medical therapy does, in cases of patients who are suitable for anti-reflux surgery. The key question is the appropriate patient selection. In order to achieve the most adequate patient selection, diagnostic tools like endoscopy, radiography, esophageal body and sphincter manometry, 24-hour esophageal pH monitoring and occasionally 24-hour bile exposure monitoring and gastric emptying studies are mandatory to carry out preoperatively. On the basis of the results of these tests the tailored concept of anti-reflux surgery can be applied. The importance of experienced surgeon should be pointed out, too.

Introduction

In recent years there has been an increased awareness among both patients and medical establishments of the diagnosis of gastro-esophageal reflux disease (GERD). This has most likely been accompanied by a real increase in prevalence and has coincided with recent changes in the availability of effective medical and surgical treatments and increasing knowledge of some of the basic mechanisms underlying gastro-esophageal reflux disease [8]. The GERD has multifactorial origin: the epithelial cell layer of the esophagus, the impaired clearing function of the esophageal body, the defective lower esophageal sphincter, the inappropriate relaxation of the lower sphincter, the mechanical factors of the gastro-esophageal junction furthermore the delayed gastric emptying can contribute to the development of the disease [13].

Discussion

Most GERD patients present to and treated by general practitioners. Some of the care for GERD patients require referral to a gastroenterologist and a surgeon. The treatment is based

not only on symptoms and referral patterns but also more increasingly on financial factors [8].

The first step in the management of the suspected GERD patient is a thorough history and physical examination. If the patient has so called alarm symptoms like dysphagia, anemia, weight loss, refractory pain or atypical symptoms, prompt endoscopy is necessary. The vast majority of patients do not require endoscopy at first. The patient should be advised to accept lifestyle modifications, to take antacids, H₂ receptor blockers or proton pump inhibitors especially in patients with consistent pain and nocturnal component of symptoms. When symptoms are more suggestive of a motility problem, the treatment can be supplemented with prokinetic drugs like 5-HT₄ receptor agonist cisapride. If symptoms recur after 4 weeks or if they are not relieved during treatment period, an endoscopy should be done. An endoscopic evaluation can be included in the database of the patient before major long-term therapeutic decisions are undertaken. During endoscopy special attention must be paid to the condition of gastro-esophageal junction. In case of suspicion of Barrett's esophagus four quadrant biopsies should be taken at the gastro-esophageal junction. Patients with Barrett's esophagus with no dysplasia ought to be in surveillance program with app. 1 year intervals between endoscopies. If Barrett's esophagus shows dysplasia, then the material should be reviewed by two independent pathologist to confirm the diagnosis and to establish whether the changes are consistent with low- or high-grade dysplasia. Low grade dysplasia mandates repeat biopsy at six months to check whether there is a progression to high-grade dysplasia. If the repeat biopsies fail to confirm dysplasia, the patient should return to normal surveillance program. If low grade dysplasia persists, then endoscopy and biopsy should be repeated in six months. If there is a diagnosis of high-grade dysplasia at the initial or any follow-up biopsy, then three months long high-dose proton pump inhibitor therapy should be done to rule out the possible inflammatory pseudodysplasia. If the repeat biopsy confirms the high-grade dysplasia the patient should be referred for consideration of resective surgery [8].

In the absence of Barrett's esophagus or for Barrett's esophagus without high-grade dysplasia, the goal of treatment of GERD should be to relieve symptoms. The current medical therapy is aimed at suppression of acid secretion while allowing other noxious agents like bile salts, pepsin and trypsin to reflux through a defective sphincter into the esophagus. By application of potent anti-secretory drugs (proton pump inhibitors) and prokinetic agents, healing of esophageal mucosal injury can be achieved in nearly 100% of patients, however, up to 50% of patients require permanent maintenance therapy to remain in remission [6]. The severity of esophagitis on initial endoscopy, a defective lower esophageal sphincter on manometry and the presence of duodenal contents in the refluxate are predictors of a chronic or recurrent course of the disease [14]. In these patients anti-reflux surgery is a rational treatment option [11, 5, 15].

If the medical therapy is effective in healing mucosal damage, but the mechanical defect of the anti-reflux barrier persists, the symptoms as well as the mucosal injury recur as soon as medical therapy is discontinued. In these patients anti-reflux surgery is a rational treatment option [11, 5, 15], because the anti-reflux surgery is designed to restore the defective barrier of the lower esophageal sphincter and effectively and permanently prevents reflux of all

gastric contents into the esophagus. It should be mentioned, that patients with Barrett's esophagus must also be followed up after a successful surgical intervention [7].

From the point of view of success the key question is the appropriate patient selection. In order to achieve the most adequate patient selection, diagnostic tools like endoscopy, radiography, esophageal body and sphincter manometry, 24-hour esophageal pH monitoring and occasionally 24-hour bile exposure monitoring and gastric emptying studies are mandatory to carry out preoperatively. On the basis of the results of these tests the tailored concept of anti-reflux surgery can be applied [5]. In summary, an indication for surgery is established in the following conditions:

- Persistent or recurrent symptoms, in spite of optimal medical treatment with proton pump inhibitors.
- Persistent or recurrent complications of the disease in spite of optimal medical treatment.
- Restricted quality of life due to drug dependence, restricted quality of life due to insufficient success of medical therapy or side effects of medical treatment.
- Substantially restricted quality of life (in patients of all ages) due to typical persistent symptoms or mechanically induced symptoms of a large hiatal hernia, such as regurgitation and postprandial epigastric pressure (volume reflux symptoms) [3].

Conclusions

Surgery is an attractive option for young or middle age patients who do not want to take chronic potent medication for lifestyle reason. Before surgery, patients should have the opportunity of a detailed discussion with both their gastroenterologist and the surgeon, regarding all the risk and benefits of long-term medical versus surgical therapy. The importance of giving adequate information to the patients about possible treatment options must be emphasized. Potential risks as well as the potential benefits of each treatment option should be communicated. The patient should make the final decision, but the physicians are responsible for providing objective information to the patients. This is especially true in cases of diseases, which can be treated by alternative methods, in other words, in cases of facultative indications for surgery [1].

The fundoplication, which was first performed by Rudolf Nissen in 1955, became the standard surgical procedure to prevent the reflux of gastric contents [9, 10]. New technologic advances in laparoscopic surgery have recently resulted in a renaissance of the Nissen fundoplication [2, 4, 3]. This type of procedures should be done only in experienced centers by expert surgeons. Although there are no long-term data available, laparoscopic fundoplication generally appears to be safe and effective and therefore preferable to open surgery [12].

In general the "wrap" procedures are the most effective ones, but preoperative motility studies influence the choice of procedure (total or partial wrap formation).

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TREATING MORBID OBESITY WITH LAPAROSCOPICALLY PLACED, ADJUSTABLE GASTRIC BAND

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The authors present their first experiences on the laparoscopically placed, adjustable gastric band treatment of morbid obesity. Treating of the morbid obesity in a surgical way, this particular method is widely accepted as the less invasive and most modern procedure, with the benefit of adjustability of the gastric band. During the spring of 1999, 4 patients were treated with the method described above, 3 male and 1 female, the average BMI was 47.5 kg/m². The mean operating time was 150 minutes (90–270), the patients left hospital the third day after the operations. We noticed no early complications, except for 1 band being displaced, it was replaced immediately by laparoscopic technique. The method, widely used all over the world is opening new aspects on treating morbid obese patients in our country, if properly indicated and operated, giving long lasting effective results.

Introduction

Morbid obesity is one of the most common chronic illness in the welfare world, the estimated frequency of 10 to 15%. Beside the overweightness other organ failures also upraise, most common is hypertension and diabetes type II. Solving such problems are not successful only by trying to reduce weight with diet, drug and behavioural modification therapy. The expectation can reach around 10 kg reduction, but for obese patients this is insufficient. It must be kept in sight that the cost of such long term therapy is very high, it is estimated for example that in the USA it represents more than 5% of the total health care costs. Methods used by surgeons for treating obese people were not accepted widely. These were major surgery procedures, carrying high risk and by causing changes in normal anatomy required even more complicated surgery for being restored. The idea of banding the gaster was clear from the first trial done by open surgery before, but having a major frustration. Done by open surgery the band could initially be too tight and later becoming larger, thus not doing its work properly. Criteria is that it should function from the first day and for years after. The development of surgery and engineering solved both problems. Laparoscopic technique can assure method for placing band via laparoscope, and the adjustable band with its inflatable balloon and reservoir gives a control for gastric restriction any time after placement. In our report we summarise our experiences on laparoscopically placed adjustable gastric band operations.

Patients and method

During the spring of 1999 at Telki Hospital in Department of Surgery 4 patients were treated with laparoscopically placed gastric band method. 3 male and 1 female (age: 26–46) with the average BMI 47.5 kg/m². All patients underwent usual preoperative investigations including psychiatric consulting. Before entering this study they had been treated for years with drugs and severe diet, but not accepting any result sufficient enough. 2 patients had hypertension controlled with drugs, 1 patient had diabetes. We found no contraindications for operation. We used the Lap-Band (Bioenterics USA) system in all cases. The technique used was the method described by Belachew et al. The patients were positioned in a reverse Trendelenburg position, we used five ports, three 5 mm, one 10 mm for the camera and one 18 mm for inserting the band. This port served later for the reservoir placement. The path prepared for band placement was just below esophagogastric junction. First steps are made at the lesser curvature, staying close to the gastric wall, preparation then follows at angle of His, and with the help of special instrument dissecting a path, the tunnel is ready for insertion of the gastric band. A calibration is made by the tube served with the set, and passed by the anaesthetist. The usual measure is 20–25 ml of saline and by withdrawing it should gently stop at the junction. The gastric band is then placed just below the balloon. Fixation of the band is crucial, without this, prolapse of the gastric wall can upraise post operatively, thus being insufficient for its purpose. We make anterior wall fixation, using 2/0 Ethibond stitches, at least three sutures across the ventral aspect of the band. After reviewing the abdomen, we continue with the placement of reservoir, sutured in the site of the fifth port, giving good position for adjustment.

Results

We managed all 4 patients with laparoscopic method, noticing 1 complication right after operation, this was displacement of the band. Reoperation was made immediately, again with laparoscopic approach, no conversion was necessary, the band was placed in its right position. The average operating time was 150 minutes (90–270). No further complications occurred. Minor analgetics were enough for post operation pain. On the next day X-ray investigation was made for assuring the right position of the band, then liquid diet was allowed. All patients left hospital on the third day. The first review was after 3 weeks, 1 patient mentioned vomiting, but managed it with drugs. Up to this day all patients are on liquid diet, solid food transition is recommended after ten weeks. Addition of liquid is also due on the tenth week, further reviews and adjusting at 4–6 weeks intervals. Long term results can not be shown yet, we are looking forward for data collection in the future.

Discussion

Treating morbid obesity in a surgical way should result high effectiveness and should cause low complication rate, either for its minimal invasiveness or its long term outcome. In the last 6 years improvement in the developing better bands, and surgeon technique, made it

possible to discharge disappointing complications due to the method used until. Recently all over the world, the most widely used technique is the laparoscopically placed, adjustable gastric band burding method. In our country this area of surgical procedure is doing its first steps, we in our article presented our experiences. Hoping this surgical way will be an effective method of the treatment of the morbid obesity, we are looking forward for sufficient weight loss and acceptable general self-comfort of all our patients.

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PALLIATIVE TREATMENT OF MALIGNANT PLEURAL EFFUSIONS BY VIDEO-ASSISTED THORACOSCOPIC SURGERY

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Malignant pleural effusion (MPE) are associated with significant morbidity. Prompt clinical evaluation followed by aggressive treatment often results in successful palliation. Video-assisted Thoracic Surgery (VATS) today can be employed in the diagnosis and treatment of idiopathic and known MPE. Between January 1994 and December 1998 233 MPE patients were treated with pleurodesis. 206 of them underwent tube thoracostomy and drainage alone followed by chemical pleurodesis. In 27 out of the 233 cases VATS management was applied. These patients had undiagnosed pleural effusions or recurrent MPE following failed previous drainage and pleurodesis. The cause of the effusion was breast cancer in 11 patients, lung cancer in 9, urogenital cancer in 3, mesothelioma in 2 and other in 2. VATS intervention was thoracoscopic exploration with biopsy and directed chemical sclerosis in undiagnosed MPE (19/27) and lysis of pleural adhesions with partial decortication and pleurodesis in recurrent effusions (8/27). VATS managements were successful 26/27 after mean follow up of 6 months. Had not mortality postoperatively and severe morbidity. Chest tubes were removed 1.5 ± 0.5 days postoperatively and hospital stay were averaged 4 ± 1 days. We concluded that VATS is a safety and effective way of managing selected patients with pleural effusions.

Introduction

Malignancies of the breast, lung pleura and genito-urinary tract and other solid tumors often associate with pleural effusions. The patients with pleural effusion have severe dyspnoea, cough, chest discomfort, and the patient's ability to perform routine of daily activities is markedly reduced. If effective systemic treatment is not available for the underlying disorder and the removal is impossible by other means, the evacuation of the fluid and the pleurodesis is mandatory. The standard therapy for malignant effusions in our experience consists of chest tube drainage and instillation of a sclerosing agent. When recurrent MPF is noted in spite of these treatments, or cytological examination and percutaneous pleural biopsy for diagnosis were unsuccessful video-assisted thoracic surgery (VATS) methods were applied. In this report results of VATS management for the diagnosis and palliation of malignant pleural effusions (MPE) are presented.

Methods

Between January 1994 and December 1998 233 patients were treated pleurodesis on account of MPE. 206 of them underwent tube thoracostomy and drainage with instillation of a sclerosing agent. 27 patients received VATS management. (16 males, 11 females, age ranged from 23 to 72 years.) The causes of the effusions were breast cancer in 11, lung cancer in 9, urogenital cancer in 3, mesothelioma in 2, other tumor in 2 patients.

19 patients had cryptogenic pleural effusions following thoracentesis and cytological examination or percutaneous pleural biopsy. In these cases we used video assisted thoracoscopy and multiple pleura biopsy, and at the end of the procedure sclerosing agent was administered intrapleurally. 8 MPE patients had multiloculated pleural effusion had failed to respond to primary chest tube thoracostomy and pleurodesis. In these cases lysis of pleural adhesions were performed prior to the partial decortication followed by directed chemical sclerosis.

Before 1996 Bleomycin was used in two cases, Vibramycin in two other, and Tissucol in another two cases (two component fibrin glue with cytosin arabinosid) as sclerosing agent Talc was administered in the remaining 7 cases. Since 1996 talc is used exclusively for sclerosing of MPE (14 cases). Talc was insufflated in 6 and administered as slurry instillation 8 cases. VATS was performed in general anaesthesia with double lumen tube intubation and single-lung ventilation.

Results

VATS management with sclerotherapy was successful in 26 cases of 27. They had not recurrent effusion after thirty days of VATS. Median survival was 5 month after mean follow up of 6 months. Three breast cancer patients survived more than 2 years.

We had not mortality postoperatively and severe morbidity. Chest tubes were removed 1.5 ± 0.5 days postoperatively and hospital stay were average 4 ± 1 days.

Discussion

Pleural drainage and instillation of a wide variety of sclerosing agent in the preferred treatment in most of the cases of MPE [1, 2, 3]. VATS today can be employed in the diagnosis and palliation of idiopathic or known malignant pleural effusion [4]. We used VATS in 27 cases of 233 patients were treated MPE. We recommend VATS management in the following cases of MPE:

1. diagnosis and sclerotherapy for cryptogenic pleural effusion
2. limited decortication and pleurodesis, after failed chest tube drainage and sclerotherapy.

We concluded that VATS is a safe and effective way of managing selected patients with malignant pleural effusion.

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LAPAROSCOPIC CHOLECYSTECTOMY IN ACUTE CHOLECYSTITIS

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The authors retrospective analyze the role of golden standard laparoscopic cholecystectomy for the treatment of acute cholecystitis. They make a comparison between the results of 50 early cholecystectomy and 44 "a froid" cholecystectomy (operation was postponed until 6 weeks after acute cholecystitis had healed). From January 1997 to December 1998 536 laparoscopic cholecystectomies were performed. In 491 cases (91.6%) laparoscopic, and in 45 cases (8.4%) traditional (opening) method was indicated. Converted cholecystectomies were in 36 cases (7.3%).

Agreeing to the literature they can determine the optimal timing of the operation in 72 hours from the onset of acute cholecystitis [2, 4]. In this group (first group) there were 50 cases, with 14 conversions (28%). In the second group (postponed, so called "a froid" phase) there were 44 patients. From this group was the intraoperative diagnosis serious acute-subacute cholecystitis in 24 cases (54.54%) causing complicated laparoscopic cholecystectomy and resulting in 11 conversions (11/44: 25%). The causes of the higher rate of conversion were the grave inflammation and slow dissection of central formation. There were no serious complication and mortality in both groups. It was diagnosed bile leak (two cases) which ceased spontaneously, one haematoma in abdominal layers, and one trocar's hernia. The authors have recommended the laparoscopic cholecystectomy for early diagnose acute cholecystitis in order to prevent the complications and reduce the sick-leave. Supporting their viewpoint the most important clinical and economical facts are:

- the recurrence of inflammation forced urgent surgery and caused more complication
- in the course of "a froid" phase there were scrutable anatomical situation
- the patients recovered in a shorter time.

Introduction

Making a study of the laparoscopic cholecystectomy for acute cholecystitis in 50 cases, and for "a froid" phase in 44 cases. There were 36 and 33 successful cases in these groups.

Material and Methods

Diagnosis of acute cholecystitis based on spastic right abdominal pain in the subcostal region, fever or subfebrility, and leukocytosis. Abdominal ultrasound is routine examination. Laboratory tests of serum bilirubin, transaminases, amylase, and alkaline phosphatase

were done. In case of extrahepatic cholestasis endoscopic retrograde cholangio-pancreatography was indicated, completing with native abdominal X-ray examination, and gastroscopy according to necessity.

Table 1
Converted laparoscopic cholecystectomies

Acute cholecystitis:	14
Chronic cholecystitis:	9
"A froid" phase:	11
Tumor of gallbladder:	2

Laparoscopic method of the authors: Using 3 trocars ("three puncture methods") generally: the epigastric and umbilical are 10 mm in diameter and the iliacal one is 5 mm. The fourth trocar was needed rarely, in the event of technical problem. After laparoscopic checking of the abdominal cavity, if necessary pericholecystic adhaesiotomy was performed usually. In case of hydrops or empyema the gallbladder was aspirated. Microbiological cultivation is obligatory. After dissection the cystic duct and artery, were clipped, and electrocautery dissection by hook. The inflamed, abnormally enlarged gallbladders were extracted in endoscopic bag through umbilical wound. Safety drain was placed into the foramen Winslowi, for 1–2 days. Fascial suture is required at the umbilical trocar's site only.

Results

In the converted cases of first group (I/A) was the female/male range: 6/8, non converted cases (I/B) was 29/7. In the second group which are II/A and II/B it was 5/6 and 24/9.

Table 2
Rate of conversion and laparoscopic cholecystectomy

1. Acute cholecystitis:	"A": conversion:	14
	"B": successful LC:	36
2. "A froid" phase:	"A": conversion:	11
	"B": successful LC:	33

Table 3
Female/male range

1/A:	6/8
1/B:	29/7
2/A:	5/6
2/B:	24/9

In the Group 1 the age varied from 16 to 88 years and in the Group 2 from 23 to 84 years.

Table 4
Age range (average, years)

1/A:	65.4
1/B:	48.3
2/A:	66.8
2/B:	51.2

There was no significant relation in the first group between the onset of the disease and the frequency of conversion. In both groups the predictors of conversion were associated with positive history disease, male sex, age over 65 years and previous laparotomy comparing the successful laparoscopic cholecystectomies in the group 1/B and 2/B it can be stated that average operating time was diverge hardly (80 minutes versus 90). There was no mortality and injury of biliary tract. Four postoperative complications were diagnosed altogether [3]. In the group 1/B a bile leak was perceived which ceased spontaneously on 4th postoperative day, and a haematoma was evacuated from abdominal layers on second postoperative day. In the group 2/B was a spontaneously solved bile leak as well as abdominal reconstruction was performed because of trocar's hernia in two months. The mean hospital treatment was 3.6, and the sick-leave was 15 days.

Conclusion

The laparoscopic cholecystectomy has been converted into an accepted minimally invasive technique for the treatment of acute cholecystitis. In the hand of experienced surgeon laparoscopic cholecystectomy is a safe procedure for acute cholecystitis [1, 5] The optimal timing of the operation is within 72 hours from the onset of disease [3, 4]. The patients will not suffer from subacute or "a froid" phase. The laparoscopic cholecystectomy in acute cholecystitis has all the same advantages like in elective cases, since more serious acute or subacute cholecystitis was found in "a froid" state! There is no significant difference between the complication and conversion rate of early and postponed laparoscopic cholecystectomies.

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VIDEO-CHOLEDOCHOSCOPY IN BILE DUCT SURGERY

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The authors report on common bile duct explorations performed in 92 patients and in one patient laparoscopically. In their practice usually ERCP and EST were attempted first when bile duct stones were suspected. Open choledochotomy was performed when the endoscopic approach was unsuccessful, or a stone was detected during selective intraoperative cholangiography. In 16 cases intraoperative video-choledochoscopy was performed. The thing that increased the average operating time by 47 minutes. In 4 patients in this group residual stones were detected postoperatively, presumably because of the inexperience of the surgeons with the use of the choledochoscope. Postoperative cholangiography raised the suspicion of a residual stone altogether in 8 cases. Postoperative ERCP was negative in 2 instances, EST and stone extraction were successful in 3 patients, but unsuccessful in 3 patients. In these last cases a successful reoperation was made in one, ESWL and dissolution therapy were performed in two patients. The authors advise to learn the technique of laparoscopic removal of the bile duct stones and the application of guide-wire, Dormia basket, Fogarty balloon catheter, and balloon dilatator. According to the data of the literature, the one stage laparoscopic procedure is successful in most of the patients, more comfortable, and cost saving.

Introduction and aims

In the era of laparoscopic cholecystectomy there is a continuous debate on the necessity of routine or selective pre- and intraoperative investigations and the treatment of bile duct stones [4, 5]. There are various options for removal of the bile duct stones: preoperative endoscopic sphincterotomy (EST) with stone extraction, open or laparoscopic bile duct exploration, postoperative EST with stone extraction, or extracorporeal shock-wave lithotripsy (ESWL) and chemical stone dissolution therapy. Among the methods presented for laparoscopic explorations choledochoscopy offers the most reliable one to avoid the incidence residual stones [3].

Methods

Data of choledochotomies performed for the extraction of bile duct stones at our department between 1993 and 1998 were analysed. Having a suspicion of bile duct stone a preope-

rative endoscopic retrograde cholangio-pancreatography (ERCP), and if necessary, EST and stone extraction were indicated. On the basis of an intraoperative positive cholangiogram made selectively during open or laparoscopic cholecystectomies, open choledochotomy and stone removal were decided. Intraoperative choledochoscopy was performed by the aid of a video-equipment used conventionally in laparoscopic cholecystectomies which was attached to a flexible choledochoscope (KarlStorz GmbH, Tuttlingen, Germany). The diagnostic values of preoperative ultrasound, liver enzyme levels, ERCP, intra- and postoperative cholangiography and choledochoscopy were examined. Comparison was made between the results of the patients treated with preoperative EST and stone extraction unsuccessfully, and with the open surgical technique, with respect to the operating time, complications, mortality rate, residual stones, hospital stay, and the value of choledochoscopy.

In 92 patients open choledochotomy, and in one patient laparoscopic exploration of the common bile duct were carried out. They were 67 women and 26 men; their average age was 64 years (range 17 to 89 years). Out of the patients 20 have symptoms characteristic for gall stones for weeks, 26 for months, and 47 for years. Preoperative ultrasound found a bile duct of normal size (<8 mm) in 31 patients, but revealed bile duct stone in other 13. Among the patients cholangitis developed in 31, and altogether 52 had jaundice. There was no increase in liver enzyme values in 23 cases. Preoperative ERCP was unsuccessful in 11, ES in 5, and stone extraction in 18 patients. A nasobiliary drain was placed in 9 cases. According to the preoperative medical risk of the patients (ASA), 13 belonged to ASA 1, 41 belonged to ASA 2, 33 belonged to ASA 3, and 6 belonged to ASA 4.

Results

Intraoperative cholangiography was performed in 81 cases, with false-positive result in 6. Intraoperative video-choledochoscopy was performed in 16 operations, with an average operating time of 161 minutes, 47 minutes more than usually measured in open choledochotomies. In one occasion, after an unsuccessful preoperative endoscopic stone extraction (because of an 40 × 20 mm large stone in the common bile duct) a successful laparoscopic bile duct exploration, video-choledochoscopy and stone removal was performed. Open choledochotomies were made by all surgeons (13) of the staff, but video-choledochoscopy was performed by only 8 of them. The T-tube remained in place on an average of 16 days. T-tube cholangiography raised the suspicion of residual bile duct stone altogether in 8 patients (out of the 16 video-choledochoscopies in 4). For treatment of the residual stones postoperative ERCP and ES-stone extraction was made in 2 patients with a negative result, in other 3 patients successfully, but in the further 3 patients without success. In this last group of patients a successful reoperation, and in 2 cases ESWL and chemical stone dissolution took place. Major postoperative complications (acute pancreatitis, cholangitis, hemiparesis, myocardial infarction) developed in 9.6% of the patients, and minor complications (wound infection, chest, urinary infection) was detected in 10.8% of the patients. Two patients were lost. The first case is of a man who was 69 years old with preoperative cholangitis and poor condition (ASA 4) and with postoperative cardiac infarction; the second case was a woman

who is 89 years old with preoperative cholangitis and jaundice. In spite of a successful choledochotomy she died on the 10th postoperative day due to a cardiopulmonary insufficiency (mortality: 2.2%). The average postoperative hospital stay was 21.3 days.

Discussion

Endoscopic ERCP, ES and stone extraction in specialized centres can be successful in more than 90% of the patients with common bile duct stones at a morbidity rate of 10% and a mortality of about 1%. In aged patients with cholangitis or severe pancreatitis the endoscopic approach is undoubtedly the first choice. The success rate of open surgical choledochotomies is the same, with comparable morbidity, but, depending on the age and comorbidity of the patients, it is with increased mortality. Laparoscopic exploration of the common bile duct can achieve a success rate of 90–94%, with a comparable low rate of morbidity and mortality. The one-stage method is cost-saving, more comfortable for the patient, but at the same time it is technically more demanding, and expensive instruments are needed. Nowadays the number of the surgical choledochotomies has been decreased, and indications to these procedures are as follows: either unsuccessful ERCP or ES or endoscopic stone extraction; or bile duct stones detected with cholangiography performed routinely or selectively in open or laparoscopic cholecystectomies. Laparoscopic exploration of the common bile duct became very popular in many specialized centres in Europe and other parts of the world [1, 2, 4]. It seems that 70% of the bile duct stones can be retrieved transcystically, with the same postoperative advantages as in laparoscopic cholecystectomies, and laparoscopic choledochotomy is necessary in only 30% of the cases. To achieve an effective laparoscopic approach skills are needed in manipulation with Dormia basket, Fogarty balloon catheter, flexible choledochoscope, balloon dilatation of cystic duct and papilla of Vater and experience in laparoscopic intracorporeal suturing. In our opinion the great number of our residual bile duct stones after choledochoscopy reflected the fact that surgeons of our staff were not sufficiently trained to carry out these procedures. On the other hand, it is obvious that patients after unsuccessful ERCP and ES or endoscopic stone removal signify the most critical risky cases.

Conclusion

Before performing the laparoscopic common bile duct exploration, it is advisable to acquire the perfect technique of balloon dilatation of bile ducts, guide wires, mechanical or electrohydraulic lithotripsy, flexible choledochoscopy, and stone removal with Dormia basket or Fogarty balloon catheter. These procedures are essential for the successful removal of a bile duct stone via the endoscopic retrograde route or via an open choledochotomy. For the future it seems that it will be a demand to perform intraoperative cholangiography, and laparoscopic removal of all bile duct stones detected preoperatively.

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SEDATION FOR AMBULATORY ENDOSCOPY

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Diagnostic and therapeutic fiberoscopy of gastrointestinal tract is often performed ambulatory and sedation is sometimes also required. Indication for sedation can be the intervention itself or the patient's psychological state. Aim of the study was to compare the effects of midazolam and combination of midazolam and fentanyl during endoscopy. Twenty eight cases were investigated: oesophagogastroduodenoscopy ($n = 14$) and colonoscopy ($n = 14$). Anaesthetics were midazolam (M) in 16 cases, midazolam-fentanyl (MF) in 12 cases. Non-invasive mean arterial pressure, pulse rate, acid-base balance and blood gases (by Astrup method) were recorded before endoscopy, at the 5th and 10th minutes of endoscopy, 15 minutes after intervention and also before emission. Pulse rate changed between 78–92/min. Mean arterial pressure appeared between 84–90 mm Hg. In MF group both were lower but there was not significant difference between the groups. The values were in normal range, there were not metabolic acidosis which needed correction. Onset of sedative effect was 2.8 min. in M group, 2.3 min. in MF group. The ability for adequate reaction returned within 11 min. in M group, within 14 min. in MF group. Fentanyl prolongs sedative effect of midazolam and offers sufficient pain relief. After 3 hours, patients could be emitted from the hospital.

Introduction

Diagnostic and/or therapeutic fiberoscopy of gastrointestinal tract is often performed ambulatory and sedation is sometimes also required. Indication for sedation can be the intervention itself – technique and duration of endoscopy – or the patient's psychological state. In case of ambulatory anaesthesia, criteria for patient's discharge from the hospital have to be also considered: stability of vital functions, loos of nausea and vomiting, ability for adequate reaction. Aim of the study was to compare the effects of midazolam and combination of midazolam and fentanyl during endoscopy.

Patients and method

Twenty eight cases were investigated: oesophagogastroduodenoscopy ($n = 14$) and colonoscopy ($n = 14$). Age of patients was between 15–78 years (average 59.2 years). Chosen anaesthesia was midazolam (M) in 16 cases, midazolam-fentanyl (MF) in 12 cases. Doses of midazolam were: 0.1 mg/kg body weight in monotherapy, 0.08 mg/kg body weight in com-

bination. Fentanyl was used in dose of 0.1–0.15 mg. Intravenous atropine premedication (0.125–0.25 mg/dosim, depending from pulse rate) was applied.

Non-invasive mean arterial pressure (MAP), pulse rate (PR), acid-base balance and blood gases (by Astrup method) were recorded before endoscopy (BE), at the 5th and 10th minutes of endoscopy (E5, E10), 15 minutes after intervention (AE15) and also before emission (BL).

We evaluated the onset of sedation and recovery time (adequate reaction to commands) and criteria for hospital discharge.

Results

Table 1
Pulse rate

P/min.	BE	E5	E10	AE15	BL
Midazolam	83	87	92	88	84
MF	78	82	87	84	82

Pulse rate changed between 78–92/min. In MF group it was lower but there was no significant difference between the groups.

Table 2
Mean arterial pressure

mmHg	BE	E5	E10	AE15	BL
Midazolam	84	86	90	85	85
MF	85	86	87	86	86

Mean arterial pressure appeared between 84–90 mmHg. In MF group it was lower but no significant difference was found between the groups.

Table 3
Actual pH

BE	E10	BL	
Midazolam	7.43	7.40	7.41
MF	7.42	7.39	7.40

Table 4
Base excess

mmol/L	BE	E10	BL
Midazolam	2.2	0.8	1.1
MF	2.0	0.6	0.9

Table 5
Buffer base

mmol/L	BE	E10	BL
Midazolam	48	46	47
MF	47	46	47

The values were in normal range, there were not metabolic acidosis which needed correction.

Table 6
Partial oxygen tension pO_2

mmHg	BE	E10	BL
Midazolam	77	76	76
MF	78	76	77

Table 7
Partial CO_2 tension

mmHg	BE	E10	BL
Midazolam	39	41	41
MF	40	42	42

Blood gases were in normal ranges. There was a patient with higher pCO_2 , he suffered from chronic obstructive pulmonary disease.

Onset of sedative effect was 2.8 min. in M group, 2.3 min. in MF group. The ability for adequate reaction returned within 11 min. in M group, within 14 min. in MF group.

Midazolam or fentanyl antagonist (Anexate, Narcan) were not given.

Discussion

Aim of sedation during upper or lower endofiberoscopy is to provide comfortable situation for the patient as well as the physician. Short diagnostic oesophagogastroduodenoscopy does not usually need sedation, local anaesthesia is enough. Therapeutic or longer diagnostic procedures can be the field for sedation or anaesthesia. Depending from the dose, midazolam is useful for sedation or anaesthesia, its amnestic effect is excellent. During painful, usually lower endoscopy, fentanyl can be also given. It prolongs sedative effect of midazolam and offers sufficient pain relief. After 3 hours, patients could be emitted from the hospital.

Proper conditions of reanimation and skilled staff have to be presented during ambulatory endoscopy in case of sedation or anaesthesia.

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SEQUENTIAL TREATMENT OF THE COMMON BILE DUCT STONES AND CHOLECYSTOLITHIASIS

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The orthodox method of the treatment of gallstone disease is laparoscopic cholecystectomy (LC) days or weeks after endoscopic retrograde cholangiopancreatography + endoscopic sphincterotomy (ERCP+ES). It can be advantageous from the point of financing, that is double reimbursement ($2 \times \text{DRG}$). On the other hand there are some disadvantages of this procedure: longer hospital stay, further suffering of the patient, difficulties at operation because of inflammation provoked by ERCP (11% 14/120 in 3 month). We report on our experience with the treatment of common bile duct stones within 24 h by sequential endoscopic-laparoscopic management. The gallstone disease of a 32 year old woman was diagnosed by ultrasonography and laboratory tests. She had ERCP+ES in the morning and LC 7 hours later. There was no complication and the patient was discharged already on the 3rd day.

Introduction

The management of cholelithiasis and choledocholithiasis has undergone striking changes in the past decade [1, 3]. Historically a combination of cholecystectomy, cholangiography, common bile duct exploration, and/or transduodenal sphincterotomy was performed by surgeons to manage these problems [8]. The evolution of laparoscopic cholecystectomy and endoscopic sphincterotomy have provided useful alternatives to traditional management. Preoperativ common bile duct clearance with endoscopic retrograde cholangiopancreatography and endoscopic sphincterotomy is routinely performed in many centers where laparoscopic cholecystectomy is the procedure of choice for the treatment of cholelithiasis [4]. A question that remains unanswered what is the optimum timing of their application. In the following a report is given of a case where endoscopic sphincterotomy and laparoscopic cholecystectomy was performed within 7 hours, without any complications.

Case report

A 32 year-old female patient was admitted with classic biliary symptoms to our hospital on 12th January, 1999. *Status:* the patient had colicky pain in the right upper quadrant of the abdomen, but no jaundice.

Laboratory findings: liver function tests were elevated alkaline phosphatase 725 U/l serum bilirubin 35 $\mu\text{Mol/l}$ US: Distension of the gallbladder, thickening of its wall were observed by ultrasonography. The gallbladder was full of stones /diameter 3-4 mm/ and in the 1,2 cm diameter common bile duct were two 4 mm stones.

The ERCP confirmed the diagnosis of the US. Endoscopic sphincterotomy was successfully performed and the stones were removed by Dormia basket stone extraction technique. Subsequently the patient consented to laparoscopic cholecystectomy. Thus, we performed the LC 7 hours after the ERCP without any difficulties. At the operation we confirmed the inflammation of the gallbladder. Histologic examination showed acute cholecystitis. The control laboratory tests /amylase, liver function tests/ became normal. The patient had an uneventful postoperative time and she was discharged 2 days after the operation and returned to the work on the 10th day.

Discussion

The past 20 years have demonstrated major changes in the therapy of gallstone disease. The rapid acceptance of laparoscopic cholecystectomy is unprecedented in general surgery. Undoubtedly, pressure from commercial and public interests as well as continued technological advances have promoted this procedure [1, 2]. Despite the rapid advance many questions remain: some have resurfaced from the past (e.g. routine intraoperative cholangiography) and some are newly arisen secondary to laparoscopic cholecystectomy (e.g. common bile duct exploration vs pre or postoperative ERCP). With the development of laparoscopic cholecystectomy ERCP has become increasingly important, as part of the noninvasive approach to biliary tract disease [5, 6, 7]. Thus, preoperative bile duct clearance via endoscopic retrograde cholangiopancreatography is the routine in many laparoscopic cholecystectomy centers for patients with suspected choledocholithiasis who are undergoing laparoscopic cholecystectomy. This sequential approach of endoscopic papillotomy and stone extraction followed by LC within 24 h is a safe and effective technique for the management of cholecystolithiasis and choledocholithiasis. By this approach we reduced the complaints of the patient, the hospital stay and the costs as well, but also the income of the hospital. We stress on the financing contradictions of the Hungarian health care system.

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VIDEO-ASSISTED THORACIC SURGERY (VATS) FOR THE TREATMENT OF PRIMARY PNEUMOTHORAX (PTX): EARLY INDICATIONS AND “BLIND RESECTION”

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Aim: To report our VATS procedure and results in the treatment of PTX. **Methods:** Between 1992–1995, 156 patients with primary PTX were admitted and drained. On the basis of permanent air leak, lung reexpansion and type of PTX, 78 patients were operated on by VATS with early indications. In first episode PTX cases we performed “emergency VATS” in haemopneumothorax and “early or late acute VATS” between 8–48 hours after acute drainage in the others. In recurrent cases “late acute VATS” was done in 24 hours after acute drainage with permanent air leak. We performed “under water-test”. In 57 *Vanderschueren* stage II–III–IV cases the lung disorders and the place of air leakage were resected. In 21 *Vanderschueren* stage I cases “blind apical resection” was performed. We carried out pleural abrasion, and two pleural drains were inserted. **Results:** In every “blind resection” case the pathology revealed lung disorders: cystic deformation, fibrosis or inflammation. We had no operative deaths. In 1 case because of intercostal artery bleeding, thoracotomy had to be performed. We had 1 recurrent PTX. There was no late complications. **Conclusion:** The early indications reduced the hospitalization. The “blind apical resections” remove abnormal lung tissue, diagnose the underlying lung disease and the metal staples can cause adhesion reaction in the apex region.

Introduction

The term “spontaneous pneumothorax” can be tracked back to the Frenchman Itard who first described the phenomena in 1803. In the following period spontaneous PTX was divided into primary and secondary groups. In secondary spontaneous PTX cases underlying lung diseases can be found, such as emphysema, fibrosis, inflammation, ARDS and asthma. Primary or idiopathic spontaneous pneumothorax is caused by the rupture of small apical blebs or bullae. The etiology of primary spontaneous pneumothorax is unknown.

The generally accepted treatment for a first episode of spontaneous PTX is pleural drainage. After minimal invasive surgery was introduced into thoracic surgery and because VATS is less invasive for patients, in PTX cases the indications for surgery and the types of investigations changed.

Based on histologic examinations, many authors demonstrated subpleural pathomorphologic pulmonary changes in idiopathic PTX [2]. In the VATS period Inderbitzi et al. found almost in every cases surgically curable, endoscopically visible alterations [2], so the term “idiopathic” suggesting absence of any lung disease, no longer seem adequate. In Jordan et al. paper [3] demonstrated that the CT is not 100% accurate in the diagnosis of emphysema

and small apical bullae may be missed on the CT and surgical management is still required for the treatment of recurrent PTX. In Schoenenberger's work [5] it is demonstrated that after 48 hours of persistent gas leaking the early use of invasive procedures seems justified. After this premise, we would like to present our experience in the treatment of patients with primary spontaneous pneumothorax.

Patients and indications

Between 1992–1995 156 patients with PTX were admitted to our Department and thoracic drainage with suction therapy was performed in every acute episode. On the basis of the type of PTX, the permanent air leak and the lung expansion, half of these patients (78) underwent VATS procedure with early indications. They were divided into two groups, on the basis whether they had first episode PTX or recurrent PTX. Sex distribution is the following: 65 men and 13 women – mean age: 29.4 years (16–71 years). Mean follow-up 15 months (2–27 months). 65 out of the 78 were smokers.

We had 57 patients with first episode primary spontaneous PTX. In this group we performed "early acute" VATS in 12 hours after acute drainage if we noticed permanent air leak – without lung reexpansion in 12 cases (21%). We had 39 (68%) "late acute" VATS in 48 hours after acute drainage with permanent air leak – with complete lung reexpansion. Two patients (3.5%) with bilateral PTX in acute episode were drained on both sides, and the greater-air-leak sides we performed "early acute" VATS in 8 hours after acute drainage. The other side remain drained. We had 3 contralateral PTX that developed 6–10–24 months after the other side was drained. In these 3 cases (5.3%) we performed "early acute" VATS in 8 hours after acute drainage. In one haemopneumothorax case (1.7%) "emergency" VATS was performed.

There were 21 patients with recurrent primary spontaneous PTX. In 5 cases (24%) the recurrence occurred 2 weeks to 3 months after thoracocentesis and in 6 cases (76%) this occurred 3 to 6 months after thoracic drainage. The patients with recurrent PTX were operated on "late acute" VATS in 24 hours after acute drainage with permanent air leak (21 cases). Before the operation we performed routine CT examinations to identify the possible underlying cause of the PTX.

Operative technique

All VATS procedures were performed under general anaesthesia, with the patient lying in the lateral decubitus position and intubated with a double-lumen endotracheal tube. We perform "under water-test" to identify the place of the air leakage. During our underwater-test procedure, in 57 of 78 cases visible air leak was discovered, in 49 cases in the 1st segment, in 6 cases on the 2nd segment and in 2 cases in the 6th segment. Our endoscopic findings based on *Vanderschueren's* classification is the following: Stage I (no endoscopic abnormalities) 21, Stage II (pleuropulmonary adhesions) 11, Stage III–IV (small and large bullae) 46. If we could see blebs or the place of air leakage, these areas were resected by endo-stapler (*Ethicon*).

The first 3 patients' upper lobe blebs were ligated by a *Roeder* loop, and the only one recurrence of PTX treated by VATS procedure was after this method. If we can find neither bullous area nor air leakage we perform "blind apical resection" with endo-stapler (*Ethicon*). When we introduced VATS into our Clinic, in the first four cases we performed partial pleurectomy, but currently we do pleural abrasion with gauze, presuming that these patients will have to undergo further thoracic interventions. At the end of the VATS procedure two suction pleural drains were inserted and the drains were removed generally on the 2nd and the 3rd postoperative day.

In every case the histological investigation of sample of "blind apical resection" revealed lung disorders: apical bullous emphysema – 57 cases (73%), multiple cystic deformation – 7 cases (9%), fibrosis or inflammation – 14 (18%).

Results

No deaths occurred during surgery or postoperatively. As an early complication in 1 case, due to bleeding, from the intercostal artery, lateral limited thoracotomy had to be performed. In 1 case pleural tube had to be reinserted for recurrent PTX after removal of the second pleural tube, so the recurrence is 1.3% after VATS. 3 patients had a prolonged air leak, and their second drain was removed on the 5th–6th and 7th day. We have no late complications, and no recurrences. The mean duration of postoperative hospitalization was 6 days.

Conclusion

Because of our indications for early VATS in the treatment of spontaneous PTX the postoperative hospitalization was reduced, and the histological investigation after "blind apical resection" in every case reveals lung disorders. During these "blind apical resections" we remove abnormal lung tissue to identify the underlying lung diseases and endoscopic metal staples can cause early and very serious adhesion reaction between the pleuras in the apex region and thereby reducing the probability of PTX there would be better postoperative results.

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VIDEO-ASSISTED THORACOSCOPIC PLEURODESIS FOR MALIGNANT PLEURAL EFFUSIONS

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Aim: The objective was to analyse the efficiency, and safety of thoracoscopic pleurodesis (TP). A retrospective study was made of an initial series of 75 patients undergoing lifetime follow-up who received TP in our department for the treatment of malignant pleural effusions (MPE). *Material and Methods:* From May 1994 to December 1998, 34 men and 41 women with a median age of 63.4 ± 12.5 years were treated by TP. We performed 36 partial diathermic abrasions on pleura combined with talc insufflation, and in 39 cases only talc poudrage. The mean duration of insertion of the chest tube was 4.1 (range 2 to 17) days, with 8.4 (range 5 to 20) days of postoperative hospitalization. There were no severe intraoperative or postoperative complications. The 30-day mortality rate was 1.3% (1 case). The period of follow-up ranged from 2.5 to 40 months (average 6.8). No case of late recurrence has been observed to date. *Conclusion:* Videothoracoscopic pleurodesis (talc poudrage) as a simple and efficient procedure seems to be the best alternative treatment regimen for the management of MPE in a group of selected patients.

Introduction

Options for the treatment of MPE include repeated thoracocentesis, tube thoracostomy with chemical sclerosis, talc pleurodesis, thoracotomy with mechanical sclerosis or decortication, irradiation or chemotherapy, and pleuro-peritoneal shunts [2, 4]. Video-assisted thoracoscopic surgery (VATS) provides unique diagnostic and therapeutic approaches to patients with pleural disorders; in addition it is useful in staging for lung cancer and diffuse malignant mesothelioma. The indications for use are recurrent pleural effusions of unknown etiology and permanent fluids. Due to its high diagnostic accuracy, it should be applied when pleural fluid analysis and needle biopsy are nondiagnostic. Trapped lung is a contraindication for pleurodesis.

Material and methods

75 patients with MPE, (34 men and 41 women with median age of 63.4 (range 35–83) years) were treated by TP. The patients underwent general anesthesia and double-lumen endotracheal intubation, which permitted collapse of the ipsilateral lung during VATS. After the pleural cavity had been emptied of all fluid, a biopsy was taken. We applied electroco-

agulation and talc poudrage (through 3 ports) in 36, and only talcage (through 2 ports) in 39 patients. Instead of endoscopic pleurectomy, we began to apply diathermic abrasion and talcage, but recently we perform talc poudrage only. The fibrosis caused by talc is related to the amount used. In cases of large metastatic tumor masses, we insufflated 5 rather than 2 grams of talc, or even more. This is the most effective sclerosant, and in accordance with the literature, we recently stopped performing electrocoagulation routinely [5]. Finally, 2 tubes were inserted at all times. Histological examination showed 5 mesotheliomas, and 70 pleural metastases.

Results

The mean preoperative history was 2.5 (0.5–6) months. The average operative time was 42.5 (17–110) minutes. There were 2 intraoperative bleedings as complications not requiring conversion. We detected fever in 12 cases, pneumonia in 1 case, incomplete lung reexpansion in 4 cases, and 1 secondary hemorrhage in the postoperative period. The average perioperative blood loss was 280 (120–1400) ml, the drainage time was 4.1 (2–17) days, and the postoperative hospital stay was 8.4 (5–20) days. The early recurrence was 2.6% (2 cases). The late results were uniformly excellent. After a median follow-up period of 6.8 months (range from 2.5 to 40), no recurrence was noted.

Discussion

With conventional pleurodesis using sclerosing agents, such as “talc slurry” through a tube, thoracostomy has a fairly high success rate. However, there are sometimes typical problems associated with poor results, including incomplete evacuation of the fluid and poor distribution of the talc throughout the pleural cavity. Other agents, the previous conservative therapy and standard palliation with a long hospital stay are most expensive, but less effective methods. The VATS technique is simple and effective with minimal disturbance to the patients [1]. Although medical thoracoscopy has a high diagnostic accuracy too, is less invasive and less expensive, it has lower therapeutic efficiency. This method can fail for a number of reasons, including irregularly scattered adhesions preventing good lung expansion, loculation of the pleural space by fibrin and adhesions, or extensive metastases. VATS has been of a great utility in performing pleurodesis as palliative treatment to improve the patient’s quality of life. Therefore, we offer TP in patients with an acceptable general condition who have MPE or an unknown basic disease (recurrent or permanent pleural effusion). The bedside talc slurry is useful in patients in a poor general condition or with a poor pulmonary function when the basic disease is well known. Sometimes, if the primary disease is unclear, a quick medical thoracoscopy can be useful before tube thoracostomy [3]. We believe that videothoracoscopic talc poudrage is of benefit and has advantages in the treatment of MPE; total parietal pleurectomy can even be unnecessary, because the survival is not significantly prolonged by more aggressive surgical approaches.

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THE HISTORY AND THE FUTURE OF TEACHING AND TRAINING OF LAPAROSCOPIC SURGERY IN HUNGARY

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Introduction: Laparoscopic biliary surgery was introduced in Hungary at the end of the 1990. A variety of experimental training and teaching courses had been performed in basic techniques and the human field, which was followed by laparoscopic biliary surgery and various advanced fields. *Aims of the study:* To review the history of teaching and training of laparoscopic surgery in Hungary in both the experimental and the human field, and to draw the consequences of this experience. *Material and methods:* In a period of 6 years 704 qualified surgeons received a full hands – on hands experimental training in laparoscopic biliary surgery, laparoscopic advanced surgery, laparoscopic gynaecologic and laparoscopic urology surgery. *Discussion:* The courses performed in the first and the second phase were of theoretical and practical components. The theoretical knowledge was based with emphasis to the new instruments and equipment, the indications, the new surgical technique. The practical knowledge gave every participant the full time to acquire this new type of surgery. At the end of the courses the successful participants received certificates to shift for training to the human field. Each institution needs to wrestle with issues concerning credentialling in advanced laparoscopic surgery. Like many technical skills, proficiency is maintained through repetition. A philosophy must be developed to determine whether each surgeon will perform this highly specialised type of surgery or whether it will be considered a general skill.

Introduction

Since the introduction of laparoscopic cholecystectomy in the late 80s, the problem of teaching and training in laparoscopic surgery is still controversial. Chief surgeons, who did the first and most of the operations, with a minimal short hands-on animal experimental work or not, became the experts. This issue forced the process of teaching this new modality to be under the global surgical privilege umbrella. However, case reports and horror stories arose of complications associated with some operators having received only minimal training. This period of growing pains and the laparoscopic “learning curve” has passed, and world wide surgical residency training programs now routinely include laparoscopic techniques taught by experienced laparoscopic-endoscopic surgeons.

History of teaching and training in laparoscopic surgery in Hungary

Among the goals that authors tried to accomplish at the end of 1990 was that to connect the teaching process in laparoscopic cholecystectomy (LC) in an animal laboratory with its introduction to the human field.

The *first phase* of this process was a common effort initiated by Professor George Berci from California, with the Postgraduate Medical University, Department of Surgery, Budapest, in December 1990. That was followed by the first operations in the human field in Pécs and Budapest. The need of the hands-on animal experimental teaching LC in pigs was realised in the first session organised for this purpose in the Spring of 1991 in the laboratories of the Surgical Department, Veterinary University, Budapest. That basic operative laparoscopy curriculum included a theoretical and a practical session, including the indications, instrumentation, basic teaching video films, operating room procedures, operating techniques and live hands-on animal operations. Each trainee had the opportunity to assist as a cameraman, assistant and operator. The instructors of that program were the authors who by that time gained experience in the human field.

This process continued with the *second phase* of teaching. In the Spring and Autumn of 1991 another 4 courses of hands-on training sessions were organised for surgeons with the authors as instructors in the laboratories of the Veterinary University, Budapest. The duration of the courses was three days, with a basic theoretical and practical curriculum for teaching laparoscopic cholecystectomy. At the end of the courses credentialling certificates were issued to the participants. In *phase 1 and 2* a total number of 147 surgeons received a basic theoretical and practical teaching and training in diagnostic and laparoscopic cholecystectomy.

In the *third phase* the hands-on animal experimental teaching of laparoscopic cholecystectomy was shifted from Budapest to be held at the Department of Experimental Surgery, Debrecen University of Medicine. From February 26, 1992 to October 5, 1998, twenty five teaching courses were organised for training in laparoscopic surgery.

The courses are classified as follows:

Type of session	Number of courses	Number of participants
LC	21	321
Individual LC courses	18	185
Urologic laparoscopy	2	19
Gynecologic laparoscopy	1	14
Laparoscopic suturing techniques	1	18
Courses for nurses (mixed with surgeons for LC)	10	
Total number of participants in phase 3		557
Total number in phase 1+2		147
Total number of participants trained in phase 1+2+3 (1992–1998)		704

The sessions had a duration of 2–3 days. Each program began with an all-day training session with lecture material and video demonstrations, which was followed by different laparoscopic manipulations in a training box, including the removal of the gallbladder from liver design. When that was finished successfully, then each participant performed independently an LC and assisted as a first assistant and a cameraman. At the end of the course every participant received a certificate of participation, with a recommendation to continue as an observer in a teaching centre where LC is a routinely performed procedure.

Similar courses were performed in Pécs and Kaposvár, but the exact number of courses and participants are not available for us.

Since 1993 teaching and training of laparoscopic surgery for medical students began at the Department of Experimental Surgery, Debrecen University of Medicine. The training sessions are similar to those performed at the postgraduate courses.

The Future

We think that a program of teaching and training laparoscopic surgery should be established to cover the graduate level, resident graduation and postgraduation. As the graduate and residency level is concerned, basic laparoscopic knowledge and training in laparoscopic cholecystectomy is sufficient. This includes the instrumentation, indications, problems of patient selection, operating room procedures and set up, the operation with hands-on experimental animal work, the complications and the postoperative care.

When this is completed successfully, then a clinical phase should be introduced. The candidate or resident should act as a cameraman and an assistant. After a successful training he should be certified to perform his first human operation with the assistance of an instructor. We think that such an experimental and clinical training program can be feasible to perform in Universities where experimental laboratories are available, to have the same instructors in both fields. Besides, laparoscopic surgery should be a compulsory part of the final exam in surgery in both the undergraduate and resident program.

Theoretical and practical experimental work must precede any *clinical introduction of advanced laparoscopy*. Performing advanced laparoscopy there is a need for a correct suturing practice and an ability to use both hands. Certification in this level requires both basic routine laparoscopic knowledge (LC) in the experimental and clinical levels, and a successful certification of advanced laparoscopy in experimental work and observing advanced laparoscopy in the clinical work. Each institution needs to wrestle with issues concerning credentialling in advanced laparoscopic surgery. Like many technical skills, proficiency is maintained through repetition. A philosophy must be developed to determine whether each surgeon will perform this highly specialised type of surgery or whether it will be considered a general skill.

LAPAROSCOPIC GASTRIC SURGERY EARLY EXPERIENCES

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In the Department of General Surgery the authors performed 12 elective laparoscopic gastric operations for gastric pathologies. The indications for the procedures were recurrent or therapy resistant and complicated peptic ulcer in 9 cases, benign gastric tumors in 2 cases and early gastric cancer in 1 case. Operative procedures were the next: posterior truncal vagotomy with anterior lesser curve seromyotomy (5 patients), total truncal vagotomy with gastrojejunostomy (2 patients), total truncal vagotomy with pyloroplasty (1 patient), total truncal vagotomy with antrectomy and Billroth-II reconstruction (1 patient), resection of benign gastric tumor by the transgastric approach (1 patient), Billroth-II resection for benign gastric tumor (1 patient), wedge resection of gastric wall for early gastric cancer (1 patient). Intraoperative gastroscopy was used for location of the lesion in 4 of 12 cases. Apart from delayed gastric emptying (2 cases), patients recovered without any problem. The mean hospital stay was 5.7 days. Early experiences with laparoscopic gastric surgery has shown that there are certain important advantages to the approaches. They hold the promise of less pain, less immobility, quicker alimentation, shorter hospitalization, less wound and respiratory complications and an earlier return to normal activities.

Introduction

Laparoscopic surgery has heralded a new era for the operative treatment of gastric pathologies [1–6]. The surgeon has a choice of several approaches, depending on his or her training and level of skill. The aim of our report is to introduce our early experiences with laparoscopic gastric surgery.

Material and Methods

Over the last few years 12 patients were operated laparoscopically for gastric pathologies. The indications for surgery were recurrent or therapy-resistant and complicated peptic ulcers in 9 patients, 4 of them with gastric outlet obstructions. Posterior truncal vagotomy with anterior lesser curve seromyotomy was performed in 5 cases. Gastric outlet obstructions were treated by three different types of procedures. Total truncal vagotomy with gastrojejunostomy was performed in 2 cases, total truncal vagotomy with pyloroplasty in 1 case and total truncal vagotomy with antrectomy and Billroth-II reconstruction in 1 case, respectively.

In 2 patients with benign gastric tumors (leiomyomas) two different techniques were used. Laparoscopic resection [1] by the transgastric approach was performed in one case with tumor on the posterior gastric wall, and [2] a gastric resection was carried out in the other case with pylorus-involving tumor, that caused partial gastric outlet obstruction. One patient with early gastric cancer was treated by wedge resection of the gastric wall. The gastric pathologies were located in 4 cases by intraoperative gastroscopy and staplers (Endo-GIA 30 U.S.S.C.) were used in 6 cases for resection and/or excision.

Results

The median operating time was 201 minutes (range 185–240) in the group treated by posterior truncal vagotomy with anterior lesser curve seromyotomy, 145 and 160 min. in the 2 patients handled by total truncal vagotomy with gastrojejunostomy, 195 min. for total truncal vagotomy with pyloroplasty and 255 min. for total truncal vagotomy, antrectomy and Billroth-II reconstruction. In the cases with benign gastric tumors and early gastric cancer, the operating times were 165 min., 185 min. and 105 min., respectively. Delayed gastric emptying occurred in 2 patients (treated by total truncal vagotomy with gastrojejunostomy), but resolved by conservative measures. There were no other postoperative complications or death. The mean hospital stay was 5.7 days. The 12 patients were evaluated between 3 and 26 (mean 10.5) months after operations. Of these 10 were graded as Visick I or II, and 2 patients were considered Visick III.

Discussion

Laparoscopic gastric surgery holds the promise of less pain, less immobility, quicker alimentation, shorter hospitalization, less wound and respiratory complications, and an earlier return to normal activities [1–6]. Today, surgeons are performing fewer elective ulcer surgeries, as the eradication of *Helicobacter pylori* represents a major step in the treatment of this disease. Nevertheless, patients with complications and those resistant to medical therapy should be offered a surgical option [3].

The laparoscopic posterior truncal vagotomy and anterior seromyotomy represents a procedure of choice for the treatment of recurrent or therapy-resistant duodenal ulcers following with an excellent late results [4]. If the ulcer patients have gastric outlet obstruction two types of procedures are recommended laparoscopically: laparoscopic total truncal vagotomy and gastrojejunostomy [6], or laparoscopic total truncal vagotomy and antrectomy with Billroth-II reconstruction [3]. The first operation is a simpler one and is known to have a lower morbidity and mortality. But it is associated with higher recurrence rate and probably is physiologically less satisfying when the stomach is chronically distended, and where an element of gastric atony can contribute to poor gastric emptying. This complication was observed in both of our cases. A combination of laparoscopic vagotomy and antrectomy on the other hand is more radical approach, not only denervating the stomach, but also removing the gastrin-secreting part of the stomach. This approach has higher mortality and morbid-

ity, at least in inexperienced hands, and should be reserved for the more experienced surgeons [2, 3]. Benign tumors of the stomach may be approached and resected laparoscopically. Wedge resection of the lesion by the transgastric approach is a safe and efficient method. The use of an anterior gastrotomy to evert and resect the tumor with attached normal gastric wall is universally successful [1]. For tumors involving the pylorus and causing partial gastric outlet obstruction, gastric resection with Billroth-II anastomosis may be the method of choice. Laparoscopic surgery may be indicated as curative procedure for early gastric cancer [5]. Two different procedures are used depending on the site of the lesion. Laparoscopic wedge resection of the stomach wall with intraoperative gastroscopy, which was applied in our case for the lesion located at the lesser curvature. Another possibility is the laparoscopic intragastric mucosal resection for the lesions located at the posterior wall of the stomach. According to the literature both procedures are curative for early gastric cancer in well selected cases.

Conclusion

Laparoscopic gastric surgery represents an elegant alternative to open surgery as long as it is performed by experienced surgeons. It is always possible to convert the laparoscopic approach to open if a complication occurs during the laparoscopic procedure. We believe that the minimally invasive approaches will renew the interest in definitive surgery for the treatment of gastric pathologies.

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LAPAROSCOPIC WEDGE RESECTION OF THE GASTRIC WALL FOR GASTRIC BENIGN TUMOUR

The Collaboration of the Laparoscopic Surgeon and the Endoscopist

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Introduction: By the introduction of the laparoscopy for the management of gastric pathology many techniques are applied by now. In these techniques the collaboration of the endoscopist and the laparoscopic surgeon is mandatory. *Aims of the study:* To emphasise the necessity of the collaboration of the endoscopist and the laparoscopic surgeon for the management of the gastric pathology using the double lifting and wedge resection technique. *Method:* A case of a female with 2×2.5 cm submucosal tumour is presented. The tumour was located in the antrum. After the onset of the general anaesthesia the gastroscope was introduced to locate the position of the tumour, the free edges of the tumour were elevated by a double lifting method and the tumour was resected by a laparoscopic linear stapler. The process of the proper resection was all through observed and directed by the view of the gastroscope. *Conclusion:* Correct wedge resection of the gastric wall can be safely performed, if the correct gastroscopic control is present. The collaboration of the endoscopist and the laparoscopic surgeon seems to be mandatory, thus avoiding the hazards arising from the use of tattooing.

Introduction

The introduction of the laparoscopic technique for the management of gastric pathology became a routine procedure, especially in the field of the treatment of early gastric cancer (EGC) [2, 4] and leiomyomas [3]. Since the accurate localisation and the free edges of the tumour can not be assessed with only the laparoscope on the serosal surface, the need for intraoperative gastroscopy is always mandatory. We had successfully performed the wedge resection of a gastric GIST tumour in a multidisciplinary approach, using the endoscope for the precise localisation of the tumour and the laparoscopic guided technique for the ENDO-GIA application for the resection.

Material and methods

A 64 year old female was referred because of occasional vomiting and epigastric pain. Esophago-gastro-duodenoscopy performed revealed a 2×2.5 submucosal gastric lesion in the antrum. Endoscopic ultrasonography showed a tumour with GIST appearance. We de-

cided to remove this tumour laparoscopically. The procedure was performed under general anesthesia. Following the creation of the pneumoperitoneum the laparoscope was introduced and diagnostic laparoscopy was then performed. A 33 mm trocar was inserted in the left part of the abdominal wall in one line with the umbilicus, and a 5 mm trocar was inserted to the right part of the abdomen in the medio-calvicular line. Then the duodenum was occluded. The gastroscope was then introduced and the submucosal lesion localised. Two gastric wall lifting threads with a T-shaped metallic end point were introduced and positioned laparoscopically beside the free edges of the lesion under a gastroscope guidance through a hollow inserted to the wall of the stomach. The other ends of the threads were extracorporeally positioned. The gastric wall was then lifted with the lesion until it is totally folded and unseen. With the help of an ENDO-GIA 60 mm (which is introduced through the 33 mm trocar) linear stapler the complete resection of the lifted lesion was accomplished and the resected specimen was removed from the abdominal cavity in a laparoscopic endobag. No bleeding occurred. Following the desufflation of the pneumoperitoneum the incisions were closed. The patient had a solid meal at the 2nd and was discharged on the 3rd postoperative day. The histopathological result of the specimen showed a lipoma, with free resection margins.

Discussion

Various techniques have been reported for the laparoscopic treatment of submucosal gastric lesions, depending on the site of the lesion. Two techniques are known. The first is the laparoscopic wedge resection of the stomach using a lesion-lifting method for lesions of the anterior wall, the lesser curvature, and the greater curvature of the stomach. The other is the laparoscopic intragastric mucosal resection for lesions of the posterior wall of the stomach and near the cardia or the pylorus [4]. Gastroscopic preoperative tattooing is also used to localise the lesion to facilitate resection [1]. A double lifting technique can easily be an alternative to tattooing, since the ink used can dissolve and spread in the gastric mucosa, making the resection line obscure. The only alternative can be the intraoperative endoscopic guidance, which can be another remarkable collaboration between the endoscopic and the laparoscopist surgeon [3]. In conclusion, if the patients are selected properly, these laparoscopic procedures are curative for the treatment of the gastric benign tumours and EGC.

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THE JUDGEMENT OF ADHESION FORMATION FOLLOWING LAPAROSCOPIC AND CONVENTIONAL CHOLECYSTECTOMY IN AN ANIMAL MODEL

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Introduction: The development of postoperative adhesions remains an almost inevitable consequence of visceral and gynaecologic surgery, appearing in 50–95% of all patients. Although decreased adhesion formation is one of the accepted advantages of laparoscopic surgery, only a small number of prospective studies have been done to support this claim. **Aims of the study:** To evaluate the extent of postoperative adhesion formation after laparoscopic and open cholecystectomy. **Material and method:** 60 experimental laparoscopic cholecystectomies (LC) were performed by qualified surgeons in dogs with the aim to acquire the laparoscopic technique. To assess the relation between the complications during the operation (bleeding, injury to the liver substance or gallbladder perforation) and the formation of adhesions, the surviving animals were divided into 4 groups according to the complications occurred. The assessment of the results was made by second – look laparoscopy 4 weeks following LC using the adhesion index. As a control group open cholecystectomy was then performed in 5 dogs without intraoperative complications. **Results:** no adhesion formation was observed in the groups where no intraoperative complications occurred. In all the cases where bleeding or injury to the liver bed occurred adhesion formation occurred. No adhesion formation was observed in case of gallbladder perforation. In all the animals of the control group adhesion formation was observed. **Conclusion:** It seems that LC has a reduced rate of adhesion formation when compared with the open technique. Complications such as bleeding or injury to the liver substance during LC can enhance adhesion formation. No adhesion formation can be mentioned in relation with gallbladder perforation when the laparoscopic technique is applied.

Introduction

The development of postoperative adhesions remains an almost inevitable consequence of visceral and gynaecologic surgery, appearing in 50–95% of all patients. Adhesion formation is associated with both early and late serious postoperative consequences such as bowel obstruction, chronic abdominal pain, infertility and increase of socio-economic costs [4].

Although decreased adhesion formation is one of the accepted advantages of laparoscopic surgery, only a small number of prospective studies have been done to support this claim.

Aims of the study

To evaluate the extent of postoperative adhesion formation after laparoscopic and open cholecystectomy. *Design*: experimental prospective animal study. *Setting*: an academic research environment.

Material and methods

1. Experimental Group

Follow up of adhesion formation in 60 experimental laparoscopic cholecystectomies (LC) performed by 40 surgeons during training in large animal models (dogs) between February 1992 – October 1998.

The animals were divided into four groups according to the postoperative complications that occurred during the LC:

- Group I: 24 LC without complications,
- Group II: 18 LC with minimal intraoperative bleeding,
- Group III: 13 LC with severe bleeding and injury to the liver bed,
- Group IV: 5 LC with gallbladder perforation.

The evaluation of the results was performed by second-look laparoscopy four weeks following the operation. The Assessment of the number of adhesions and quantitation of the degree of adhesions was achieved by the graduation of adhesion formation on a scale of 0–4 (Adhesion Index = AI).

2. Control Group

Conventional cholecystectomy performed by trainee's in 5 dogs, with no intraoperative complications such as bleeding, injury to the liver bed or perforation of the gallbladder. The evaluation of the results was assessed by second-look laparoscopy four weeks following the operation. The Assessment of the number of adhesions and quantitation of the degree of adhesions was achieved by the graduation of adhesion formation on a scale of 0–4 (Adhesion Index = AI).

Results

1. Experimental group

Group I: 24 LC without complications. No adhesion formation was observed (AI:0)

Group II: 18 LC with minimal intraoperative bleeding: a membranous form "spider web" adhesion formation was observed to the liver bed in 100% of the animals (mean AI:2.5, total AI:45).

Group III: 13 LC with severe bleeding and injury to the liver bed: they produced "spider web" dense adhesions to the liver bed and few fibrous "columnar type" band adhesions to the abdominal wall. Adhesion formation was observed in all the animals (100%) in this group (AI:2.85, total AI:37.05).

Group IV: 5 LC with gallbladder perforation: no adhesion formation was observed (AI:0).

2. Control group

All the experimental animals in the control group developed "spider web" dense adhesions to the liver bed and fibrous adhesions the abdominal wall (100%).

Summary of the results

Following LC without complications no adhesions developed.

Adhesions developed in all animals in group II and III when intraoperative complication such as bleeding or injury to the liver bed occurred. No adhesions developed after gallbladder perforation. No distant adhesions developed. In comparison, adhesions developed in all the animals in the control group.

Discussion

Researchers devoted to clear the pathogenesis of adhesion formation suppose that injury to the peritoneal surfaces with consequent inflammation leads to the production of plasminogen activator inhibitors. These inhibitors result in the loss of normal mesothelial fibrinolytic activity, and if prolonged, this allows the organisation of fibrinous adhesions into permanent fibrous adhesions [5]. Adhesion formation can be prevented by several methods using:

- Resorbable biomaterials (ACP gel – hyaluronan solution) [2]
- Oxidized regenerated cellulose adhesion barrier (INTERCEED – TC7) [1]
- Instillation of Ringer's lactate [6].

Laparoscopic surgery has the facility to diminish the exposure of the peritoneal surfaces and it minimises the elective tissue trauma and the invasion of body integrity. Even the disturbance of physiological homeostasis is minimal and it is supposed that it reduces the potential of contamination and infection. Thus, laparoscopic surgery possess all the armamentarium to defend against adhesion formation, but it seems that the severity of the intraoperative complications during LC can initiate minimal adhesion formation in comparison with the conventional technique [3].

Conclusion

When no complication occur, experimental LC is not associated with adhesion formation. Intraoperative complications (bleeding or injury to the liver substance) enhances adhesion formation even during LC. Gallbladder perforation is not associated with adhesion formation. Conventional cholecystectomy is always associated with a higher degree of adhesion formation. Laparoscopic surgery results in a marked decrease in adhesion formation compared with the conventional technique.

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THE IMPORTANCE OF INTRAOPERATIVE ENDOSCOPY

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Nowadays it is an essential demand of the surgeon to make a correct preoperative diagnosis, that is a precondition of optimal operation. Unfortunately it cannot be clarified in each case, what is the location and extension of the alteration, or surgeon finds an unexpected disease during the operation. In similar cases the authors make an intraoperative upper gastrointestinal endoscopy and/or colonoscopy. During these procedures, the identification of the reason of bleeding and in some cases polypoid lesions were found. Over the past few years 16 examinations have been carried out. The examination influenced the course of the operation in each case advantageously. Therefore, the diagnostic repertoire can also be extended by this method. This is, why preoperative endoscopy is of primary importance.

Introduction

Before surgeries the site and size of the disorders to be operated cannot always be clarified. Therefore the authors in case of need perform an intraoperative endoscopy (IE) of the upper and lower digestive tract.

Aim

The authors will show their cases and evaluate their experiences earned obtained with IEs.

Methods

The authors examined 16 patients being in intratracheal narcosis by Olympus GIF Q 20 and CF 10 I endoscopes. *The indications were as follows:* 1. Discovering the reason of severe, acute bleeding in the early postoperative period. 2. Identification of foreign bodies. 3. Localization of a known pathological disorder for the best benefit of the operation.

Results

Intraoperative gastroscopy (9 patients):

a) Laparoscopies (6 cases): the identification of early gastric cancer, marking of the site of the gastric ulcer; marking of gastric leiomyomas; exact estimation of the pyloric region of duodenal ulcer with the trouble of passage.

b) Laparotomies (3 cases): the identification of oesophageal cancer, diagnosis of the source of bleeding; search of a foreign body.

Intraoperative colonoscopy (7 patients):

a) In open surgeries: localization of malignant polyps in 5 cases; marking of the residuum of malignant polyp after endoscopic polypectomy.

b) Laparoscopic surgery in one case the identification of malignant colonic polyp.

Discussion

IE is a world wide used method [2]. Most authors find this a valuable method in operations where the reason was gastrointestinal bleeding, especially caused by vascular dysplasia of smaller extension. The area beyond the Treitz band cannot be routinely examined by endoscopy, so IE can provide valuable help in the identification of changes there, beside enteroscopy [1, 2, 4]. This method is of great importance also in the localisation of colonic polyps and endoscopic therapy [3]. It was Szántó who reported first in Hungary on intraoperative upper gastrointestinal panendoscopy (UGP) [5]. In our cases UGP has been made several times. In 6 examinations endoscopy was necessary with laparoscopic operations. During our intraoperative colonoscopies we have localised those colonic polyps, which proved histologically malignant, but endoscopic polypectomy could not be carried out. This diagnostic method proves as well, that the direct contact between the surgeon and the gastroenterologist make exact identification of diseases and treatment more effective.

Conclusion

The IE differs from the traditional endoscopic examinations because of the circumstances during the surgery. In most cases the preoperatively given site of disease, the circumstances during the surgery did not make possible the correct identification of the site and size of the disorder. There is a great possibility that the spreading of laparoscopic surgery would increase the need of IE. It is possible that the application of the preoperative dying technics in a few cases make the IE unnecessary.

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JEJUNAL FEEDING IN NECROTISING ACUTE PANCREATITIS – A RETROSPECTIVE STUDY

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The acute necrotising pancreatitis is the most serious form of pancreatic inflammatory disease leading to multiorgan failure and high (15–20%) mortality. The poor nutritional and metabolic condition and secondary bacterial translocation rise the mortality further on. A newly introduced clinical method of continuous nasojejunal feeding-based on experimental works - resulted in lower mortality rate (less than 4%) by perfusing adequate nutrients into the second loop of jejunum via a feeding tube. The better nutritional and immunological status of the patients, with restored absorption and intestinal motility promoted recovery, and prevented the septic complications. Although in some cases with serious progression operation became necessary; the timing of surgery was easier because of the less fragile state of the patient. The continuous nasojejunal feeding is a promising new method among the therapeutic modalities of the acute pancreatitis.

Introduction

Acute pancreatitis is a common disease with varying severity in a large scale, from mild form to severe pancreatitis leading to multiple organ failure (MOF) and death [12]. The severity of the disease is depending on the extent of necrosis of pancreatic and peripancreatic or retroperitoneal tissues at a relatively early phase of the disease. The time course of development of infected necrosis and septic shock shows inverse correlation with the extension of the necrotic process. The development of MOF positively correlates with the morbidity and mortality rates [1].

Therapeutic options of the acute pancreatitis are strongly related to the severity of the disease. Current trends in therapy of acute pancreatitis indicate that surgery should be done only in cases of infected necrosis proven by fine needle biopsy and culture of the necrotised tissue. In severe acute pancreatitis, the principal goal of conservative therapeutic measures is the supportive treatment of organ dysfunctions to reduce the risk of development of infective complications and thereby decreasing the frequency of MOF and subsequent death [7, 16, 18].

It has been widely accepted that stopping oral feeding and applying total parenteral nutrition (TPN) may decrease the mortality and it seems to be an important part of the conservative treatment modalities [20]. However, experimental and clinical studies have been demonstrated that long term TPN itself may cause mucosal atrophy in the gut and enhance the rate

of the translocation of bacteria and bacterial products (endotoxins) through the gut mucosa [2, 24]. Continuous jejunal feeding (JF) seems to be ideal to decrease exocrine function of pancreas and to prevent bacterial translocation and septic complications [5, 8, 10].

The aim of the present study is to test the effectiveness of the dietetic treatment and to compare the impact of TPN and JF on the course of acute necrotising pancreatitis.

Patients and methods

Patients admitted to our medical department did not develop yet severe acute abdominal symptoms at admittance although their complaints and signs were according to the picture of acute pancreatitis.

Altogether 86 consecutive patients (57 males, 29 females mean age: 48 years in males and 53 years in females) with severe acute necrotizing pancreatitis were entered into the study. Acute pancreatitis was related to alcohol consumption in 55 cases (45 males, 10 females), to biliary disease in 26 cases (11 males, 14 females). In 6 patients (3 male and 3 females) the ethiology was unidentified [9]. Diagnosis of acute pancreatitis was based on characteristic physical signs and elevation of Serum amylase levels at least by twice of upper limit of normal. The presence of pancreatic necrosis was identified by elevation of C-reactive protein (120 mg/l) and contrast enhanced CT scan. Radiological severity of pancreatitis represented at least 20% necrosis of the gland with nonenhancement after intravenously injection of contrast material. Patients with acute necrotizing pancreatitis were divided retrospectively into 2 groups according to the type of artificial feeding (TPN or JF). TPN was applied in 30 cases. TPN was performed by peripheral veins so that the solution for TPN was hypocaloric (1000–1500 Kcal/day) and was given in about 2000 ml of volume depending on the cardiovascular state of the patients. JF was performed in 56 cases. The jejunal feeding tube was placed into the 2nd loop of jejunum by duodenoscopy. JF solutions (Nutrisone Standard, Peptisone, EGIS–Nutricia, Budapest) was given by continuous 24 h perfusion in a volume of about 2000 ml /day providing a calorie intake of 2000 kcal/day according to the rules of calorie and fluid intake [9].

All patients received standard doses of antacids, H₂-blockers, and nitrate preparations for opening of papilla Vateri [21]. Broad-spectrum antibiotics were given in 35 patients with suspicion of development of infective complications.

The rate of cure, requirement of surgery, mortality rate and time of hospitalisation were analysed. To control the nutritional condition we calculate the Nitrogen balance, according the formula containing the amount the excreted Nitrogen (urine BUN, and kreatinine) and plasma BUN.

Mathematical formulas for calculating Nitrogen balance:

N-balance: Nitrogen intake – Nitrogen excretion

$$\text{N-excretion(g/day)} = \frac{\text{UUN(mg/100ml)} \times \text{urine volume (L)}}{100} + 20\% \text{ of } \Sigma \text{BUN} + 2 \text{ g}$$

N-intake/day (where: 1g protein = 6.25g N)

Table 1

Groups	Mortality
JF	2/56*
TPN	6/30

* $p < 0.05$ (chi-square test)

Table 2

Groups	Surgery
JF	5/56
TPN	4/30

* $p < 0.056$

Results

1. Healing rate and time of hospitalisation

The rates of clinical and morphological healing were significantly higher (81 %) in the JF group as compared to the TPN group (35.5 %), ($p < 0.05$, chi-square test). The time of hospitalisation showed no difference between the groups (JF: 16.5 days, TPN: 17 days).

2. Mortality rate and requirement of surgery

The mortality rate and the rate of surgery showed large differences in favour of JF (Tables 1, 2). The mortality was less than 4% in the JF group, and 20% in the TPN group, ($p < 0.05$). Surgery became necessary in 9% and 13% in the JF and TPN groups respectively.

3. Nutritional state

In a representative group of 30 patients fed via jejunal tube we measured the changes in body weight during enteral nutrition. The patients in the JF groups did not loose weight (Figs 1–4).

In a group of five representative cases the Nitrogen balance turned to positive during jejunal feeding, according to the formula we used routinely in our institution (Fig. 5).

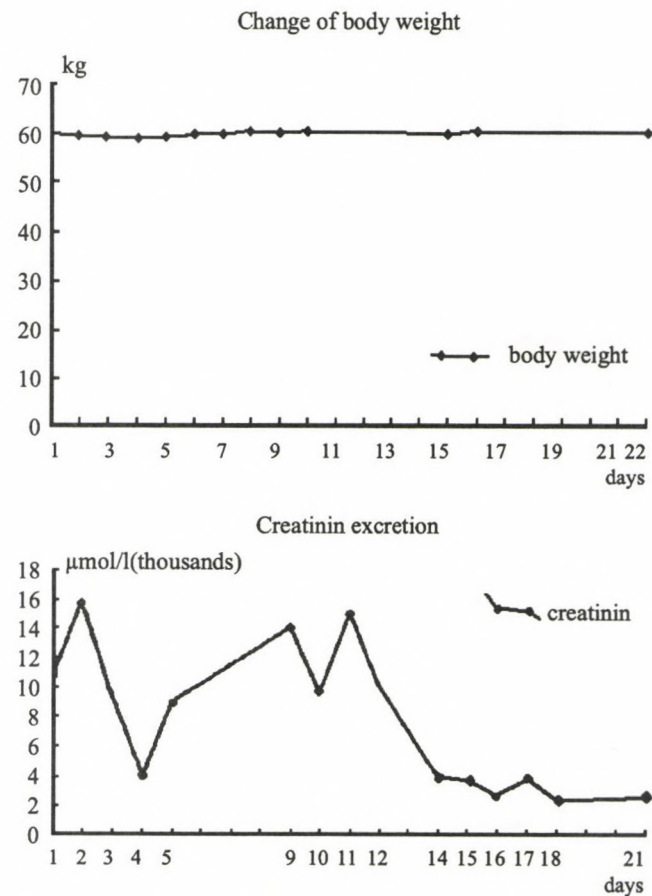
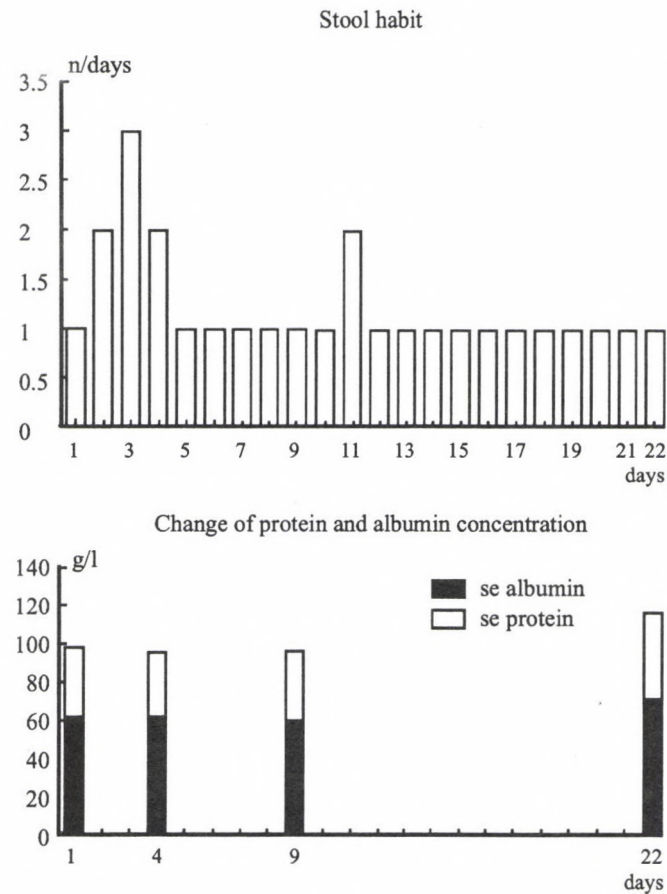


Figure 1. The positive changing of some nutritional parameters during jejunal feeding shows the effect enteral nutrition in a representative case

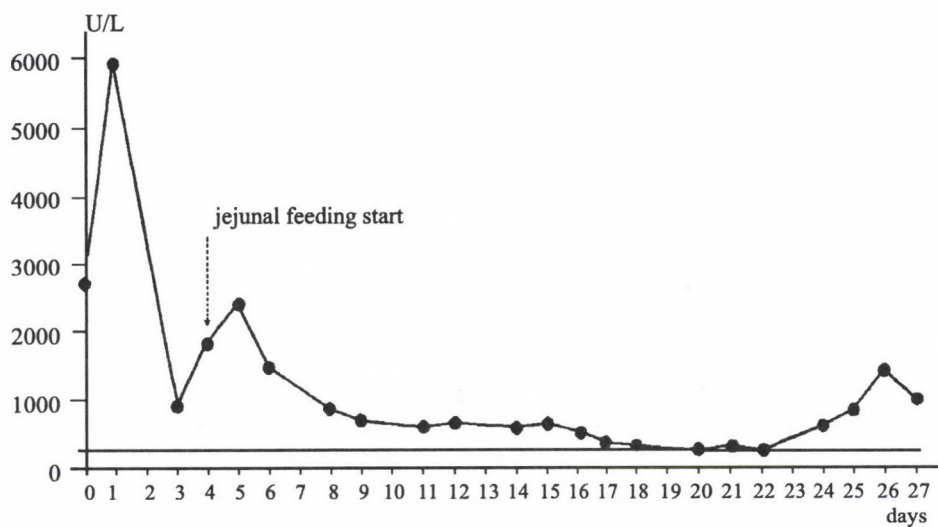


Figure 2. The amylase level normalised, and stabilised after the 10th day of jejunal feeding in a representative case

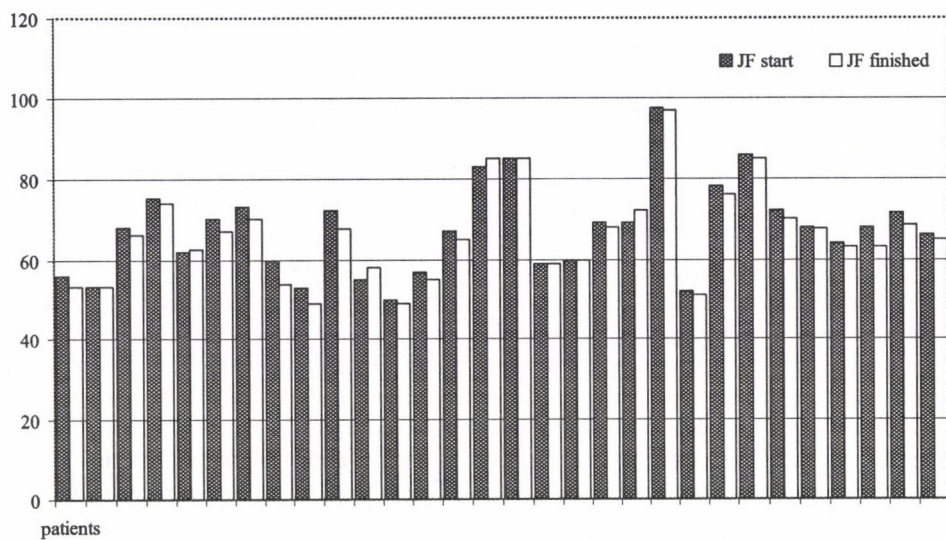


Figure 3. The body weight did not decreased in a group of 30 cases

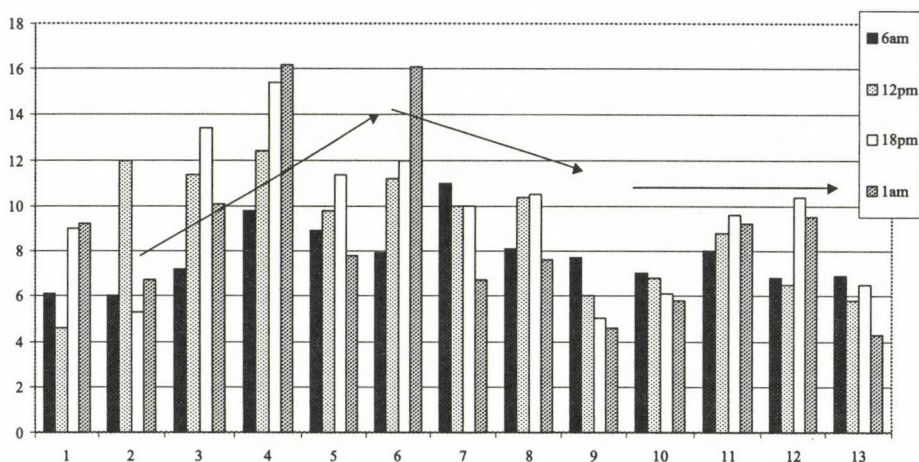


Figure 4. The serum glucose stabilised after the beginning period of jejunal feeding

4. Quality of life during jejunal feeding

We continuously observed the complains of patients and collected the data about the physical and emotional senses during the enteral nutrition. The abdominal pain and the bloating stepwise decreased at the fist days of jejunal feeding, the motility of the colon increased and sense of hunger gradually ameliorated. After the first 3 days of accommodation the patients were able to increase their physical activity, they managed themselves with the continuous jejunal tube nutrition, keeping an almost regular hospital social activity.

5. Complication of jejunal feeding

There were no serious complication related to nutrition in the enteral group. Diarrhoea was found only during the first 3 days in 30% of cases but it was not an undesirable complication because it replaced the previous paralytic ileus. Tube clogging occurred surprisingly rarely. In one case the nitrogen load caused temporary encephalopathy. In another case the nutrient caused fever reaction because of the severe local circulatory failure demonstrated by increased absorbtion of contrast material in a patient suffering from severe atherosclerosis, who went on aortobifemoral bypass before. In some cases higher blood glucose levels were found as a complication of pancreatitis, with a sufficient response to correcting fluid balance and Insulin therapy.

Discussion

Acute necrotizing pancreatitis is a serious condition with significant mortality and morbidity varying according to the severity of the disease. Surgery, including necrosectomy, drainage of retroperitoneal spaces, and lavage, is preserved for treatment of infective compli-

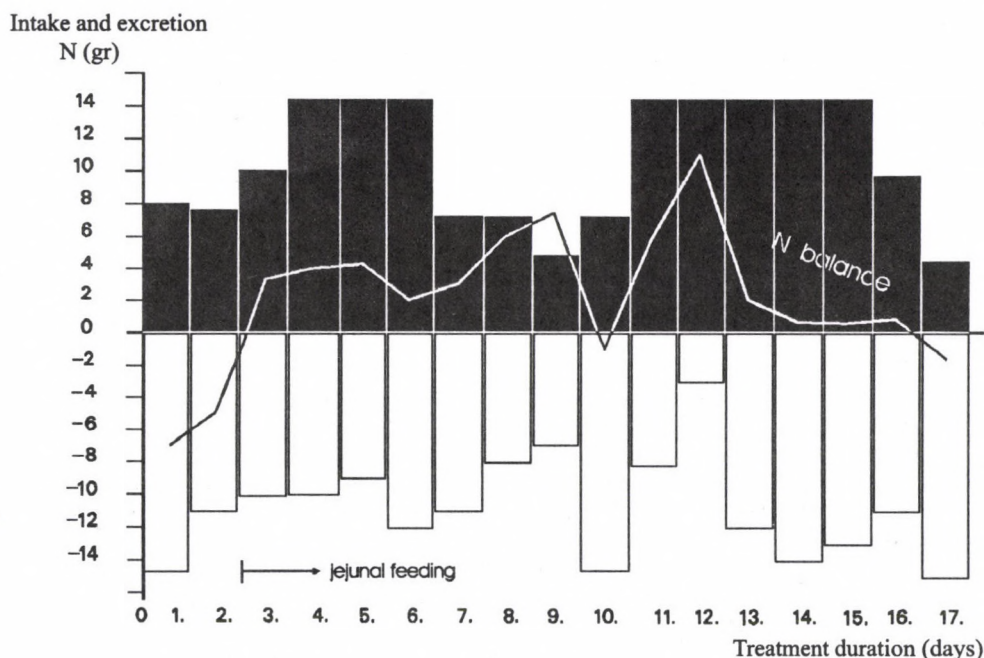


Figure 5. Nitrogen balance according to intake and excretion of nitrogen

cations. In spite of the long history of enteral nutrition [3], only in the last few years were papers published about preliminary experiences with enteral nutrition in severe acute pancreatitis [4, 6, 14, 15, 19, 23]. In this study, we have showed that the JF has a beneficial effect on the mortality rate and the frequency of surgery needed. It has been previously shown that the most important factor of mortality and morbidity due to acute pancreatitis is the development of infected pancreatic and retroperitoneal necrosis. TPN was demonstrated to enhance bacterial translocation through the atrophied bowel wall [2]. The JF seems to maintain the physiologic motility of the gut [11], to prevent atrophy of villi, to increase mesenteric circulation and to put pancreas into the rest [13, 17]. The slow, continuous infusion of nutrients did not interrupt the volume and bicarbonate changes characterising the interdigestive phases and the postprandial peak and integrated secretions were the same as during basal secretion. Thus the slowly administered jejunal diet does not stimulate pancreas secretion, it puts the pancreas into rest just like fasting does, without the harmful metabolic, circulatory and motility effects of starvation [8]. It was demonstrated that in all those illnesses and states where the increase of the pancreatic exocrine function is not desirable, the continuously administered jejunal feeding can be safely applied [23]. Really, the reduced mortality rate in the JF group may be not only but also of the consequence of the ameliorated nutrition and the decreased rate of bacterial translocation and endotoxaemia.

The precise mechanism by which the JF can prevent bacterial translocation and consequently reduce the severity of the disease is not well known [22]. Prevention of mucosal

atrophy, stimulation of motility and immune functions seems to be involved. Additives to the tube feeding solutions as L-Arginine, glutamine or increased rate of ω -6 fatty acids may give further chance to influence immune responses. To test these hypotheses further experimental studies should be performed. The beneficial effects of JF above TPN in pancreatitis have to be proven by randomised prospective trials, too.

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LAPAROSCOPIC SURGERY OF FOCAL LESIONS OF THE LIVER

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In this work the laparoscopic surgical approach of two benign hepatic lesions (focal nodular hyperplasia [1st case], and hepatic cyst with simultaneous cholecystolithiasis [2nd case]) will be discussed. The authors present the steps of the laparoscopic procedures: non-anatomical liver resection in the first, resection and cholecystectomy in the latter case. During the operations no surgical complications occurred, the postoperative course was also uneventful. The patients were discharged in the fifth day after the surgery, without any complaints. During a short follow-up period, our patients were asymptomatic and free of recurrences. In our opinion, the laparoscopic hepatic surgery might be a feasible technique in the hands of surgeons with hepatic and laparoscopic experience, but careful selection criteria should be followed in the selection of such cases.

Aim

The application of laparoscopy (exploration and if possible, resection) in the case of two patients with focal hepatic lesions, when previous clinical examinations have confirmed benign hepatic alterations.

Method

In both cases the instruments and the localisation of the ports were similar to that are routinely used during laparoscopic cholecystectomy. Moreover, Ultracision harmonic scalpel and Endo-GIA were used for resection of the liver. In each case non-anatomical laparoscopic resections were performed.

Results

The observed hepatic lesions were successfully removed from the liver of both patients. The postoperative course was uneventful; they were discharged in the fifth day after the surgery. More than one year after the operation, they are free of symptoms or recurrences.

Discussion

In well-selected cases, with certain laparoscopic experience, the application of laparoscopy became possible not only in "routine" cases. Here, we present the laparoscopic approach of two benign hepatic lesions. In our first case, in the background of the patient's complains (dull pain in the right upper quadrant of the abdomen) a circumscribed, possibly benign lesion, originating from the right lobe of the liver was verified by ultrasonography (US) and CT. The tumour has caused the external compression of the colon, as it was detected by irrigoscopy and colonoscopy. With the intention of laparoscopic exploration, but preparing for further interventions, we decided on laparoscopic surgical procedure. During the operation, the lesion was found to be well circumscribed. In toto resection was possible with the application of Ultracision harmonic scalpel and Endo-GIA. During the operation no surgical complication has occurred, blood transfusion was not necessary [4]. The removal of the resected specimen from the abdominal cavity was quite difficult, due to its extent ($8 \times 8 \times 5$ cm) and solid consistency. The final histological examination has confirmed focal nodular hyperplasia. In the literature there are conflicting data concerning the laparoscopic management of focal liver lesions. Samama et al. [4] have found this technique to be feasible also in the surgery of malignant tumours, whilst others have regarded that to be inappropriate, because of oncological considerations.

Our second patient was examined for postprandial abdominal discomfort. CT scans and US have demonstrated cholecystolithiasis and a 10×8 cm large cystic lesion in the right lobe of the liver, which has caused compression on the gallbladder. During the laparoscopic approach, a well-circumscribed cyst was detectable. Instead of fenestration of the cyst – which was planned preoperatively on the basis of literary recommendations [3] – we decided on complete resection. The lesion was resected without surgical complications. Histology has confirmed a so-called cholangiogenic cyst of the liver.

In both cases, the postoperative course was uneventful; the patients were discharged in the fifth day after the operation. The time of convalescence was as short, and the cosmetic result was as good, as it is observed after laparoscopic cholecystectomies.

According to our experiences and by literary data, we conclude that laparoscopic liver surgery could be an appropriate method in well-selected cases [1]. This technique should not be considered a new surgery, but simply a new surgical approach with difficulties but advantages, too [2]. Laparoscopic hepatic resections are feasible with low morbidity and mortality; the short and medium term results are comparable to those obtained with open surgery, provided that the surgeon has experience in open hepatic surgery, as well as in advanced laparoscopy [2]. Moreover, the laparoscopic approach possibly prevents severe intraabdominal adhesions, which provides the possibility of further interventions and hepatic re-resections [5].

Summary

On the basis of our experience, the laparoscopic hepatic surgery might be an appropriate method in the hands of experienced surgeons, and provides the same results as the conven-

tional open techniques. On the other hand, the application of this procedure results to short convalescence and good cosmetic outcome.

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SUCCESSFUL THORACOSCOPIC SURGICAL TREATMENT OF OESOPHAGEAL CYST

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The authors report a video-thoroscopically successfully treated case of oesophageal cyst. The symptomatic lesion was diagnosed by swallowing, X-ray, oesophagoscopy, chest CT scan and endoscopic ultrasonography. The benign tumour was removed by a videothoroscopic method using selective intubation. There were no intra-operative and postoperative complications. The patient was discharged on the fifth postoperative day. The videothoroscopic technique is safe, involves little pain and permits a rapid return to normal activity. It is a preferred method for removing benign lesions of the oesophagus.

Introduction

The oesophageal cyst is an uncommon benign lesion originating in the foregut [1]. This lesion is extremely rare in adults and is usually discovered incidentally during radiographic or endoscopic examination [2]. Endoscopic ultrasonography is of importance in the diagnosis [3]. Malignant transformation is low, but removal is often required on symptomatic grounds. Video-thoroscopic resection offers distinct advantages for the treatment of benign tumours of the oesophagus. We present a video-thoroscopically successfully treated case of oesophageal cyst. Only two similar cases have been found in the literature [4, 5].

Case report

A 22-year-old female patient presented with epigastric discomfort and 3 months of dysphagia for solids with retrosternal pain. The preoperative investigations (barium swallow, oesophagoscopy, chest CT scan, endoscopic ultrasonography) showed a 6 × 8 cm intramural oesophageal cyst 10 cm above the oesophago-gastric junction.

Surgical technique

The operation was performed under general anaesthesia, with the patient in the right lateral decubitus position. A double-lumen endotracheal tube was used and the left lung was

collapsed. Carbon dioxide insufflation was not required. Three stab incisions were required. The lower segment of the oesophagus was mobilized and a longitudinal myotomy was made directly over the lesion. The cyst was enucleated intact and removed. The oesophageal mucosa was confirmed to be intact by endoluminal endoscopy. The operating time was 90 minutes; blood loss was minimal (50 ml). There were no intraoperative or postoperative complications. Histological examination confirmed the preoperative diagnosis. The postoperative period was uneventful, and the patient was discharged on the fifth day.

Conclusion

The utility of endoscopic ultrasonography for the diagnosis of submucosal tumours of the oesophagus has been established. The video-thoracoscopic technique is safe, involves little pain and permits a rapid return to normal activity. It is a preferred method for removing benign lesions of the oesophagus.

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THE ROLE OF DIAGNOSTIC LAPAROSCOPY IN STAGING OF PANCREATIC CANCERS

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Authors report elective diagnostic laparoscopy, and the role of this method in evaluating operability of pancreatic cancer. At their department 11 diagnostic laparoscopic procedures of pancreatic cancer were performed during the last 5 years. In 3 cases tumor proved to be resectable despite preoperative imaging results of unresectable condition. On the basis of international literature authors give brief summary of indications, cost and benefit of diagnostic laparoscopy, and its place in the diagnostic algorithm of pancreatic cancer.

Introduction

Early detection, tumor diagnosis with histological proof and tumor-staging are the principle aims of diagnostic approaches in patients suffering from pancreatic cancer. Asymptomatic and small cancers are often missed since they produce no or no typical symptoms and no reliable screening methods are available. Symptomatic pancreatic cancers are often so advanced at the time of diagnosis that only minority (20–30%) of patients qualify for curative resection [10]. Variety of nonsurgical techniques are available to provide effective palliation of jaundice and pain. Patient selection is important to plan appropriate therapy and avoid unnecessary laparotomy. Laparoscopy has been suggested as a sensitive method for detecting metastases in case of incurable disease.

Discussion

Pancreatic cancer is the fourth-leading cause of cancer-related death in the United States. The prognosis is bleak and the overall five-year survival remains less than 5%, but some subsets of patients may have a better chance [8]. Surgical resection offers the only chance of cure. Symptoms, which are dependent on site and cell type, are often vague, and most patients present with advanced disease, which precludes potentially curative therapy. Despite recent advances in pancreatic imaging and development of nonoperative techniques for relief of biliary obstruction, most patients still undergo an exploratory laparotomy for accurate staging and palliation. For those who do not require a palliative procedure, exploration does

not confer any benefit and is associated with significant morbidity and mortality, affecting both the quality and duration of survival. The use of laparoscopy in the diagnosis and treatment of malignant diseases is one of the great advances of surgery in the last few decades. Its role as a diagnostic modality and a staging tool continue to expand [2]. The most important indications of diagnostic laparoscopy will be discussed initially.

1. In the case of focal liver disease number of hits is higher than during blind aspiration.
2. High suspicion of liver tumor. Differentiation between hepatocellular carcinoma and rapidly developing cirrhosis, or between primer and metastatic hepatic lesions is quite difficult in several cases. Early diagnosis greatly improves the chance of resection.
3. In the case of enlarged liver, retroperitoneal tumor or palpable abdominal mass there is high risk of injury of dilated veins during blind biopsy.
4. If there is some abdominal doubtfulness or in old or immunocompromised patient diagnostic laparoscopy may reveal serious abdominal disease in contrast to the mild clinical symptoms.
5. Ascites of unknown origin.
6. Second look after tumor resection or chemo-radiotherapy to evaluate recurrence.
7. Determination of tumor stadium is important to clarify surgical tactics and to avoid unnecessary laparotomy.

There is a considerable improvement in the resectability rate of pancreatic head cancer during the last two decades. In some centers it is over 20%, while operative mortality decreased from 17% to 6–9% in the case of resection and from 17% to 14% during palliation. However, increased resectability rate reflects improved selection of patients for operation rather than an increase in the number of resectable patients per se. Mean survival time is 17 months and 6.6 months after resection and palliation respectively. Tumors of the body and tail of pancreas has got a much worse prognosis. Resectability rate is not more than 5–10% and mean survival is about 4 months. It is always complex task to appreciate resectability of pancreatic cancer. In addition to the clinical symptoms imaging techniques (US, CT, ERCP, EUS, angiography) and diagnostic laparoscopy are also important. However, non of the preoperative examinations can decide this question in every patients. Eventually laparotomy is the method which is suitable for establish local irresectability without any doubt, and we can obtain definitive histology. Histologic diagnosis is mandatory to obtain in every malignant disease. For example liver hamartomas can mimic metastasis macroscopically and without histology it is very difficult to differentiate between reactive and metastatic lymph nodes, or distal obstructive pancreatopathy and pancreatic tumor. In such cases intraoperative freezing histology is the correct way to choose since to perform palliative operation without histologic diagnosis is failure.

According to some authors for diagnosis pancreatic carcinoma sonography and computed tomography are sufficient in 95% of the cases [3]. Dynamic, contrast-enhanced CT correctly predicts unresectability in near 100% of cases but correctly predicts resectability in only 67% [4]. Despite recent advantages in diagnostic technology, less than 50% of unresectable tumors were identified preoperatively [3]. If the patient's history and blood test abnormalities suggest pancreatic carcinoma and the helical CT scan shows a mass in the head of the

pancreas that appears to be resectable, the patient should be prepared for surgery. If no mass is apparent on the helical CT scan, a diagnostic ERCP is indicated. If microscopic proof of the diagnosis will avoid surgery an FNA for cytology should be performed. When unresectability appears likely and cannot be confirmed in less invasive ways, laparoscopy is indicated [7]. The ability to assess resectability with simply diagnostic laparoscopy remains relatively low (<40%). During extended staging laparoscopy unresectability was determined if one of the following conditions was present: (1) metastases (hepatic, serosal, or peritoneal), (2) extrapancreatic extension of tumor (i.e.; mesocolic involvement), (3) celiac or portal node involvement, (4) invasion or encasement of the celiac axis or hepatic artery, or (5) encasement by tumor of the portal or superior mesenteric vein and/or superior mesenteric artery [4]. One to two-third of patients deemed resectable by preoperative imaging show signs of irresectable cancer at laparoscopy. The use of laparoscopy has significantly reduced the percentage of patients undergoing open exploration without resection. By this extended diagnostic laparoscopy about 75% of patients explored were resectable, compared with the experience of 1980s of 10–30% [4].

According to other investigators only 13% of patients with pancreatic cancer might profit from laparoscopy. Because of this low number and the risk of trocar metastases they do not recommend it generally for pancreatic cancer patient before laparotomy [5, 6, 11]. The etiology of port-site metastasis is unknown but it is an important long-term complication of diagnostic laparoscopy. The incidence is about 1.6% but occurs only in patients with advanced disease, so it will not adversely influence the limited survival of these patients [9].

Summary

At our department diagnostic algorithm of pancreatic cancer is the following. When the patient with jaundice is operable according to the preoperative examinations we perform ERCP and EST with cytology and after that resection. If the tumor is inoperable on the basis of CT scan but jaundice is present we can choose endoscopic or surgical palliation. Furthermore, if development of duodenal obstruction is expected or present, it is better to resolve biliary and gastric derivation at the same time by an open operation. If the patient has not got jaundice and the tumor is shown as operable by CT scan, resection is the next step. If preoperative examinations show unresectable state we perform US or CT guided aspiration. If it will have got negative result for metastases, diagnostic laparoscopy is the best thing to do. After laparoscopy with no visible metastases we perform laparotomy.

Finally, the combined use of selected diagnostic tests proved more effective than any single diagnostic test for accurately staging patients with pancreatic cancers and should be considered to minimize unnecessary surgery [1].

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THE LAPAROSCOPIC TECHNIQUE FOR BILATERAL INGUINAL HERNIAS

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From March 1994 to March 1999 359 laparoscopic hernioplasties have been performed on 295 patients. In 349 cases (97.2%) TAPP (transabdominal preperitoneal), in 10 cases (2.8%) TEP (total extraperitoneal) method was used for the treatment. In 64 cases (21.7%) bilateral hernias were operated using TAPP-method only. There were 15 hidden hernias and 14 recurrences on the contralateral side in this group. The hernial ring was covered with two smaller meshes or one bigger. There were no intraoperative complications. In 21 cases (32.8%) subcutaneous emphysema and in 3 cases (4.6%) sero-haematoma was developed. The emphysemas were solved spontaneously in 2–3 hours after the surgery. One haematoma was needed puncture. The patients were discharged from the hospital on the second or third postoperative day. The authors found that the bilateral laparoscopic hernioplasty much more favourable for the patients.

Introduction

According to the literature 5% is incidence of the inguinal hernia among the adults.¹ In USA 500,000, France 100,000, United Kingdom 80,000 and in Hungary 15,000–20,000 hernioplasties were done yearly [1, 2]. The management of hernias, the sick-leave of patients are costly. The incidence of bilateral hernias is 2.5% [1], but has increased as far as 21–30% due to the diagnostic possibility of laparoscopy.

Table 1
Inguinal hernioplasties/year

U.S.A.	500,000
France	100,000
United Kingdom	80,000
Hungary	15,000–20,000

Table 2
Inguino-femoral hernioplasties in Hungary (1998)

All:	20,896	
Traditional:	20,531	(98.25%)
Unilateral:	20,016	(95.78%)
Bilateral:	515	(2.46%)
Laparoscopic:	365	(1.74%)

Patients and Methods

From March 1994 to March 1999 295 patients underwent operation and 359 laparoscopic hernioplasties were performed. In 97.2% of cases TAPP-method, in 2.8% of all TEP-method was chosen. Bilateral hernias were made in 21.7%, (64 patients) using TAPP-method only. There was no female patient in this group. The age of the patients was 24 to 72 years. In 15 (23.4%) cases occult contralateral hernia was diagnosed. 14 patients (21.8%) suffered from recurrent hernia. Two separated meshes were used in 55 cases (86%) and one overlapped mesh in 9 (14%). (The separated mesh was like twofold unilateral operation!)

Table 3
Data of patients

Number of patients:	295	
Number of unilateral hernia:	231	(78.9%)
Number of bilateral hernia:	64	(21.7%)
Male/Female ratio:	273/22	(92.5%) / (7.5%)
Age from 12 years to 76	In unilateral hernias:	12-76
	In bilateral hernias:	24-72

Operating technique

The technique is the same like unilateral methods [1, 2, 3, 5]. In the beginning two 12 mm in diameter operating trocars were used. After having practice, one was changed for 5 mm in diameter. The thicker trocar is needed for inserting the mesh into the abdominal cavity, in such a way it is possible to check the maneuver. The mesh is fixed on the Gimbernat's-ligament (below) and Poupart's ligament (aside) and transverse fascia (above) by staplers [1, 2]. The number of clamps can be reduced, because the fixing stabilizes the mesh until removing the gas from the abdominal cavity, afterwards the intraabdominal pressure smooth it. An accurate fixing is required in order to prevent the moving of the mesh into the inguinal canal in case of wide medial hernial ring. The most frequent cause the recurrences is a too small mesh! The authors prefer the oversized, overlapped mesh for wide medial hernias [4].

The solving of the "oblique" recurrent hernias after traditional operations needed wider and higher mesh because the external ring can be found high. Sewing pursestring-suture for the reconstruction of the peritoneum, with knotting extracorporally. Finishing of the operation: Removing gas and trocars, suture of the fascia and skin. The umbilical wound in needed fascial reconstruction only. The puncture channel of the operating trocars will cease by closing of the abdominal layers like the tiles [2, 4].

Results

There were no intraoperative complication! Subcutaneous emphysemas of 21 patients (32.8%) and sero-haematomas in 3 cases (4.6%) were observed. The emphysemas were solved in some hours after operation spontaneously. One haematoma was required puncture, the others were absorbed in 1–2 weeks. There was no neuralgia, trocar's hernia, injury of the bowels and urinary bladder. The authors have not perceived recurrence till this time. The patients left the hospital on second or third postoperative day.

Conclusion

The advantages of bilateral laparoscopic hernioplasty:

- the same operative approach is sufficient for both sides
- minimal postoperative pain (in contrast to traditional bilateral operations!)
- diagnostic possibility in the abdominal cavity and particularly for hidden hernias
- early return to normal physical activity.

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MAGYAR
TUDOMÁNYOS AKADÉMIA
KÖNYVTÁRA

NEW SURGICAL PROCEDURES IN POSTGRADUATE MEDICAL EDUCATION

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An outstanding role in developing the recent nation-wide postgraduate accreditation process in Hungary has been played by University Medical School of Pécs. *Graduate training:* By providing opportunities for students to practice basic surgical interventions on living tissues, the Department of Experimental Surgery has served as a bridge between theoretical and clinical phases of their education. Students benefit from the infrastructure of surgical training we provide, including even access to microsurgery and laparoscopic techniques. *Postgraduate training:* One category of postgraduate training offered by our department is further training of young physicians in special branches of surgery, with emphasis on microsurgery and laparoscopy. The other category is in the form of special courses. A great number of applicants from across Hungary highlight the need for running such courses. Throughout Europe such training is available only at very high prices. With the invaluable assistance of Prof. Z. Szabo (San Francisco, USA), we have been able to create the right environment and offer expert technical training in laparoscopic procedures since 1995. We face new challenges in the year 1999. As part of the new resident training system, Department of Experimental Surgery will provide not only training in traditional surgical procedures, but also include training in the most up to date techniques. Organizing such sources, apart from financial backing, requires genuine professional commitment.

Establishing an up-to-date system of postgraduate studies has received peculiar attention in higher education by becoming a major focus of the nation-wide accreditation process in Hungary.

An outstanding role in developing the new postgraduate training model has been played by the University Medical School of Pécs, which, by way of establishing its own Centre for Postgraduate Education meant to co-ordinate the whole spectrum of courses necessary for professional development during and after the specialists training, has created the conditions for multimedia and distance education and it will also play a key part in the resident training to be launched on 1 September, 1999.

The quality of graduate education is ensured by the clinical courses including the bedside teaching practice, which is based on the knowledge background provided by the departments offering premedical, medical and preclinical courses. By providing opportunities for the students to learn and practise basic surgical interventions on living tissue, the Department of Experimental Surgery serves as a special kind of bridge between theory-oriented courses and clinical subjects. The success of these initial steps helps some students develop a positive

attitude towards the so-called manually-oriented branches of medicine and often this is what lies in the basis of a life-long commitment to surgery and other similar specialities.

Graduate training requires operating theatres, appropriate equipment, infrastructure for anaesthetising and an appropriate animal house on the one hand, and experienced teaching staff and assistants, on the other. Recently, grant applications and central university funds have been combined to create the conditions for and continuous availability of opportunities for practising techniques used in microsurgery, with special regard to laparoscopic procedures.

Our postgraduate training is provided in two basic forms. One of these, mainly utilised by heads of the operation-oriented departments such as Traumatology, Surgery, Vascular Surgery and Orthopaedic Surgery, get realised by using our practising operating theatres for the training and further training of young doctors working in special areas of medicine. Special emphasis is laid on practising microsurgical suturing techniques by providing operating theatres, as well as experimental animals, manual surgical tools and operational microscopes.

For practising laparoscopic procedures including various types of operations on isolated organs, dogs and pigs, a complete STORZ tower, a pelvitrainer and surgical tools are made available at the department.

The other kind of postgraduate training is provided in the form of special courses participated by a wide range of specialists coming from nearly all departments in this country. The need for organising such courses has been justified by the great numbers of applicants as well as by the fact that both older and younger colleagues would like to learn the new techniques and use them at the highest possible level.

Laparoscopic techniques applied in minimally invasive surgical procedures require a peculiar spatial overview, a different kind of approach to manual solutions and skills of manipulation on formations significantly magnified and projected on the TV screen. Special treatments were established all over Europe (e.g. in Strasbourg, Extramadura University, and Tübingen) for the purposes of teaching and practising laparoscopic operations on experimental animals (mainly pigs), according to didactically well-planned curricula. These courses represent very high standards, however, due to the extremely high fees, they are unaffordable for many specialists.

The spacious operating theatre at the Department of Experimental Surgery of the University Medical School of Pécs, the high technical quality of the equipment, the expertise of the assisting staff as well as the animal house make the department suitable for organising courses in laparoscopic surgery. The first such courses, which were participated by 25 doctors coming from various clinics and hospitals of Hungary, were run in June, 1995. A remarkable contribution to the high standards of the training imparted was made by Prof. Zoltán Szabó, director of Microsurgery and Operative Endoscopy Training Institute (MOET), San Francisco, US, who undertook to act as course leader. Even for colleagues who have been using laparoscopy as routine procedure, learning the intracorporal suturing technique did not come easy.

It should also be mentioned that organising the first courses was extremely difficult. The operations were conducted on four pigs on four operating tables using four laparoscopic towers simultaneously. At the end of the courses all participants took an examination and their success at this examination marked not only the successful completion of the course but

also the fact that we were able to provide for appropriate training, even according to international standards. The most reliable indicator of the success seems to me the fact that in 1996 we had to run as many as 5 courses in laparoscopic surgery.

In June and September, 1997 we organised 2-week courses for surgeons and obstetricians, where the range of target activities were extended to laparoscopic suturing techniques, minimally invasive surgery, hernia management, removal of stones from the bile duct and laparoscopic procedures used in complicated gall bladder operations. In sum, 180 doctors have been offered opportunities for practising laparoscopic surgery ranging between basic procedures and the most recently developed complicated clinical interventions.

It is impossible not to mention the names of those outstanding surgeons who took part in organising the courses and also in raising funds for launching and running them successfully. Chief physicians Gergely Csáky, and István Gál, as well as Assistant Professor György Wéber were those who undertook the organisation. Prof. Zoltán Szabó of the MOET, San Francisco, in turn, not only acted as course leader but he also obtained full support from STORZ by way of presenting the most up-to-date laparoscopic technology. Prof. Horváth Örs from Department of Surgical Clinic of University Medical School of Pécs used his authority in convincing the participants of the importance of learning laparoscopic procedures. Special thanks must also go to each of my colleagues and co-workers, who contributed to the success of the course by offering the special expertise they have.

The year 1999 faces new challenges. During the first two years of the new system of resident training to be introduced in autumn, meant to promote the acquisition of the basic material identified for each of the individual branches of medicine, our department, as well as all other Departments of Experimental Surgery, serving as the practising base for operation-oriented specialities of medicine, will need to accept a special role. Apart from developing operational skills by practising traditional surgical procedures, basic skills areas identified in the curriculum of resident training in the field of surgery also include training in the most up-to-date surgical techniques. In addition to creating the financial background, organising these courses will also require serious professional commitment and increased workload.

Considering all the factors outlined above I think, this task can only be solved if the whole spectrum of medical training, including both undergraduate and postgraduate education is seen and treated as the unity of theory and practice. This requires an unusual amount of commitment, enthusiasm and devotion for teaching.

SYNCHRONICALLY PERFORMED LAPAROSCOPIC CHOLECYSTECTOMY AND HERNIOPLASTY

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Cholecystectomies and hernioplasties are the two most frequently performed surgical interventions. The laparoscopic technique can be offered for the simultaneous treatment with both operating indications. The synchronical operation can give all the advantages of the minimally invasive technique. Authors had performed laparoscopic cholecystectomy with laparoscopic hernioplasty in five cases. Two inguinal and three postoperative hernias were reconstructed. The cholecystectomy was performed with a "three puncture method", and the hernioplasty by using the same approach, completed by inserting a fourth assisting trocar as required. The hernial ring was covered with an intraperitoneally placed mesh, which was fixed by staplers (the so-called "IPOM-method": intra-peritoneal on-lay mesh). There was no intra-, nor postoperative complication. The hernioplasty combined with laparoscopic cholecystectomy did not have effect on postoperative pain and nursing time. The return to the normal physical activity was short, similar to laparoscopic hernioplasty (in 1–2 weeks). Authors conclude that the simultaneous, synchronous laparoscopic cholecystectomy and hernioplasty is recommended and should be the method of choice because it is more advantageous for patients.

Introduction

The advantage of the minimally invasive technique is the short hospital stay, the less postoperative pain and early mobilization. After laparoscopic procedures wound infection and immobilization is highly reduced, therefore a less rate of postoperative thromboembolism and morbidity is expected. Cholecystectomies and hernioplasties are the two most frequently performed operations. The laparoscopic technique can give the possibility for the operative management of the two indications. The authors present their experiences of using laparoscopic cholecystectomy and hernioplasty at the same time.

Patients and method

From October 1996 to April 1999 five synchronical laparoscopic cholecystectomy and hernioplasty had been performed.

Case reports:

1. 60-years-old female patient, suffering from typical biliary complaints. Cholelithiasis was verified by ultrasound. In the left groin there was a reducible, apple-sized hernia, causing recurrent subileus. Intraoperative findings: lateral accret hernia. The omentum was in the hernial sac. There were pericholecystic adhesions. Operation: laparoscopic (or lysis of the adhesions) adhesiotomy, cholecystectomy and IPOM-hernioplasty. Operating time: 100 minutes.

2. 65-years-old female patient. There was a left-sided inguinal hernia with diagnosed cholelithiasis, causing increased spasms. Intraoperative findings: lateral inguinal hernia, chronic cholecystitis. Operation: laparoscopic cholecystectomy and hernioplasty (IPOM). Operating time: 80 minutes.

3. 65-years-old female patient with postoperative accret hernia in the scar of a previous lower median laparotomy causing subileus. Verified cholelithiasis. Intraoperative findings: chronic cholecystitis and moderate pericholecystitis. Double hernial sac involving the omentum and the transverse colon. Operation: laparoscopic lysis of pericholenystic adhesions, cholecystectomy, and hernioplasty (IPOM). Operating time: 120 minutes.

4. 44-years-old female patient. Recurrent biliary attack and verified small gallstones. Postoperative hernia was detected in the distal part of a scar of previous lower median laparotomy. Irreducible walnut-sized sac. Intraoperative findings: Omentum in the sac. Empyema of gallbladder. Operation: Adhesiotomy, cholecystectomy, and IPOM- hernioplasty laparoscopically. Operating time: 100 minutes.

5. 70-years-old female patient with a postoperative hernia in the middle of a previous hernioplasty according to Mayo. Multiple biliar colic. Cholelithiasis. Intraoperative findings: Omentum in the sac. subacute cholecystitis. Operation: laparoscopic adhesiotomy, cholecystectomy, and IPOM-hernioplasty. Operating time: 90 minutes.

The mean age of the patients was 61.2 years (range from 44 to 70 years). The diagnosis of cholelithiasis was confirmed by ultrasound and the hernia by physical examination. All the patients underwent the operations under general anaesthesia. The authors prefer the three puncture method, using umbilical, epigastric and right iliac trocar sites. The same ports were used for performing laparoscopic hernioplasty, inserting a fourth assistant trocar in case of a technical problem. All laparoscopic hernioplasty were finished as IPOM-method: using a perfectly measured polypropilene mesh and fixing it by staplers without peritoneal dissection. Antibiotic prophylaxis was given in case of empyema of the gallbladder. Minor analgetics was used for postoperative relief of pain. In general a drain was placed into the foramen Winslowi and removed on the first postoperative day. The removal suture was on the seventh postoperative day.

Results

The average operating time was 98 minutes (range from 80 to 120 minutes). There was only one intraoperative complication: the empyemic gallbladder was perforated. There were

no postoperative complications. The use of minor analgetics were sufficient. The patients were discharged from the hospital on the second or third postoperative day, following sufficient bowel movements. Patients could obtain or could return to the normal activity in 1–2 weeks after surgery. The authors have not detected recurrent hernias up to date.

Conclusion

Nowadays surgery is living in the era of minimally invasive technique. Laparoscopic cholecystectomy [4] and hernioplasty [1, 3] are considered to be the “golden standard” operations in both biliary and hernial surgery. Authors would like to emphasize and recommend the possibility of solving the two problems in one laparoscopic session. The synchronic operations prolonged the operating time proportionally, but they were of no influence on the postoperative pain, nursing time, early mobilization and return to normal physical activity [2]. Laparoscopic cholecystectomy as a routine operation can be connected with laparoscopic hernioplasty in order to gain the advantage of a single narcosis, operating and sick-leave. In case of indications for laparoscopic cholecystectomy and hernioplasty authors emphasize the possibility of performing the two operations synchronically in one session.

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LAPAROSCOPIC ADRENALECTOMY NEW EXPERIENCES

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Authors have performed 23 laparoscopic adrenalectomies between 03.04.1997 and 02.04.1999. They have removed 16 cortical adenomas, 2 nodular hyperplasias, 2 cysts, 1 carcinoma, 1 pheochromocytoma and 1 myolipoma. The operation time was 90–260 minutes that gradually has been decreased by using "Ultracision" ultrasonic shear. They have made simultaneously two cholecystectomies and one liver wedge biopsy. During removing pheochromocytoma they have not detected extremely high blood pressure data. They had one intraoperative complication, the perforation of the diaphragm which required a temporary thoracic suction drainage. All operations were completed laparoscopically. Patients have been released on the 2nd–3rd postoperative day. Their experiences confirm the literary data that the laparoscopic approach to adrenalectomy is the method of choice today.

Introduction

The most rapidly extending, worldwide used surgical technique of the present days is laparoscopy. It is true for endocrine surgery, too [3]. In our country the first publication [5] on a right sided laparoscopic adrenalectomy was published in 1996. Since that time several publications appeared about this topic. At the Congress of the Hungarian Surgical Society Endoscopic Surgical Section in 1998 we also reported on early results of 13 cases of laparoscopic adrenalectomy. Now we are presenting our further experiences.

Methods and Results

In our Department 10 right and 13 left sided laparoscopic adrenalectomies have been performed between 3rd April 1997 and 2nd April 1999. The age of the patients was between 28–60 years. Endocrinological internal medicine departments have performed the preoperative investigations. It means special examinations for hormone activity and CT, MRI scan for exact localization of disease. The postoperative histological findings showed that 16 cortical adenomas, 2 nodular hyperplasias, 2 cysts, 1 carcinoma, 1 pheochromocytoma and 1 myolipoma were removed. The diameter of tumours was about 2–6 cm. The applied transabdominal method has already been introduced in details in our previous publication [4].

We have made twice simultaneous cholecystectomy and once liver wedge biopsy. Since October 1998 we have been working with "Ultracision" ultrasonic coagulation-cutting equipment. We have used various original or self-made plastic bags for removing the specimens from the abdomen. The anaesthesia lasted 115–300 minutes (average: 191) and the effective operation time was 90–260 minutes (average: 158). A safety drain was inserted at the end of each operation and it was removed on the first postoperative day. The patients were released or returned to the endocrine internal medicine departments on the second-third postoperative day. We had one intraoperative complication. The puncture of the diaphragm required thoracic suction drainage for two days. The operation was completed laparoscopically without any cardio-respiratory disturbance.

Discussion

The laparoscopic adrenalectomy has a relatively short, about 3 years long history in our country. In our department we use this method for two years. After the early difficulties the specific tricks of the technique have been gradually formed just like the methods of avoiding or preventing specific complications. The always-expending up-to-date equipment gave us new possibilities. The use of ultrasonic shear has meant a qualitative leap. It reduced the effective operation time from over 200 minutes (max. 260) of the early period to less than two hours. If we use metal clips, we apply them only to the main suprarenal vein. The preparation of the organ margin can be followed more precisely. During right side operations a simultaneous cholecystectomy can be performed without changing the position of the patient or inserting further trocars.

We have removed one pheochromocytoma, too. Technically it has not been different from other adrenalectomies, we had not detected extremely high blood pressure. In agreement with literary data [2] it is due to the well guided anaesthesia and a correct endocrinological preparation. We have not made laparoscopic operation on patients with previous abdominal intervention, in these cases the retroperitoneal approach is more favourable [1]. Recurring problem was the question of specimen removal from the abdomen. We have tested many types of factory made retrieval bags with metal or synthetic rim with various results. All of them have had a common disadvantage, the very high price. Those bags that we have prepared from plastic infusion bags by putting in a purse-string suture at its rim, proved very suitable in the daily practice.

Conclusions

Based on experiences of 23 operations during two years we have the opinion that laparoscopic adrenalectomy is a safe procedure with the advantage of a quick postoperative recovery. It requires an adequate endocrinological and diagnostic background, modern equipment and an operating team well skilled in both laparoscopy and endocrine surgery. During the intervention other procedures can also be performed simultaneously like cholecystec-

tomy, liver wedge biopsy, adhesiolysis, etc. In accordance to international experience it is our belief, that laparoscopic adrenalectomy is the method of choice in the treatment of benign lesions of the suprarenal glands.

Summary

Adrenalectomy made by laparoscopic approach is a safe solution for surgical treatment of suprarenal diseases. Due to developing technique and equipment the operation load is not higher than by classic way and the postoperative rehabilitation time is reduced. There is a chance for making extended or combined operations. The lower postoperative recovery charges balance the higher operative costs. In cases with previous abdominal surgery the retroperitoneal approach proved to be more favourable.

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EFFECT OF LAPAROSCOPIC ANTIREFLUX OPERATION ON ESOPHAGEAL MANOMETRY, 24 HOURS PH-METRY AND QUALITY OF LIFE IN GASTROESOPHAGEAL REFLUX DISEASE

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It has been suggested that laparoscopic Nissen fundoplication is an effective procedure for the treatment of gastroesophageal reflux disease (GERD). Twenty-six patients with chronic gastroesophageal reflux disease underwent laparoscopic floppy Nissen fundoplication. 24 hours pH-metry, manometry and Gastrointestinal Quality of Life Index (GIQLI) questionnaire were done preoperatively, six-month and one year after the operation. The six weeks control investigation was limited to 24 pH-metry and GIQLI interview. Adequate reflux control was obtained in all patients, with reduction in acid reflux variables at six weeks, six months as well as at one year after the operation. Preoperative reflux index and DeMeester score was significantly higher than those we found postoperatively at both time period. Preoperative lower esophageal-sphincter tone and length was abnormal on average. Both parameters increased significantly at six-month and one year after the operation. GIQLI also showed characteristic changes. Compared to preoperative values we found significantly higher GIQLI at both six-month and one year following surgery. Laparoscopic Nissen fundoplication provides an excellent symptomatic and physiologic outcome in patients with esophageal reflux disease.

Introduction

Gastroesophageal reflux disease (GERD) is a common upper gastrointestinal disease often complicated by esophagitis, stricture or Barrett's esophagus in approximately two thirds of affected patients [3]. Although medical therapy may control most of the symptoms, some patients with persistence reflux require surgery. Good long-term result of laparoscopic fundoplication is well known with the disappearance of reflux symptoms in 80–97% of cases [4]. Beside the conventional diagnostic techniques i.e. manometry and pH-metry, patients quality of life is also very important for making the indication for surgery and for follow up.

Objective

Our aim was to evaluate prospectively the outcome of laparoscopic Nissen fundoplication in patients with typical symptoms of gastroesophageal reflux.

Patients and methods

Between November 1997 and April 1999 twenty-six patients with chronic GERD underwent laparoscopic floppy Nissen fundoplication. There were 10 women and 16 men of median age 48.65 ± 2.56 years. Preoperative assessments included clinical history and physical examination, 24 hours ambulatory pH monitoring, stationary esophageal manometry, esophago-gastro-duodenoscopy with biopsy, GIQLI interview and barium X-ray examination of the esophagus and stomach. Patients were seen for 24 hours pH-metry and GIQLI interview 6 weeks after the operation. All patients underwent 24 hours pH-metry and stationary esophageal manometry again at 6 and 12 months.

Surgical procedure: Laparoscopic floppy Nissen fundoplication was performed in all patients, in which the short gastric vessels were divided. The wrap was calibrated over a 50-Fr Boas tube and measured 2 cm in length. The crura were closed selectively.

Esophageal manometry: Medications that interfere with esophageal motility were discontinued 5 days before the study. The study was performed using an eight-lumen manometry catheter (Zinectics Medical, Inc.) continuously perfused at a rate of 0.5 ml/min by pneumatic-hydraulic capillary infusion system which was connected to a polygraph (Medtronic Synectics).

Pressure, length and relaxation of the lower esophageal sphincter (LES) were measured using a station pull-through technique, with 1 cm increments between stations.

24 hours esophageal pH monitoring: Acid suppressing drugs were discontinued 14 days before the study. Ambulatory 24 hours pH monitoring was performed using a portable measuring unit (Digitrapper MD, Synectics Medical). An internal reference pH catheter (Synectics Medical) was placed 5 cm above the upper border of the manometrically determined LES. All patients were instructed to pursue normal activities. Data from the Digitrapper were loaded into a computer and analyzed by a software program (Polygram for Windows, Medtronic Synectics). The DeMeester score and the reflux index (percentage of time that the pH was below 4.0) were evaluated.

Gastrointestinal Quality of Life: Quality of life assessment was performed with a well standardized form (Eypasch's Gastrointestinal Quality of Life Index). Junior staff members explained the questions to the patients, left a copy of the questionnaire and requested that they complete it within 48 hours then it was collected.

Statistical analysis: Results were given as mean \pm SEM. The significance between the preoperative and postoperative data was calculated by two-tailed Student's *t*-test.

Results

Twenty-two patients were completely free of symptoms and were off all antireflux medication after the operation. Three patients had only partial symptomatic relief and one had to be reoperated 1 year after the laparoscopic procedure because of persistent symptoms. He is currently asymptomatic following remedial surgery. Three of the patients were converted to open Nissen fundoplication two because of heavy bleeding during dissection of short gastric vessels and one because of injury of the esophagus. There were no deaths. Intraoperative

pneumothorax occurred in four patients. Hospital stay averaged 7.11 ± 0.68 days. Laparoscopic fundoplication took an average of 174 ± 48.54 minutes.

Manometry: The mean LES pressure increased significantly ($p < 0.01$) from 12.41 ± 2.19 to 26.16 ± 4.14 mmHg 0.5 year after operation and remained at normal value (18.4 ± 2.17) 1 year after surgery which was not significant compared to preoperative value. (Figure 1). At both 0.5 and 1 year following surgery the overall length of the LES also increased significantly ($p < 0.05$) from an average of 2.77 ± 0.36 cm to 4.42 ± 0.36 and 4.4 ± 0.74 respectively (Figure 2).

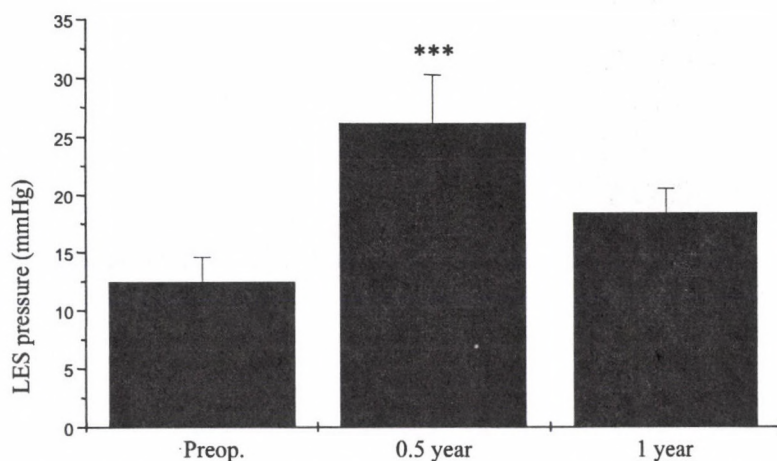


Figure 1. Changes of LES pressure before and 0.5 and 1 year after surgery

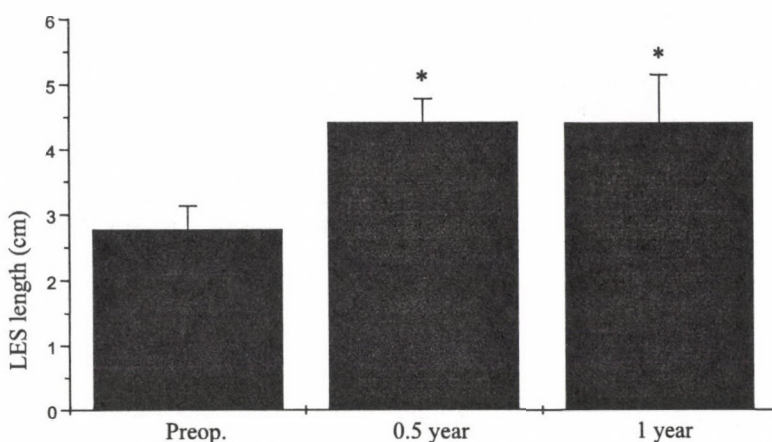


Figure 2. Changes of LES overall length before and 0.5 and 1 year after surgery

PH monitoring: Tables 3 and 4 show that Nissen fundoplication reduced acid exposure to normal. Both DeMeester score and reflux index decreased significantly at both time interval after operation. DeMeester score was 66.42 ± 11.15 before operation. The postoperative values were 9.96 ± 4.30 ($p < 0.005$); 10.74 ± 7.59 ($p < 0.05$); 3.22 ± 1.54 ($p < 0.05$).

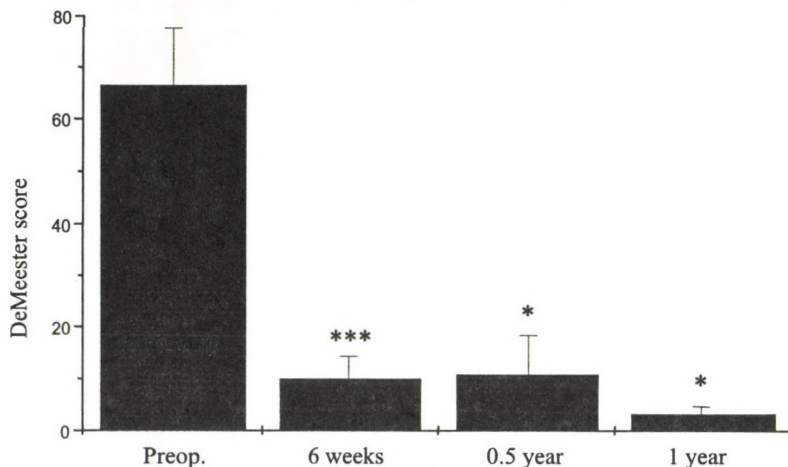


Figure 3. DeMeester score before and after laparoscopic Nissen fundoplication

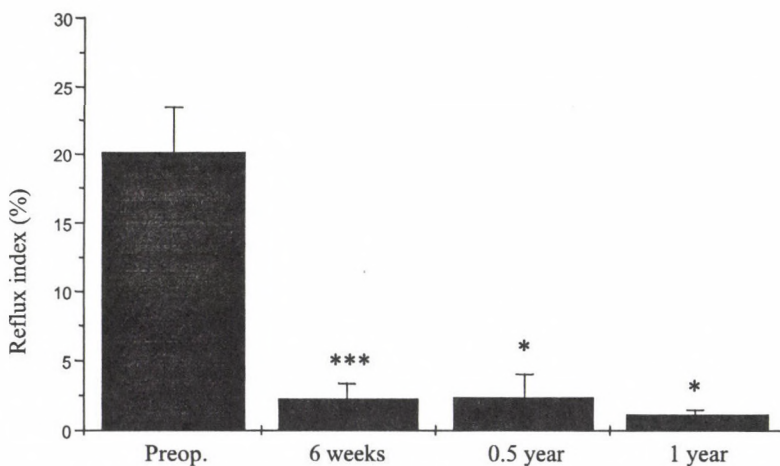


Figure 4. Reflux index before and after laparoscopic Nissen fundoplication

GIQLI: Compared to the maximal achievable GIQLI (144) the value obtained before surgery was relatively low 63.8 ± 7.01 . After the operation the average score improved with the elapsed time. The six weeks control value was 84.52 ± 8.6 . Both 0.5 and 1 year following surgery the average quality of life index 100.57 ± 7.9 and 106.6 ± 7.51 were significantly higher ($p < 0.05$) compared to preoperative values (Figure 5).

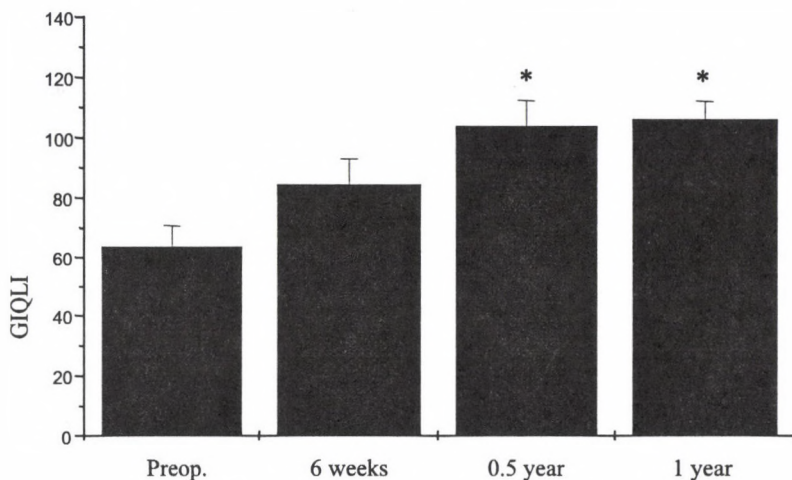


Figure 5. Changes of "Gastrointestinal quality of life index" before and 0.5 and 1 year after surgery

Discussion

Laparoscopic fundoplication was first introduced into clinical practice in 1991 [1]. Anti-reflux surgery is designed to correct the mechanically defective LES, which accounts for about 70% of GERD [8]. Various studies have shown that laparoscopic Nissen fundoplication results in a significant rise in resting LES pressure and length [5, 6]. In the present study the mean LES pressure and overall length was significantly increased.

24 hours ambulatory pH monitoring has emerged as the gold standard for quantitative measurements of esophageal acid exposure. The goal of therapy is to reduce esophageal exposure to gastric juice. The intraesophageal 24 hours pH profile was restored to normal in all patients after laparoscopic Nissen fundoplication in this present series.

Quality of life analyses have become an important part of surgical outcome analysis. Some authors using SF-36 instruments found significant differences between preoperative and postoperative score after laparoscopic antireflux surgery [7]. We elected to use Eypasch's Gastrointestinal Quality of Life Index [2]. In our data quality of life index was significantly better after surgery. In summary in spite of the small sample size this study demonstrates that laparoscopic Nissen fundoplication is an effective therapeutic option in selected patients with GERD.

Early results show a better quality of life, improved LES function and length and decreased gastroesophageal reflux similar to those reported in the medical literature.

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FIRST HUNGARIAN, INTERNET-BASED PROSPECTIVE, MULTICENTER STUDY: THE HERNIA-PROJECT

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In inguinal hernia repair, different laparoscopic and open techniques of tension-free repair using synthetic meshes have been reported to result in better patient comfort and lower recurrence rates compared with conventional procedures like Shouldice's or Bassini's operation. In comparison with the laparoscopic procedure, open tension-free repair can be performed under local anaesthesia and is less expensive. For these reasons, the recent trend in inguinal hernia surgery, has been towards using an open, mesh-based tensionless repair (Lichtenstein technique). To evaluate and support the widespread use of this technique in Hungary a large, prospective multicentre trial was initiated at 15 March 1999. Prospective registration of 1500 hernia operation using Lichtenstein technique is undertaken that is carried out in 15 hospitals. Postoperative outcome, complications and recurrence is recorded through a five years period. The case presentation and data collection is internet based. Each center participating in the study is connected by internet to the coordinating center and all information concerning this study is sent by this way. This system is able to generate actual statistical data in every moment of the study.

Introduction

The history of the most commonly performed surgical procedure, repair of the groin hernia, contains an evolution of arguments related to cause, anatomy, and technique. Dedicated surgeons have tested many surgical methods to best address the complexities of the groin hernia. Recently, the addition of laparoscopic herniorrhaphy to the surgical armamentarium has intensified the century-long debate. Of all factors used to compare the various methods of inguinal herniorrhaphy, the incidence of recurrence is most often held as the measure of success. The principles of present day herniorrhaphy evolved from Bassini more than a century ago. Numerous modified techniques for the repair of the groin hernias by the anterior inguinal approach have since been developed with improvement in morbidity, recurrence rates, and duration of hospitalization. Although a heterogenous group of techniques are available for surgeon selection, two methods of anterior herniorrhaphy, the Shouldice repair and the Lichtenstein repair, appear to show the best results. The Lichtenstein "tension-free" hernia repair uses an onlay prosthesis to reconstruct the inguinal floor and eliminate suture line tension, the disadvantage present in all modifications of the Bassini repair [1]. General surgeons not specializing in the repair of inguinal hernias have reported recurrence rates of less than 1% when using the Lichtenstein repair [3]. Despite continued improvements and low

reported recurrence rates, the overall recurrence rate for primary hernia repair is estimated at 10% and increases to 25% for repair of recurrent hernias [2]. Surgical repair of recurrent hernias leads to increased cost, is technically difficult, and carries a higher morbidity. It is thought that early recurrence after the anterior repair results from technical errors or tension on the suture line from the unnatural approximation of tissues. Late recurrence results from defects in collagen metabolism as a patient ages, with thinning of scar tissue and continued inherent weakness of the inguinal floor [2]. The Lichtenstein mesh repair was developed to address these mechanism of recurrence. To evaluate and support the widespread use of this technique in Hungary a large, prospective multicentre trial was started at 1999. This study was approved by the ethics committee of the hospitals concerned.

Patients and methods

After informed consent, 1500 patients having elective repair of a primary inguinal hernia is to be entered into the trial. The open tension-free hernioplasty is performed according to Lichtenstein [1]. Postoperative outcome, complications and recurrence is recorded through a five years period [4]. For accurate recording of the data, a specific protocol and checklist is available on homepage of First Department of Surgery, Medical School of University, Pécs. Each patients' file consisted of 4 forms, each one addressing a specific aspect under investigation. Every question has to be answered (yes/no). All collected data is then sent from each center to the coordinating center via internet to be entered into database. This system is able to generate actual statistical results in every moment of the study and could provide sufficient data for further improvement of hernia surgery.

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THE LAPAROSCOPIC TREATMENT OF NON-PARASITIC LIVER CYSTS FIVE YEARS EXPERIENCE

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The incidence of cystic liver lesions seems to be more frequent as previously suggested. The treatment of symptomatic non-parasitic cysts is controversial. Ultrasonography (US) or computer tomography (CT) guided drainage and/or sclerotisation versus surgical fenestration or partial resection, even liver resection has been advocated. Recently with the development of laparoscopic surgery this minimal invasive approach was also applied in the surgical treatment of single or multiple cystic lesions.

Between 1994 and April 1999 21 patients with non-parasitic cysts were treated by laparoscopic fenestration or partial resection at the 1st Department of Surgery, Semmelweis University of Medicine. In 13 cases the symptomatic cyst presented the indication for surgery, while in the others cholelithiasis and GERD was the primary cause of intervention in 7 and 1 patient respectively. There were 16 woman and 5 men with a mean age of 42.3 years (17–78). The cyst was solitary in 17 cases and multiple 3–6-number in four patients. The size varied between 1.5–25 cm (average 7.2 cm). Patients were selected for the laparoscopic approach according to the US and/or CT appearance and superficial localization of the cyst. Wide unroofing or partial resection of the cyst wall till the margin of normal liver tissue was performed in all cases. The cystic cavity was drained.

All operations were completed laparoscopically. Intraoperative complication did not occur. Bleeding from the resected margin could be well controlled by electrocautery or clipping. Patients left the ward after the drains were removed on postoperative day 2–4 depending upon the amount of serious discharge. No complication was observed postoperatively. During the average of 12.5 months (1 to 54 months) follow-up of 19 patients no recurrence was observed. Two patients required reoperation. In one 17 year old male patient cystadenocarcinoma was verified by histology, upon reoperation the lesion was found unresectable. In another case left hemi-hepatectomy was performed because of cyst recurrence caused by cholangiocell adenoma.

In selected cases of superficially located symptomatic, non-parasitic cysts the laparoscopic fenestration might be the first choice of treatment. The method is safe and effective in the hands of surgeons experienced in both laparoscopic and liver surgery. Careful exploration of the cystic cavity and histological examination of the resected cyst wall is mandatory to avoid diagnostic mishaps.

Introductions

With the wide spread availability and routine use of ultrasonography (US) and computer tomography (CT) the recognition of cystic liver lesions became more frequent recently. Most of them are diagnose incidentally as a co-morbidity, and are asymptomatic, while in other case those might be responsible for uncertain complains like right upper quadrant pain, abdominal discomfort. Treatment of these lesions is controversial. Depending upon size and

location surgical resection, fenestration or US guided puncture, drainage and/or alcoholic sclerotization might be treatment options. With the development of laparoscopic surgery among others this technique has also been applied in the field of liver surgery.

Patients and methods

At the 1st Department of Surgery of the Semmelweis University of Medicine during the last 5 years 21 patients with cystic lesion of the liver were treated by laparoscopic technique. In 13 patient the indication for operation was the liver cyst, while in the 8 other patients were liver lesion was a co-morbidity in association with cholelithiasis and GERD with hiatal hernia in 7 and 1 patients respectively. The cysts were solitary in 17 and multiple in 4 cases. Size changed between 2.5–25 cm (average 7.2 cm). The small cysts were incidental findings during other laparoscopic operation. Patients data are detailed in Table 1.

Table 1
Patients data

Number of patients	21
Male-female ratio	5/16
Age	42.5 years (17–78)
Size of cyst	7.2 cm (2.5–25 cm)
Number of cysts	single
	17
	3
	4
	6
	2
	1
	1

Operative technique: 3 or 4 ports were placed depending upon the type of disease the operation was indicated for. (3 ports for fenestration, 4 ports in cholecystectomy, while in one case 5 ports for fundoplication.) The cyst was opened and its content aspirated. Then the cystic fibrotic wall was excised using electrocautery. The resection was extended till the margin of normal liver tissue. The inner wall of the cyst is thoroughly explored for any sign of growth. The cystic wall is sent for histologic examination. In cases of multiple cysts fenestration was performed one-by one. Deeply situated cysts were usually opened through the overlying superficial one. Drains were left in the cystic cavity.

Results

All operations were completed laparoscopically.

Minimal bleeding occurring during the resection could be controlled by electrocautery, in some cases we used clips to occlude arteries. Conversion was not required in any case. Drains were removed on postoperative day 2–4 depending upon the amount of serous discharge. In non of the cases did we observe biloma or, biliary fistulisation. Following the removal of the drains the patients were emitted. Histologic examination showed cystadenocarcinoma in a

17 years old man, and cholangiocellular adenoma in a 47 years old woman. Both of them were reoperated. The cystadenocarcinoma proved to be unresectable, while the adenoma was removed by left hemihepatectomy. During the mean follow up period of 12.5 months (1–54 months) the patients are free of symptoms. Recurrence was not observed.

Discussion

Asymptomatic cysts are frequent findings during CT examinations or US. In most cases these require follow-up only. Surgical intervention is suggested for symptomatic cysts, or for those, that show enlargement tendency. Generally wide unroofing or fenestration is the surgical method, but partial liver resection is also suggested [5]. Depending upon the size and number of the cysts US or CT guided aspiration and/or drainage carries high recurrence rate and the danger of infection. To provide permanent cure puncture is combined with sclerotherapy using ethanol, fibrin sealant, Pantopaque or tetracyclin derivative. Although the reported results show a low recurrence rate, still the majority of the patients with hepatic cysts are treated surgically [4]. Recently the development of laparoscopic surgery presents a new therapeutic approach [2]. Even it has been applied in polycystic liver disease, too [3]. For the exclusion of neoplastic lesion the exploration of the cystic cavity and histological examination of the resected wall is very important. In two of our cases this verified the neoplastic lesion which required further surgical treatment. In cases of multiple cysts it is possible technically to open the deeply located ones through the superficial, provided the two cysts are lying close to each other. The laparoscopic procedure can be performed safely. The liver parenchyme should be respected to avoid lesion to bile ducts. To prevent recurrence of the cyst as much wall should be removed as possible.

In our experience the main advantage of the laparoscopic approach is the quick recovery and significantly shortened hospital stay. Because intra abdominal adhesions seldom develop the recurrences can still be effectively treated laparoscopically [1, 6].

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CONTENTS

Corneal transplantation in children. <i>E. Balázs, K. Balázs, L. Takács and A. Berta</i> .	225
An unusual pulmonary perforation case after chest tube placement. <i>G. Yuncu, D. Aykanlı, S. Yaldız, M. Ülğan and H. Alper</i>	231
Relationship between the survival and the clinicopathological parameters of the patients with tumors in the pancreatic head region. <i>Cs. Berczi, J. Bocsi, K. Lapis and Gy. Balázs</i>	235
Surgically treated Hashimoto's thyroiditis. <i>F. Győry, G. Lukács, F. Juhász, E. Mezősi, Sz. Szakáll, T. Vég, J. Máth and Gy. Balázs</i>	243
Fibro-osseous lesion of rib. <i>S. Gürsoy, S. Yaldız, G. Yuncu, M. Ülğan, D. Aykanlı and A. G. Yener</i>	249
Eosinophilic cystitis in view of two cases. <i>F. Szabó, Zs. Simon and G. Arató</i>	253
Two cases of benign tracheo-gastric fistula following esophagectomy for cancer. <i>K. Kalmár, T. F. Molnár and Ö. P. Horváth</i>	261
Clinical nutrition in liver and pancreatic diseases. <i>L. Harsányi</i>	269
Testicular biopsy helping assisted reproduction. <i>E. Erdei, É. Magyar, I. Lellei, J. Rózsahegyi, A. Laki, A. Rusz and Gy. Papp</i>	279
A case of a calcified renal cyst. <i>D. L. Répássy, S. Csata and Gy. Tamás</i>	289
Anatomic variations in patients operated for bladder substitution. <i>Gy. Tamás and D. L. Répássy</i>	297
Eosinophilic cystitis. <i>S. Csata, D. L. Répássy, P. Hazslinszky and B. Járny</i>	303
Comparison of morbidity of lumbar flank approach and transperitoneal approach for radical nephrectomy. <i>D. L. Répássy, A. Bécsi, Gy. Tamás and T. Weninger</i>	311
Metabolic consequences of orthotopic ileal neobladder. <i>D. L. Répássy, A. Bécsi, Gy. Tamás and T. Weninger</i>	321
Isolated urethral amyloidosis (Case report). <i>D. L. Répássy, A. Tankó, T. Weninger, E. Babarcsi and Gy. Tamás</i>	329
Heteromorphic grade of renal cell cancer. <i>D. L. Répássy, R. Gaál and J. Sebők</i>	335
Forgotten rubber drain in the abdomen (Case report). <i>A. Gökalp and G. Maralcán</i>	343
Acta Chirurgica Hungarica – Volume 38: Index	349

Dear Reader!

You are holding the last issue of Acta Chirurgica Hungarica in your hand, since its publication will cease, giving way to other journals.

It is the opinion of the Editorial Board that throughout the past decades, Acta Chirurgica Hungarica played an important role in communicating the Hungarian surgical results abroad, when, for many, this was the only opportunity to do so in a foreign language.

We are grateful to the Hungarian Academy of Sciences for publishing our Journal for all these years, we thank each and every Hungarian as well as foreign scientist for the constant excellent scientific contributions, and last but not least, we wish to thank every member of the Editorial Board for their outstanding help given throughout the years.

A handwritten signature in black ink, appearing to read 'Mihály Ihász', with a stylized flourish at the end.

Mihály Ihász
Editor-in-Chief

CORNEAL TRANSPLANTATION IN CHILDREN

E. Balázs, K. Balázs, L. Takács and A. Berta

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Authors discuss the special problems related to childhood keratoplasties. They evaluate the results of the keratoplasties carried out in children during the past 10 years in their service. They review the concerning literature and summarize their opinion on the corneal transplantations of this age group.

Introduction

Keratoplasty is the most frequently and successfully executed organ transplantation. More than 40,000 such operations have been carried out in the United States in 1990. In adults, it has become a routine surgical intervention. 90–100% of the grafts transplanted for keratoconus remain clear in adults, and the chance for clear grafts in the higher risk Fuchs' dystrophic and bullous keratopathy corneas is still 60–85% [14]. The rate of successful childhood keratoplasties, however, is smaller than this, because of various aggravating factors.

In the present study, we evaluate the results of childhood keratoplasties done in our service during the past ten years. The purpose of this study was to establish an opinion concerning this problem and decide how the outcome of childhood and infantile keratoplasties could be improved.

Patients and Results

Between 1985 and 1994 we performed 42 keratoplasties in 32 eyes of 26 children, of which 39 were perforating and 3 lamellar corneal transplantations, including 11 re-keratoplasties.

Four patients (2 bilateral buphthalmos, 1 bilateral Peters' anomaly and 1 perforating eye injury) were less than 2-years old. In 5 eyes of these patients, nine perforating keratoplasties were carried out, including 4 re-keratoplasties. Besides the corneal transplantations, 23 other ophthalmological operations were done in these patients until the age of 2 (not considering suture removals), 12 of which aimed to control glaucoma. Eight of the nine transplanted corneas have lost their transparency in an average of five months. One of them remained semi-transparent, allowing the child with buphthalmos to move around safely (Table 1).

Table 1
Keratoplasties performed in children younger than 2 years old

Number of patients	4
Number of operated eyes	5
Corneal transplantation:	
Perforating	9
Lamellar	—
Re-keratoplasty	4
Non-transparent grafts	8
Semi-transparent graft	1

In the examined period 2 2–6-year-old children (1 with congenital glaucoma and 1 with severe acetic acid burn) were operated on. The latter child had 3 repeated corneal transplantations and in each cases, the graft had lost its transparency in an average of 10 months (Table 2).

Table 2
Keratoplasties carried out in children between 2 and 6 years old

Number of patients	2
Number of operated eyes	2
Corneal transplantation:	
Perforating	4
Lamellar	—
Re-keratoplasty	2
Non-transparent grafts	3
Semi-transparent graft	1

Twenty-five eyes of 20 school-age children were operated. Twenty-nine corneal transplantations were performed in this age-group, including 26 perforating and 3 lamellar keratoplasties. Five re-keratoplasties were carried out. In two-thirds of the cases the corneal transplantation was required for keratoconus or other corneal dystrophy. In the remaining one third of the patients chemical or perforating injury, leucoma or corneal perforation due to keratitis were the causes of keratoplasties. Twenty-two of the grafts remained clear, two became semi-transparent and 5 transplants lost their transparency (Table 3) during the follow-up period. The first keratoplasty of 1 child in this group had been done in another institution for vascularized corneal leucoma.

Discussion

Plenty of studies [1, 2, 4, 6, 10, 13] have shown that the results of corneal transplantations performed in small children, especially in infants, are much less favorable than those carried out in adults of the same prognostic groups. In this study, it has been shown, that only one of 16 infantile corneal grafts transplanted for bilateral, total, congenital corneal clouding re-

Table 3
Keratoplasties performed in children more than 6 years old

Number of patients	20
Number of operated eyes	25
Corneal transplantation:	
Perforating	26
Lamellar	3
Re-keratoplasty	5
Clear grafts	22
Non-transparent grafts	5
Semi-transparent graft	2

mained clear during our follow-up period. There were times in the history of keratoplasty when corneal transplantation in small children was considered as an absolute failure and was not accepted at all, because of the severe postoperative complications, the uncontrollable secondary glaucoma and the almost always lost graft transparency [7]. Although there has been a detectable improvement in the outcome of childhood keratoplasties during the last two decades, brought about by the development of microsurgical techniques, the routine use of viscoelastic materials and implantations of intraocular lenses, the differences in the results as compared to adult keratoplasties are still obvious. The still observed poor prognosis and unfavorable outcome of childhood corneal transplantations are due to several special factors. The surgical intervention itself is more difficult to perform in this age-group because the infantile cornea and sclera is less rigid than in adults. Iridocorneal adhesions are frequent. The vitreous body is consistent and ready to leave its place, similarly to the lens. After this, the "empty", small eye collapses rising further technical difficulties.

The postoperative treatment is not less troublesome, especially in children between 1- and 4-years old. A reliable biomicroscopical examination, a subconjunctival injection, as well as suture removals necessitate repeated general anaesthesia, bearing the possibility of further complications. A strict postoperative control is needed in the first 4–6 postoperative weeks after childhood corneal transplantations. According to previously published data [3, 15] and our own experience, at this age, especially under the age of one year, wound healing is accomplished rapidly, in about one month. Nevertheless, sutures may cut through the soft recipient rapidly. Suture loosening may be also facilitated by the contraction of the scar tissue [17]. Mucus accumulates in the loose suture loops, irritating the eyelids and the surrounding tissues, provoking fast neovascularization and severe inflammatory reactions. This latter process leads to the clouding of the transplant in children having an immature immune system [8]. A further difficulty is that our tiny patients are not able to tell us when their eye had begun tearing or when their vision had become worse. Consequently, if the doctors or the parents are not alert enough, symptoms like a badly opening eye, rubbing or crying may be overlooked and the optimal time of suture removal or drug application can be missed. Thus, immunological reactions may be perceived only in the irreversible stage.

The special problems related to childhood keratoplasties involve the lack of visual improvement even in the cases of relatively clear grafts, because of the accompanying eye diseases, the already present amblyopia and the alterations of the central nervous system.

The prognosis of childhood corneal transplantations is greatly influenced by the underlying corneal disease, the age of the patient and the presence of absence of elevated intraocular pressure. Usually, results are worse in the cases of congenital, total corneal clouding than in those of acquired leucomas. The outcome is especially despairing in Peters' anomaly, where the surgeon must face multiple anterior segment malformations and a both surgically and conservatively hardly manageable glaucoma [2, 11]. In the cases of traumatic or nontraumatic acquired leucomas, the prognosis for both clear grafts and good visual acuities are better. Regarding the patients' age, our results also point out that the worse prognosis is expected in children under the age of two years, especially in case of associated high intraocular pressure, deteriorating the visual functions and resulting in the clouding of the transplant. In the age-group of between 2 and 6-years old the results are better and the outcome of corneal transplantations carried out in children above six years is almost as good as in adults [1, 16].

The problems of childhood keratoplasties raise several questions. *Firstly, how old the donor should be*, e.g. are the chances for clear grafts increased if dilatable infantile cornea is transplanted in infants? Considering the differences in corneal size, keratometric data and histological properties between neonates and adults, as well as the abrupt changes of these characteristics during the first 6 months of life and their gradual alterations until the age of two (Table 4) [6, 9], the above suggestion seems to be reasonable. We tried this possibility, but in accordance with the previously published results of Paufigue et al. [12], Koenig et al. [6], and Brown and Salamon [3], we found adult donors more suitable for childhood keratoplasties. *Secondly, what preoperative measures should be taken?* In order to avoid lens and vitreous loss we think that besides general anaesthesia, application of ocular massage, compression, akinesia and intravenous mannitol are advantageous. Retrobulbar anaesthesia is not recommended because of the shallow orbit. *What should be the diameter of the trepanated recipient and how large should be the transplant?* The optimal size of the recipient bed is 5.5–7.0 mm. In the case of aphakia and thin recipient, the graft should be 0.5 mm larger than the recipient bed because of the increased elasticity of children's cornea. According to Panda et al. [10], larger grafts have increased susceptibility to failure because of the increased risk of high intraocular pressure. *What kind of suture should be applied and when should it be removed?* Some authors recommend 10/0 interrupted sutures, others use double running sutures. Our experiences with the simple 10/0 running sutures are favourable. Similarly to Brown and Salamon, we remove these sutures as soon as microabscess formation is observed in the graft at the apex of the stitches and superficial neovascularization is beginning in the recipient, even if these changes are noticed as early as the postoperative 2–4th weeks.

Table 4
Changes in corneal parameters in the first two years after birth

	At birth	At the end of the 2nd year
Diameter	9.8 mm	11.75 mm
Area	75 mm ²	108 mm ²
Refractive power	57.7 D	43–44 D
Endothelial cell count	4500 mm ⁻²	3400 mm ⁻²

Are there any special intraoperative measures needed? With the help of viscoelastic materials, the iridocorneal adhesions can be gently resolved while providing protection for the corneal endothelium. If cataract removal is necessary, extracapsular extraction should be preferred and a posterior chamber lens implanted together with the keratoplasty, in order to avoid amblyopia. *Finally, when to carry out keratoplasty?* In spite of the improving management of postoperative complications, we share the opinion of Sundmacher and Althaus, e.g. it is better to avoid complications than to treat them. Accordingly, we prefer to make keratoplasty after the age of one year, even if the risk of amblyopia is increased, instead of voting for the early corneal transplantations, whose complications often lead to the loss of light perception. We think that, if the above recommendations are considered, the outcome of childhood keratoplasties can be improved.

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AN UNUSUAL PULMONARY PERFORATION CASE AFTER CHEST TUBE PLACEMENT*

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Pulmonary laceration is an uncommon complication of tube thoracostomy technique that is expected vigorous clinically and may be fatal. In this study, we report a case of pulmonary laceration owing to a tube thoracostomy, with no clinical signs, and detected incidentally on thorax computed tomography.

Introduction

Tube thoracostomy is an invasive and standard therapy for a number of pulmonary disorders, caring about 1% complication rate [3]. Most confronted complications include diaphragm or lung laceration, damage to intraabdominal organs and intercostal artery bleeding. The incidence of complication is probably greater than is generally accepted. Here we report an intraparenchymally located chest tube, detected on thorax CT after thoracic empyema on a gun shot wound.

Case Report

A 28-year-old male has undergone partial resection of small intestine after a gun shot wound. Ten days after, he has been reoperated for perisplenic abscess, and plus drainage has been seen through a 1 cm laceration of the diaphragm. He was referred to our hospital for the management of emphysema. Chest X-ray showed air-fluid level. After tube thoracostomy, 600 cc. emphysema fluid was drained and air leak was stopped immediately. At the third day of tube thoracostomy, a homogeneous density at the lower lobe lung field persisted at the chest X-ray. Thorax CT scan was done and intraparenchymal malpositioned chest tube was seen (Fig. 1). Then chest tube was removed. On control chest X-rays, a small air-fluid level located to the previously chest tube side has occurred. Control thorax CT has revealed intraparenchymally fibrosis of the tube tract after two months (Fig. 2).

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Fig. 1. Thorax CT showing intraparenchymally malpositioned chest tube

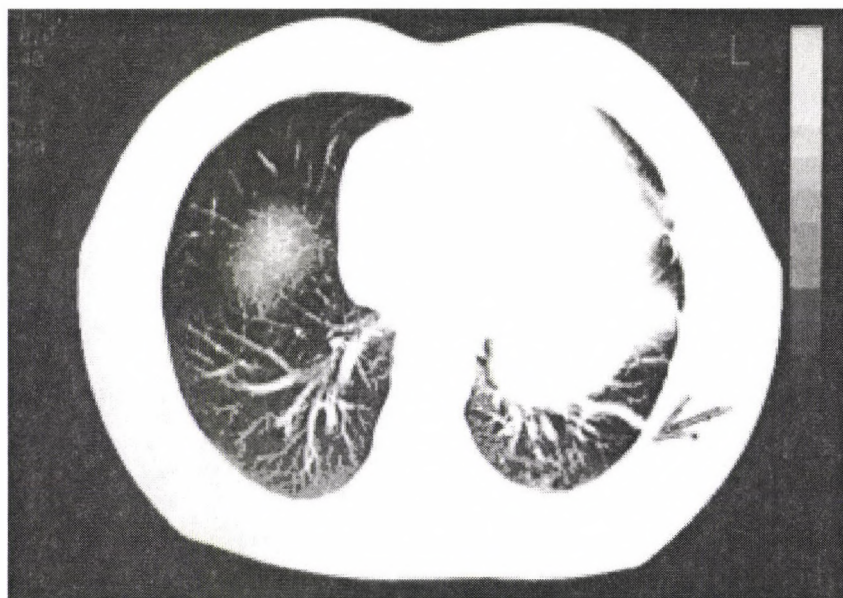


Fig. 2. Control thorax CT showing intraparenchymally fibrosis of the tube tract

Discussion

Tube thoracostomy is associated with a certain incidence of morbidity related to the technique of insertion. Lung perforation secondary to this procedure is also reported. Fraser described 3 cases of lung perforation secondary to tube thoracostomy and in none was the perforation suspected clinically [2]. In the presented case above also, clinical and radiological findings were absent and pulmonary perforation was detected incidentally on the thorax CT. Fraser also reported that in all three cases of pulmonary lacerations the tube had been inserted with the use of a trocar but in the presented case, tube has been replaced with a haemostatic clamp.

Baldt *et al.* [1] used CT to assess the spectrum of complications after emergency tube thoracostomy and showed the role of CT in detection of these abnormalities. He also reported that five intraparenchymal malpositioned tube were seen only at CT and no clinical findings were positive.

We suppose that pulmonary consolidation is the cause of clinically absence of bleeding and air leakage in some cases as in the presented case.

Iatrogenic lung perforation may be minimized by strict adherence to proper technique but despite appropriate precautions it may occur and sometimes the lack or nonspecificity of clinical and radiographic findings may overlook this serious problem.

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RELATIONSHIP BETWEEN THE SURVIVAL AND THE CLINICOPATHOLOGICAL PARAMETERS OF THE PATIENTS WITH TUMORS IN THE PANCREATIC HEAD REGION

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Retrospective study was performed to assess the possible prognostic factors for survival in patients after radical surgery with carcinoma of the pancreatic head region.

Twenty-nine patients underwent pancreaticoduodenectomy for cancers of the pancreatic head (n=22) and the papilla of Vater (n=7). Using flow cytometry, authors measured the nuclear DNA content of tumor cells. DNA ploidy status was evaluated from paraffin-embedded tumor tissues.

Fourteen DNA diploid and eight DNA-aneuploid pancreatic carcinomas occurred. Six DNA diploid and one DNA-aneuploid tumors were diagnosed in the group of papilla of Vater. Mean survival of patients with the carcinoma of pancreatic head was 9.3 months. Survival of the patients with the cancer of papilla of Vater was 20.5 months. The mean survival was 10 months in case of DNA-diploid pancreatic carcinoma, and it was 8 months in case of DNA-aneuploid cancer. The survival of the patients with DNA* diploid Vater papilla tumor was 17 months, and it was 40 months with the DNA-aneuploid cancer. The mean proliferative index (PI) of DNA-diploid pancreatic cancers was 9.7%, whereas that of the DNA-aneuploid cases was 13.3%. The mean PI of DNA-diploid tumors of papilla of Vater was 7.5% and that of the DNA aneuploid cases was 28%. There was no significant correlation between the PI and the survival.

DNA-ploidy status and PI had no significant effect on the survival in patients with carcinoma of the pancreatic head region.

Introduction

The incidence of cancers of pancreatic head region has increased in the past decades [5, 11]. Pancreaticoduodenectomy (PD), with or without pylorus preservation is the curative intervention for these malignant tumors [2, 8–10, 14, 16–18].

The measurement of the nuclear DNA content from different carcinomas by flow cytometry has come into wide use. There are only few reports on the DNA content of tumors of the pancreatic head region. The few published studies have reported controversial results with regard to the percentage of DNA aneuploid tumors and the prognostic information of DNA ploidy [1, 4, 7, 13, 15].

The aim of our study was to evaluate the prognostic factors for survival following radical PD of the patients with carcinoma of the pancreatic head region.

Materials and Methods

From 1984 to 1995, 29 patients underwent radical surgery for carcinoma of the pancreatic head (n=22) or cancer of the papilla of Vater (n=7). The mean age of the patients was 55 years (ranged from 31 to 76 years). Twelve patients (41%) were over 60. There were 19 males (65.5%) and 10 females (34.5%).

Whipple procedure was performed in 7 patients, and pylorus preserving partial PD was carried out in 22 cases. After PD, pancreatojejunostomy was performed in 7 patients, while pancreatogastrostomy was made in 22 cases.

Following operation detailed histologic examination was performed. Origin of the carcinoma, pTNM stage (tumor size, lymph node involvement), involvement of the pancreatic resection margin were measured.

Using flow cytometry the nuclear DNA content, DNA-ploidy status of the tumor cells and the PI was evaluated from paraffin-embedded tumor tissues. DNA analysis was carried out without preceding knowledge of the pathologic or survival data.

In the course of the DNA analysis, tumors were classified DNA diploid or DNA aneuploid. A sample with a single G0/G1 peak was regarded as being DNA diploid. All other cases were defined DNA aneuploid.

Carefully stored representative blocks were selected following hematoxylin-eosin staining of sample slices, which did not contain necrotic and haemorrhaged tissues. Paraffin was removed at ambient temperature from the embedded tumor tissue slices 50 μ m thickness by changing twice the xylene solvent (extraction time were 40 min. each). Rehydration was made with dilute ethanol followed by rinsing with distilled water, finally the slices were minced with scissors. Cell nuclear suspension was prepared by overnight trypsinisation, which was suitable for DNA measurement and contained only little amount of debris. The suspension was then washed twice with PBS (phosphate buffered normal saline) in a centrifuge and finally the sediment was resuspended in 0.95 ml of PBS which contained the following ingredients: 0.025% ribonuclease, 0.03% of EDTA, 0.05% of NaN₃ and it was incubated at 37 °C for one hour. The nuclear count/ml was assessed in a Bürkers's chamber and it was adjusted to 100,000–1,000,000/ml, then the nuclei were stained with 50 μ g/ml propidium iodide. The DNA content was measured in a FACStar Flow Cytometer (Benton Dickinson Immunocytometry System, San Jose, CA). Excitation was made with a 5 W argon-ion laser source at 488 nm and 200 mW output. Registration of the fluorescent light emission was made at 584/42 nm.

In order to improve the resolving power 15,000 cells were measured per sample at a streaming velocity of 100–500 cells/sec. Signals originating from damaged cells and debris were excluded by measuring forward scattering and 90° side scattering.

DNA ploidy, DNA index (fraction of the abnormal cell line DNA content and the normal – diploid – DNA content) and the distribution of the cell cycles were determined with the Rabinovitch Multicycle software (Phoenix Flow Systems Inc. San Diego, CA). PI was calculated by the addition of the S-phase % and the G2 % phase data. Only the histograms with variation coefficient (CV) below 8 were evaluated.

Statistical analysis was performed with two-sample *t*-test. A *p* value less than 0.05 was considered to be significant. Kaplan–Meier curves were used to estimate survival time.

Results

Surgery: Whipple procedure was performed in 6 patients, and pylorus preserving partial PD was carried out in 16 cases for cancer in the head of the pancreas. One patient underwent Whipple procedure, and pylorus preserving partial PD was made in 6 cases in patients with carcinoma of papilla of Vater.

Histopathology: The postoperative histologic examination showed adenocarcinomas in all cases. Three carcinomas were less than 2 cm in diameter, and in 26 cases tumor size was more than 2 cm. Regional lymph node metastasis showed up in 5 patients. Twenty-four patients were in Stage I, 4 of them were in Stage II and 1 was in Stage IV.

The pancreatic resection margin was free from tumor tissues in all cases. There were 12 low-grade tumors (Grades I–II), and 10 high-grade carcinomas (Grades III–IV) in the case of the pancreatic head cancers. Among the papilla of Vater cases 6 Grades I–II and a single Grade IV tumors were found.

DNA analysis: Out of the 22 pancreatic carcinomas 14 were diploid and 8 were aneuploid. Six diploid and one aneuploid tumors occurred in the patients with carcinoma of papilla of Vater (Table 1). The DNA index ranged between 1.15–2 in aneuploid cases.

Table 1
DNA-ploidy status of the tumors

	Pancreas	Papilla of Vater	Total
	Patients No		
DNA-diploid tumor	14	6	20
DNA-aneuploid tumor	8	1	9

The PI of the diploid pancreatic cancers was 9.7% and the PI of the aneuploid cases was 13.3%. The mean PI of the diploid tumor of papilla of Vater was 7.5% and that of the aneuploid case was 28%. The overall PI was significantly higher for the aneuploid than for the diploid tumors. The high-grade cases occurred in significantly greater number in the aneuploid tumorous patients (6/8), than among those with diploid tumors (5/14). The PI was significantly elevated in the high-grade carcinomas than in the low-grade cases.

Survival: Patients with pancreatic cancer had a median survival of 9.3 months. The survival of cases with tumor of papilla of Vater was 20.5 months. Cumulative survival (Kaplan–Meier curves) after PD is shown in Fig. 1.

In the group of patients with age above 60 the survival was 10.5 months. It was not significantly different relative to that of patients below 60 years of age (8.6 months). The survival of male patients (11.8 months) was longer than that of the females (5.7 months).

Tumor size (more than 2 cm) and poor differentiation had significantly negative effect on the survival. The survival decreased when lymph node involvement occurred but the difference was not significant.

The survival was 10 months in case of DNA diploid pancreatic carcinoma, and it was 8 months in case of DNA aneuploid cancer. The survival of the patients with carcinoma of

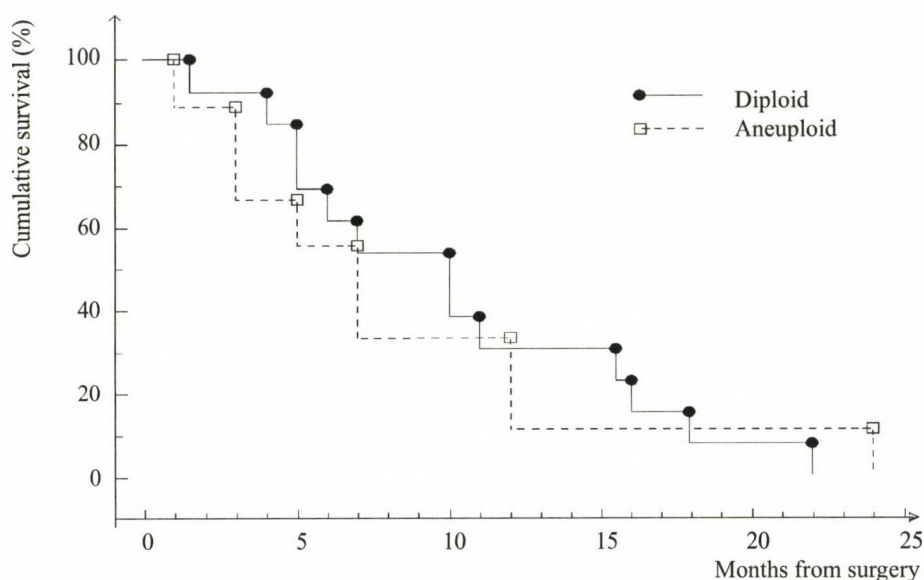


Fig. 1. Cumulative survival in patients with tumors of the pancreatic head region after pancreaticoduodenectomy (Kaplan-Meier curves)

papilla of Vater was 17 months in DNA diploid, and 40 months in DNA aneuploid cases. Although the survival of the patients with diploid tumor was longer in general, than those with DNA aneuploid tumors, but it was not significant (Table 2). Similarly we did not observe significant correlation between the PI and the survival.

The survival of low-grade pancreatic carcinomas was 10.9 months and the survival of the high-grade tumors was 7.8 months (Table 3). The high-grade carcinomas occurred in a significantly higher rate in DNA-aneuploid cases (6/8), than in DNA-diploid cases (5/14). The PI was significantly increased in high-grade tumors.

Table 2
Influence of DNA-ploidy and proliferative index on survival of the patients with cancer of the pancreatic head region

			Survival (month)	Patient (No.)	Statistical analysis (<i>p</i>)
DNA-diploid tumor	PI low (< 10%)		13	17	NS
	PI high (> 10%)		9	3	NS
DNA-aneuploid tumor	PI low (< 10%)		3	1	—
	PI high (> 10%)		13	8	NS

NS = not significant

Table 3
Tumor grade and survival of patients after pancreaticoduodenectomy

	Pancreas		Papilla of Vater		Total	
			Patient No.	survival (month)		
Grades I–II	12	10.9	6	13.8	18	27.3
Grades III–IV	10	7.7	1	40	11	10.7

Discussion

Allema measured the factors for survival in tumors of pancreatic head region [2]. Survival was significantly reduced in those cases when the carcinoma had pancreatic or distal bile duct origin, when the pancreatic resection margin was involved, or when the tumor propagated to the portal vein and the mesenteric vessels. Furthermore, the survival showed significant decrease when tumor size was more than 2 cm in diameter and when regional lymph nodes were involved. The survival of our patients was significantly higher in tumors of papilla of Vater compared to the pancreatic head carcinomas. Age and sex had no significant influence on the survival, however, the survival of our male patients was essentially longer. According to our experience the survival of the patients was significantly lower, when the tumor size was more than 2 cm. Presence of lymph node metastasis decreased the survival in pancreatic cancer. There were no lymph node metastases present in patients with cancer of papilla of Vater.

In the latest years the view is ever increasing that the survival of the patients is influenced by the DNA ploidy of tumor cells besides their origin (pancreas, papilla of Vater) and their pTNM stage. Statistical analysis sometimes showed that the DNA ploidy is an important and independent factor for prognosis. Some authors found that the PI was also an independent and useful prognostic factor [3, 5, 13].

Some publications reveal significantly lower survival DNA-aneuploid cancer cases with high PI in pancreatic cancer [3, 13]. In contrast to above-mentioned references, others found that the average survival of the patients with DNA-aneuploid pancreatic cancer was not lower than that with DNA-diploid cases. They did not find correlation between the PI and the survival [4, 6, 7, 12].

The survival of our patients with DNA-aneuploid pancreatic carcinoma decreased compared to the DNA diploid cases. However, this difference was not significant. The survival of the patients with carcinoma of the papilla of Vater did not decrease in DNA-aneuploid cases. There was no correlation found between PI and survival.

In the references occurrence of DNA-diploid carcinomas varied in between 15% and 52%, and DNA-aneuploid cases ranged from 15% to 85% in pancreatic cancer [1, 3, 4, 13, 15]. It was observed that DNA-aneuploid pancreatic tumors were present at a significantly higher rate in advanced cases and when lymph node metastasis was present (Stages III–IV),

and in high-grade types of carcinomas [1, 4, 13]. Our data also refer the above trend although they did not reveal any direct correlation between DNA-ploidy and the *p* TNM stadium.

Allison [3] found that the PI of the DNA-diploid tumors ranged from 3% to 16%, and the PI was dominantly higher in DNA-aneuploid cancer (ranged: 5–38%). In our pancreatic head tumor cases the rate of DNA aneuploidy was 36%. In cases with cancer of papilla of Vater DNA-aneuploid tumors were present in 14%. The PI ranged from 4.4% to 11.5% in DNA-diploid pancreatic carcinomas, and the rate changed from 3% to 22% in DNA-aneuploid pancreatic tumors. The PI ranged from 3.5% to 11% in DNA-diploid ampullary tumors, and it was 28% in DNA-aneuploid ampullary cancer.

In conclusion, the tumor size and the poor differentiation were negative prognostic factors from the point of view of survival in carcinomas of the pancreatic head region. DNA ploidy and PI had disadvantageous influence on the survival, but they exerted no significant effects on the survival. However, because DNA ploidy and PI were identified as independent prognostic factors, they should be used as additional factors in future randomised trials of this carcinoma.

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SURGICALLY TREATED HASHIMOTO'S THYROIDITIS

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The primary way to treat Hashimoto's thyroiditis is conservative. However, it has a relatively high occurrence in operated patients, up to 13% in the literature. Indications for surgery are suspicion of malignancy, and/or trachea/esophagus compression.

2818 thyroid operations were performed at our department between 1986 and 1995. 279 patients suffered from thyroid cancer and 2539 had benign disease. Histology revealed Hashimoto's thyroiditis in 118 cases. Coexisting malignant thyroid tumor was found in 14 cases (11.8%): 9 papillary, 2 follicular, 1 anaplastic cancer, and 2 non-Hodgkin lymphoma.

Postoperative recurrent laryngeal nerve paralysis occurred in 8 cases, of which 6 remained permanent. This relatively high incidence supports the importance to identify the laryngeal nerve during every operation for Hashimoto's thyroiditis. Four patients had temporary and one had permanent hypoparathyroidism.

Coexistence of Hashimoto's thyroiditis and thyroid carcinoma, the increased risk for the development of non-Hodgkin's lymphoma in chronic lymphocytic thyroiditis and the need for thyroxin supplementation in many cases justify a careful, long-term follow-up of patients with Hashimoto's disease.

Introduction

Chronic lymphocytic thyroiditis is an organ-specific autoimmune disease first recognized as a distinct entity by Hashimoto in 1912. The disease occurs predominantly in females and may be seen in association with other autoimmune diseases. Hashimoto's thyroiditis is most usually seen as a firm diffuse bilateral goiter in a young or middle-aged woman. In nearly 90% of the cases an elevated antimicrosomal antibody level is pathognomic. The clinical course may be uneventful until the late hypothyroid phase. The mainstay of treatment is thyroxin supplementation [2, 6, 12, 13].

Indications for surgery were as follows in our series:

- suspicion of malignancy (fine needle aspiration cytology, cold nodule, clinical signs),
- trachea and/or esophagus compression or dislocation,
- misdiagnosis of autonomous adenoma with hyperfunction.

In the present study we investigated the data of patients whose histology revealed Hashimoto's thyroiditis. Characteristics of the indication, type of surgery and complications of the operations were evaluated.

Patients and Methods

2818 patients were operated for thyroid disease at our department between 1986 and 1995. Thyroiditis was described in 543 cases by histology ranging from mild lymphocytic infiltration to Hashimoto's thyroiditis. Among the 118 cases with Hashimoto's thyroiditis there were 111 female and 7 male patients (mean age: 47.37 ± 12.9 years).

Preoperative fine needle aspiration cytology was performed in 40 cases: suspicion of malignancy was described in 27, thyroiditis in 7, normal or other benign cytological result in 6 cases.

Ultrasound was performed in 30 cases, nodular changes were found in 18 instances. Per technetate scan (^{99m}Tc) showed cold nodules in 19 cases. In 6 cases the indication for the operation was hot nodules with hyperthyroidism; the reason for the misdiagnoses being that only functioning thyroid tissue could take up the isotope showing the picture of a hot nodule. Trachea and/or esophagus X-ray examination was performed in 56 cases, severe trachea and/or esophagus compression was shown in 16 patients.

Results

Coexistence of malignant thyroid tumor and Hashimoto's thyroiditis occurred in 14 cases (11.8%): 9 papillary, 2 follicular, 1 anaplastic cancer, and 2 non-Hodgkin lymphoma (Table 1). Regarding of the all cancer cases 5% (14/279) had simultaneous thyroid cancer and Hashimoto's thyroiditis. It did not differ significantly from the rate of Hashimoto's thyroiditis with benign diseases: 4% (104/2539).

Table 1
Coexistence of Hashimoto's thyroiditis and malignant tumors

	No.
Papillary cancer	9
Follicular cancer	2
Non-Hodgkin lymphoma	2
Anaplastic cancer	1
All	14

Histology confirmed malignancy in 5 cases out of the 27 suspicious cytological results. Evaluation of fine needle aspirates from Hashimoto's thyroiditis needs special experience. The cytomorphologic picture may be miscellaneous. Sometimes it raises the possibility of malignancy. The hypercellular form with lymphocyte and lymphoblast dominance may mimic the appearance of malignant lymphoma. Atypical follicular cells may suggest the simultaneous occurrence of thyroid cancer and thyroiditis [1].

Of the 56 cases when frozen section analysis was performed, 36 confirmed Hashimoto's or chronic thyroiditis, 9 confirmed tumors, 8 adenoma, 3 were uncertain, raising the suspi-

cion of malignancy. In 2 cases lymph node excision was performed prior to thyroid surgery, and histology showed metastatic papillary cancer. In 4 cases only the final histology of the subtotally resected thyroid lobe or enucleated nodule revealed malignancy. Total thyroidectomy was performed in 11 cases, near-total thyroidectomy in 3, lobectomy in 4, bilateral subtotal thyroidectomy in 59, unilateral resection or enucleation in 40, exploration or biopsy in 2 instances. In patients treated by bilateral subtotal thyroidectomy 1 had occult solitary papillary cancer without lymph node or distant metastases, the other had malignant lymphoma, therefore completion operation was not necessary. The types of operations and complications are shown in Table 2. Transitory hypoparathyroidism occurred in 4 cases after subtotal thyroidectomy. Permanent hypoparathyroidism remained in 1 of the total thyroidectomy cases. Postoperative laryngeal nerve paralysis occurred in 8 cases, 6 of which proved to be permanent.

Table 2
Type of operation and complications

	No.	Malignancy	Recurrent laryngeal nerve paralysis		Hypoparathyroidism	
			temporary	permanent	temporary	permanent
Total thyroidectomy	11	9	1	2	0	1
Near-total thyroidectomy	3	1	0	0	0	0
Lobectomy	4	2	0	0	0	0
Bilateral subtotal thyroidectomy	59	2	1	4	4	0
Unilateral subtotal resection, or enucleation	40	0	0	0	0	0
Exploration and biopsy	2	0	0	0	0	0

In 2 patients, operated for papillary cancer, modified radical neck dissection was performed for lymph node recurrence. No recurrence occurred after the operations for benign disease.

Discussion

The rate of simultaneous occurrence of Hashimoto's thyroiditis and thyroid cancer shows high variance in the literature (3–23%) in selected surgically treated patient population [7]. The relationship between Hashimoto's thyroiditis and differentiated cancer is unknown. Some authors suggest that elevated TSH or antithyroid antibody levels may promote the development of malignant lesions [10, 11]. On the other hand, chronic thyroiditis was considered to be a favorable prognostic factor by others [5, 8]. In addition, evidence now confirms an increased risk for the development of non-Hodgkin's lymphomas of the thyroid gland in patients with chronic lymphocytic thyroiditis. In 8 out of our 15 patients treated for non-Hodgkin lymphoma of the thyroid between 1950 and 1996, the simultaneous presence of Hashimoto's thyroiditis was confirmed [3, 4, 9].

Two cases out of the 6 permanent laryngeal nerve injuries occurred during the preparation of the nerve in total thyroidectomy, the other 4 in subtotal thyroidectomy without the preparation of the nerve. Strong adhesion between the strap muscle and the thyroid lobe, local edema, a firm, relatively fixed thyroid lobe may play roles in this high rate of recurrent laryngeal nerve injury in benign conditions. We think that the injury can be prevented by the identification of the nerve even in the case of subtotal thyroidectomy for benign disease.

Three patients were lost during follow-up: one malignant lymphoma and one anaplastic cancer patient due to local recurrence, and one papillary cancer patient due to distant metastases. No one patient died in the benign patient group.

Thyroxin supplementation is given to the patients during follow-up according to the serum thyroid hormone concentration. It means suppression doses in the case of differentiated cancer. Nodular changes or any alteration in goiter or in the remaining thyroid tissue should be viewed with suspicion and investigated appropriately with fine needle aspiration cytology.

Coexistence of Hashimoto's thyroiditis and thyroid carcinoma, the increased risk for the development of non-Hodgkin's lymphoma in chronic lymphocytic thyroiditis and the need for thyroxin supplementation in many cases justify a careful, long-term follow-up of patients with Hashimoto's disease.

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FIBRO-OSSEOUS LESION OF RIB*

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A 3 × 4 cm homogeneous opacity was incidentally detected over the first rib at routine chest radiography. Radionuclide bone scan identified a hot spot, not excluding malignancy and excision of the rib revealed fibro-osseous lesion. A review of the literature showed 12 cases of this extremely rare lesion.

Introduction

Fibro-osseous lesion of rib is an unusual benign asymptomatic lesion and identified by a “hot” spot on a radionuclide bone scan performed to rule out metastatic carcinoma [3]. In differential diagnosis, it is sometimes impossible to exclude malignancy. Here we present a case who underwent excision of the left first rib and histopathologically diagnosed as fibro-osseous lesion.

Case Report

An asymptomatic 64-year-old woman was admitted to hospital for a 3 × 4 cm mass that was incidentally detected over the first rib at routine chest radiography (Fig. 1). She had a history of a blunt thoracic injury a year ago. Thorax computerized tomography (CT) showed a lesion of 3 cm, characterized by cortical irregularity and periosteal reaction over the first left rib (Fig. 2). Radionuclide bone scan demonstrated osteoblastic activation of the lesion (Fig. 3). The needle biopsy was not performed because of the risk of malign spread. The patient underwent the excision of the first rib since the possibility of malignancy was not excluded. At the operation, a 3 × 4 cm dirty white mass, originated from the first rib was totally excised with the rib. At microscopy foamy macrophages, numerous generating vessels, fibrous tissue appearing between the lamellary bone trabeculae and mature bone marrow at the periphery has led the diagnosis as fibro-osseous lesion of the rib (Fig. 4).

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Fig. 1. Chest radiography showing a mass over the first rib

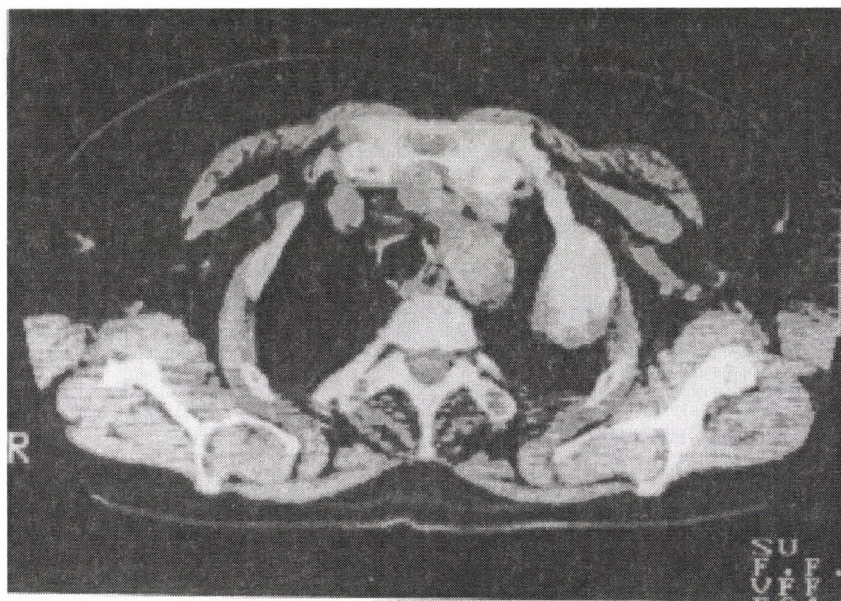


Fig. 2. Thorax CT showing cortical irregularity and periosteal reaction

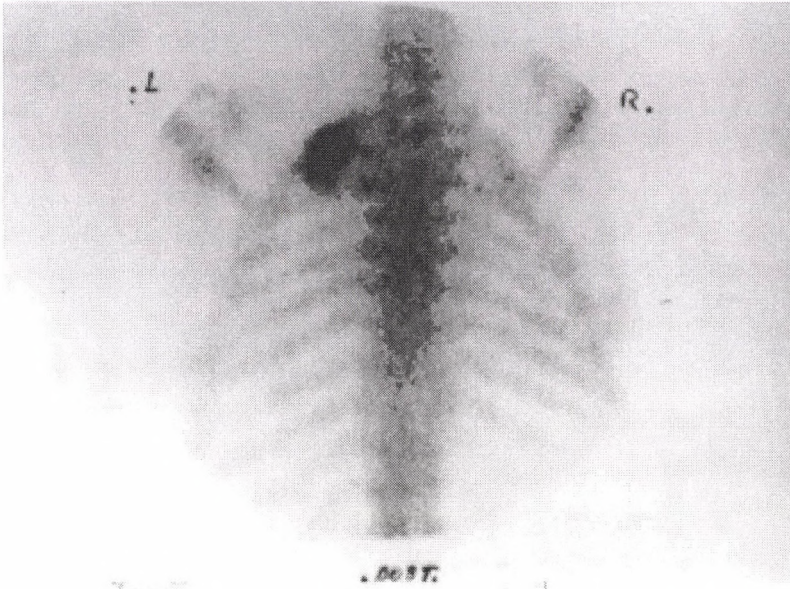


Fig. 3. Radionuclide bone scan showing osteoblastic activation of the lesion

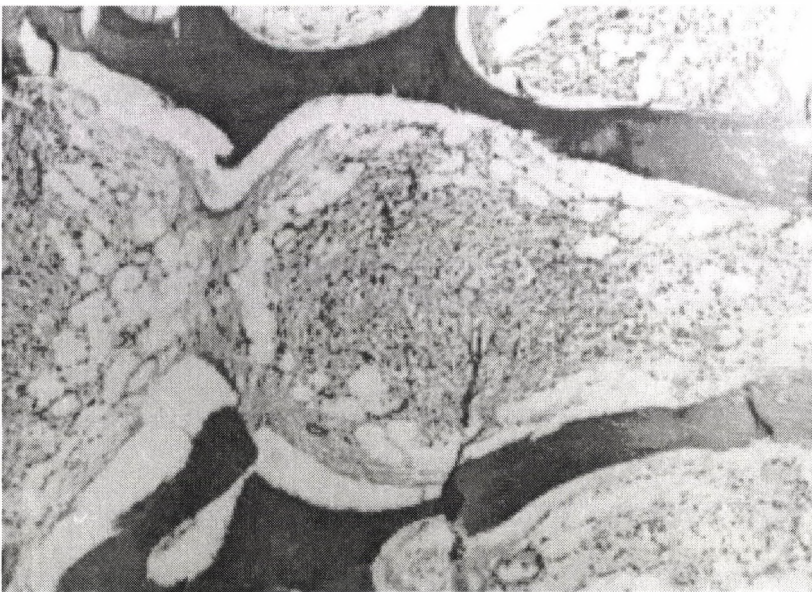


Fig. 4. At microscopy foamy macrophages and lamellary bone trabeculae are seen (HE $\times 100$)

Discussion

There are some theoretical considerations about the origin of fibro-osseous lesion. McCarthy and colleagues [3] suggest that perhaps the fibro-osseous lesion of rib is a late or "burnt-out" form of osteoid osteoma. The presence of intertrabecular fibrous tissue and foam cells have made the differential diagnosis with the osteoid osteoma. However, Dalinka and colleagues [1] believe that fibro-osseous lesion of the rib is related to Erdheim-Chester disease. Another consideration is, possible post-traumatic origin [2, 4]. Mirra [4] thinks that it is more likely because 7 of 12 reported cases had a history of blunt thoracic injury. Presented case also defined a blunt injury over the thorax a year ago.

Although it has been reported that most cases are not discernible on plain radiography, we have perceived the lesion on the X-ray first and confirmed it with the radionuclide bone scan later.

The course of the disease is totally benign and may not need to be removed. From here McCarthy and colleagues [3] suggest such patients be followed by repeat bone scans, but Mirra [4] reminds the possibility of malignancy in those hot spotted lesion on bone scan. We believe that surgical resection may be performed unless the diagnosis is definite.

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EOSINOPHILIC CYSTITIS IN VIEW OF TWO CASES

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Authors present their experiences with eosinophilic cystitis. In both of their cases the preoperative evaluation presumed bladder cancer, the histologic examination, however, showed eosinophilic cystitis. In this report a discussion is given on the diagnostic and treatment possibilities of the entity.

Introduction

Eosinophilic cystitis is a rare disease of the bladder, first described by Brown in 1960 [1]. The entity is characterized by a proliferative mucosal lesion. By histology, eosinophilic and plasma cell infiltration are observable in the mucosa, submucosa and/or muscular layer [6, 11]. Often the recurring forms produce muscular necrosis and fibrosis [4, 11, 17]. Both males and females can be affected at any age. The complaints generally include frequency, dysuria and often macroscopic haematuria [5, 6, 15]. By cystoscopy, a diffusely oedematous, hyperanaemic bladder mucous membrane is visible [8, 11], not infrequently with the detection of wide polypoid masses, raising the suspicion of a bladder tumor [13, 15]. Two different clinical forms are known. One of the forms – found to occur in females and children – frequently becomes complicated with allergic diseases and peripheral eosinophilia. The other form, mostly appearing in older males, may arise in relationship with bladder and prostate diseases [4]. In this case the urine is generally sterile, with possible presence of eosinophilia in the blood [4, 5, 7, 8].

The origin of the disease is unknown, though recent studies have focused attention on tissue damage caused by cytotoxic proteins released by activated eosinophilic cells [3]. Other possible factors include atopic diseases, food allergy, medication, parasite infection, as well as systematic and local agents [6, 10, 11, 17].

Since, due to the rarity of the disease, recognition of the entity may cause difficulties in differential diagnostics, we report on two of our cases.

Case Reports

Case 1. A 67-year-old female patient had a case history of insulin treatment due to diabetes, ischaemic heart disease, hypertonia, removal of the uterus and adnexa because of myoma uteri, as well as Stoeckel surgery because of stress incontinence. She had been receiving treatment for diabetic polyneuropathy, spondylarthrosis universalis and depression. For two years she had been treated for chronic recurring cystitis. Recently her lower abdominal pains worsened, with the appearance of macroscopic haematuria. There were no bouts of any allergic diseases. No deviations other than a red blood cell count of 68 mm/h were found in either the blood count or the chemical analysis of the blood. Urinary examination revealed sucrose positivity, sedimentation analysis showed an erythrocyte count of 60–80 and a leukocyte count of 10–15. Bacteriology analysis of the urine turned out negative. The patient was not found to have peripheral eosinophilia or eosinophiluria. Abdominal ultrasound revealed cholelithiasis and a diffuse liver lesion. *True pelvic CT* signalled thickening of the right-sided bladder wall (14 mm), without finding any solid components in the bladder. *By cystoscopy*, flat, tumor-like, oedematous, erythematous alterations were observable bilaterally in the areas around the urethral orifitium. TUR biopsy was performed by means of spinal anaesthesia. *Histology* confirmed eosinophilic cystitis. All allergy tests proved to be negative. The patient was thus started on a course of nonsteroid antiinflammatory drug and antihistamine. Six weeks later the patient returned to our Clinic with complaints of a temperature and the shivers. Abdominal ultrasound revealed dilatation of the right-sided cavity system. *By cystoscopy* the orifice on both sides was found to be open, the right orifice evacuated debris, the bladder mucous membrane showed inflammation and was oedematous, however, no signs of a tumor were visible. *Abdominal CT* exhibited an aposthematous kidney on the right side, as well as a calcerous, hydroptic gall-bladder. Due to septic shock the patient received intensive care, and right-sided nephrectomy was performed as soon as her condition stabilized. The histologic diagnosis was pyelonephritis acuta apostematosa. Shortly after, the patient's condition improved without complaints or a temperature.

Case 2. A 54-year-old male patient had no previous history of treatment for any serious illness. Routine laboratory tests for a catarrhus upper respiratory tract found microscopic haematuria. The patient had no complaints of micturition. Upon admission he had right-sided lumbar sensitivity and pains. Urine cytology showed no malignity, the picture referred to inflammation. The protozone and helmintiasis tests were negative, as were the allergy tests. No elevation was noted in the peripheral eosinophilic level and eosinophiluria was not manifest. The qualitative and quantitative blood count, as well as the chemical analysis of the blood showed no deviations. The urine sediment contained 25–30 leukocytes, 15–20 red blood cells and plenty of bacteria. Bacteriology test of the urine revealed *Enterococcus faecalis* 10^5 . *Abdominal ultrasound* displayed thickening of the right-sided bladder (57 mm in length and 17 mm in width), as well as a 4 cm sized bladder diverticulum on the right side. Dilatation of the right-sided renal cavity system, a left-sided cortical kidney cyst 3 cm in size, cholelithiasis and a diffuse liver lesion were also confirmed. *Infusional urography* disclosed right-sided hydronephrosis, shadow loss in the bladder on the right side, and bladder diverticuli (Fig. 1). *Abdominal CT* revealed tumorous expansion in the bladder with manifestation of



Fig. 1. Right-sided hydronephrosis, shadow on the bladder also on the right side

two thick-walled cystic masses in the environs of the right-sided urethral orifitium. The perivesicular fatty tissue was seen to be distinctly infiltrated (Fig. 2). *MR imaging* found bladder diverticuli, where the right-sided alteration was depressed by fibrosis, which with all probability also partly encased the right ureter. The bladder wall on the right side was seen to be thickened, which according to the radiologist could be caused by cystitis tuberculosa or

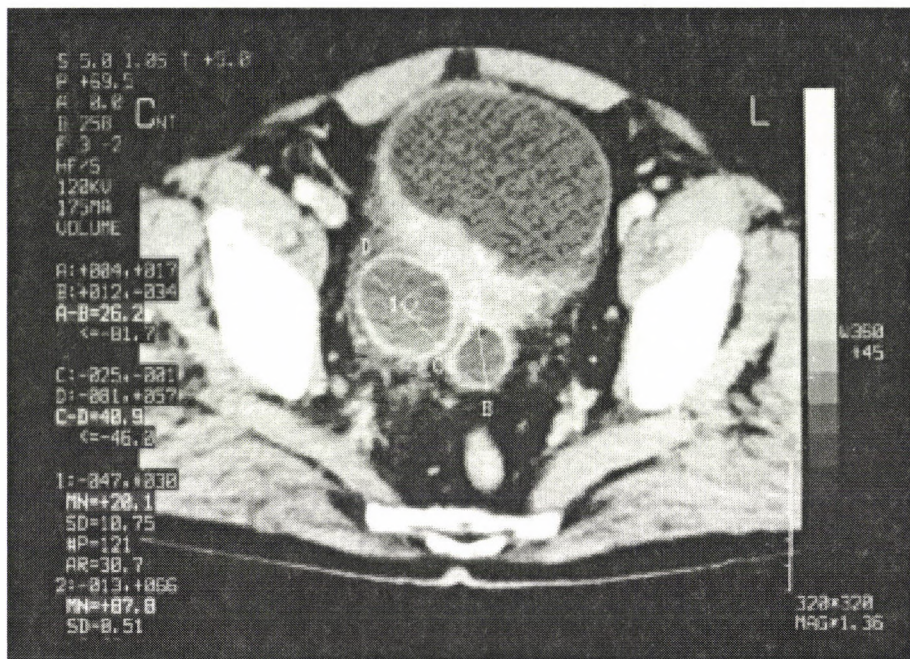


Fig. 2. Contrast CT image; the uneven thickening of the bladder wall, perivascular infiltration and two diverticuli are visible

schistosomiasis, too, apart from a tumor. *Cystoscopy*: oedematous, bullous, polyp-like tumorous alterations were detectable on the base, as well as right lateral and posterior wall of the bladder, extending to the left orificium. The first step was to place a transrenal drain on the right side, then bladder cold biopsy was performed. Histologic examination failed to confirm tumor, the lamina propria was found to reveal eosinophilic and lymphoplasmocytoid cellular infiltration. In order to exclude the possibility of prostate tumor, ultrasound transrectal sextant prostate needle biopsy was taken. The histologic finding proved to be hyperplasia adenomatosa prostaticae. The second step involved the transurethral resection of the alterations seen in the bladder, then a few days later a double J stent was placed in the right kidney, and the transrenal drain was removed. Histology (bladder TUR biopsy) revealed microscopic bladder wall details with occasional urothelial lining in the biopsy samples deriving from seven different areas of the bladder. The mucous membrane was found to be intact, below which, however, expressed inflammation was manifest in the greatly oedematous lamina propria and in the muscle of the bladder wall. The inflammation was partly made up of lymphoplasmocytic cells with a high amount of primary and secondary follicular formations. A large number of eosinophilic granulocytes were also detectable. None of the samples showed tumor-like alterations (Fig. 3/a). The patient received a 2×200 mg dose of ofloxacin and a 2×50 mg dose of diclofenac for a duration of 6 weeks. Two months later control tests

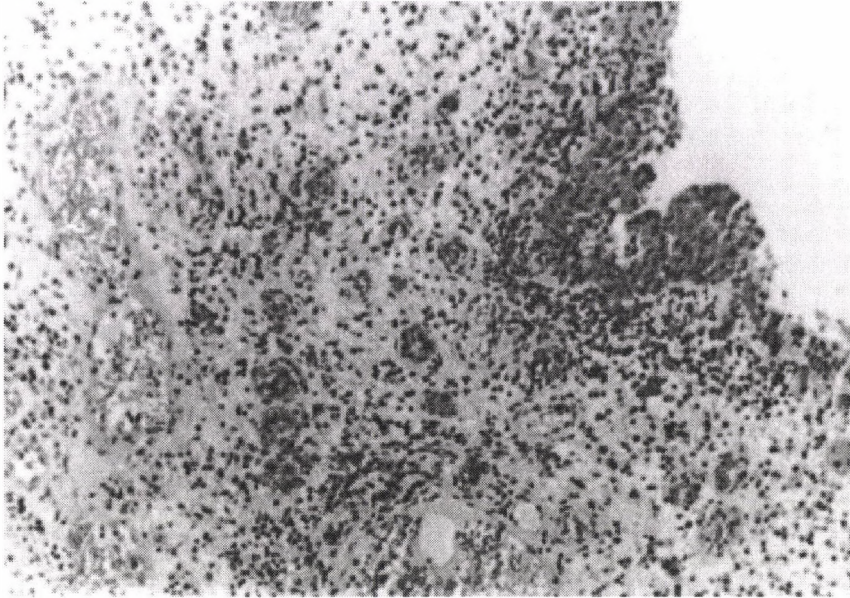


Fig. 3/a. Histologic appearance of eosinophilic cystitis. Oedematous lamina propria showing considerable inflammation, with numerous eosinophilic cells, granulocytes and lymphoplasmacytoid cells, beneath the intact urothelial cover. Note the inflammatory infiltration of the epithelium (HE \times 120)

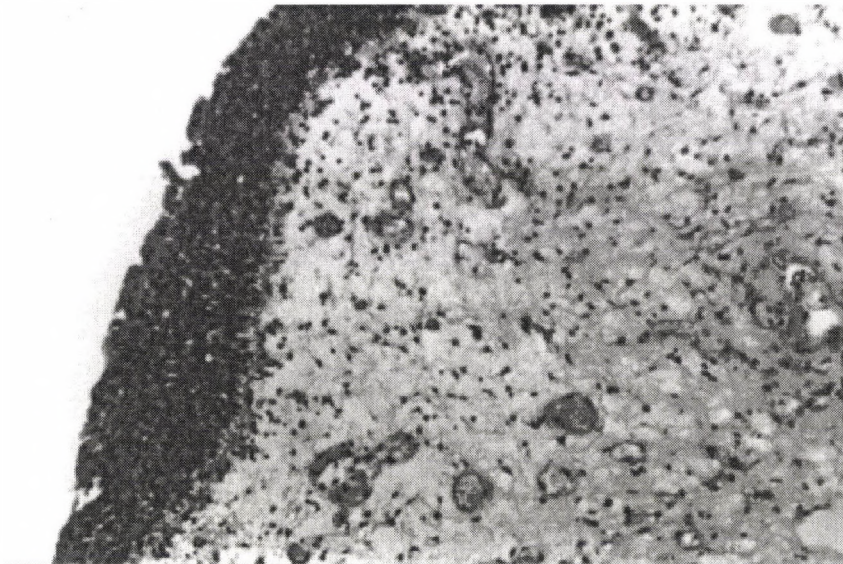


Fig. 3/b. Control biopsy after treatment shows less oedema in the bladder wall and significant decrease in inflammation (HE \times 120)

were done. The urine sediment was still overfilled with red blood cells. The bacteriology test of the urine came out negative. The blood-count as well as the chemical analysis of the blood showed no deviations. The red blood cell count was 26 mm/h. Abdominal CT scan revealed regression of the right-sided bladder thickening, at the same time, however, the upper third of the bladder on the left showed considerable, irregular thickening (24 mm). The perivesical infiltration decreased to a marked degree. The double J stent was removed and biopsy was taken from the bladder. Throughout cystoscopy the bladder was found to be streaked to a great extent, but no bullous, oedematous, tumor-like alterations were seen. Cold biopsies were performed from the right surface of the bladder base as well as from the CT-depicted thickened area on the left. Histology showed the urothelium to be intact on the surfaces of the rice-sized tissue samples taken from two different areas of the bladder following treatment. Beneath the urothelium, the oedema was found to be significantly lessened, with moderation of the earlier inflammation as well, eosinophilic granulocytes, however, were still noted. No signs of tumor-like alterations were manifest in the samples (Fig. 3/b). Two weeks later, control abdominal ultrasound revealed no dilatation of the renal cavity system.

Although the results of the allergy tests turned out negative, the patient nonetheless received antihistamine treatment. He is currently complaint-free and is planned to be called back for regular check-ups.

Discussion

Eosinophilic cystitis is a rare disease. Around 100 cases have been reported on in the literature [3]. To 1998, a total of 17 cases were discussed in which cystoscopy emerged the possibility of tumor [13]. The symptoms include haematuria, dysuria, micturition and lower abdominal pain [7, 10]. Lumber pain caused by difficulty in passing urine is also a characteristic symptom [4, 8, 9].

The etiology of eosinophilic cystitis is unclear. A probable cause may be that IgE mediated mast cell degranulation provoked by various endogenous and exogenous allergens gives rise to an elevation of eosinophilic chemotactic factors [6, 11, 17]. These activated eosinophilic cells release cytotoxic cation proteins, responsible for tissue damage. *In vitro* studies have shown that IL-5 is capable of activating eosinophilic cells, and of inducing the transformation of lymphocytes into IgA secreting plasma cells [3]. According to Hellstrom, an allergic cause is to be presumed in the case of young women and children, while allergy and peripheral eosinophilia are non-characteristic in the case of older males. In these cases, prostatic bladder disease, bladder tumor or previous surgical intervention can be held responsible for the development of the disease [4]. There are literary data on cases involving administration of Mitomycin C for the treatment of bladder tumor, and in Japan following Transilant given for the treatment of asthma [12, 16], furthermore, cases have also been described subsequent to methycillin and warfarin administration [6]. Apart from the above, presumable causes may also include schistosomiasis, filariasis, hydatida infection, virus and bacteria [6, 10, 11], but food allergy, contact allergens (e.g. tampon) [6, 11], as well as allergy to drugs [6, 11] cannot be excluded either. The possibility for the joint occurrence of eosinophilic gastroenteritis, Glanzmann thrombasthenia and asthma bronchiale also exists

[17]. Although eosinophiluria is not rare, it cannot be confirmed in all cases [11, 17]. The differential diagnosis of eosinophiluria should include consideration of the possibility of interstitial nephritis, acute tubular necrosis, chronic renal deficiency and glomerulonephritis. The peripheral eosinophilic level might be elevated [5, 6], with the simultaneous elevation of the serum and urinary IgE levels being specific. Increase in the urinary IgA level is a notification of the local immune response, while IgE signals an allergic disease [6, 11]. Haematuria, pyuria proteinuria are frequent observations, with haematuria provable in 80% of the cases – from which 50% is present in macroscopic form [2].

The cystoscopic appearance of the alteration is non-specific. The seen image is often that of an oedematous bladder wall with submucous haemorrhaging, and on occasions ulcerous papillary lesions or velvety erythematic plaques are visible [6, 17]. Based on the macroscopic picture, it can frequently be mixed up with bladder neoplasia [7, 13, 17]. Infusional urography is generally not much help in setting up the diagnosis, but is all the more helpful in verifying secondary pyelo-ureterectasy or possible extravasation [8]. Computed tomography has no specificity in the diagnosis of eosinophilic cystitis, and there are no literary data on cases being studied by MR imaging. In our presented cases MR imaging gave rise to the possibility of cystitis tuberculosa as well as schistosomiasis, besides the suspicion of a tumor. The result of a bladder biopsy is essential for establishing the diagnosis. The histologic appearance is characterized by the eosinophilic and plasma cell infiltration of the lamina propria, and sometimes even the muscle layer [6]. Localized bladder wall fibrosis is not a rare observation, especially in the chronic recurring cases [6, 17]. The possibility of interstitial cystitis, bacterial cystitis, tuberculosis and bladder tumor should all be taken into account when differential diagnosing eosinophilic cystitis [2, 6, 7].

There are no therapies available for the successful treatment of eosinophilic cystitis. Before any treatment, the ureter should be freed of any bacteria caused by infection [6, 11]. In all cases, thorough studies should be conducted in the direction of any possible allergies [6, 17]. Cases of improvement have been described following systemic steroid administration [11, 15, 17]. In other cases non-steroid antiinflammatory antihistamines proved to be effective [9]. Castillo et al. [2] reported a case where no improvement could be achieved by either steroids, antihistamines, antibiotics, or intravesical dimethyl-sulphoxide. Treatment descriptions range from bladder irrigation by various methods to intravesical chemotherapy, including dimethyl sulphoxide, cyclophosphamide, actinomycin D and intravesical silver nitrate. Complete recovery has been reported on following whole transurethral resection of tumor-like alterations in the bladder [13]. Intense macroscopic haematuria or considerable decrease in bladder capacity may call for cystectomy or some form of urinary diversion [6, 17], while renal dysfunction necessitates nephrectomy [8]. Eosinophilic cystitis is a chronic recurring disease needing close follow-up. Also not to be neglected is the fact that a negative cystoscopic control study does not exclude the possibility of a later recurrence [11, 15]. Complete spontaneous recovery has been reported on in children [14], while in adults there is always the probability of a relapse or progression even despite treatment [11, 17]. The recovery process might often involve fibrotic changes in the muscle, which could possibly also lead to loss in renal function [8, 17].

There are no uniform, "good" methods for following the eosinophilic cystitis cases, or for judging any possible progression. Thijssen et al. [15] conducted follow-ups of their cases by

means of red blood cell count, peripheral eosinophil level control and cystoscopy, other only applied cystoscopy [6].

Based on the present two cases, it is our view that asymptomatic microhaematuria or recurrences of cystitis should draw attention to the possibility of eosinophilic cystitis. Since the various imaging techniques (IVP, CT, and in our case MR) do not ensure correct diagnosis, it is essential to perform biopsy and have knowledge of the histology results in order to establish a firm diagnosis. This is particularly important in view of the patient receiving correct information about the disease and its consequences.

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TWO CASES OF BENIGN TRACHEO-GASTRIC FISTULA FOLLOWING ESOPHAGECTOMY FOR CANCER

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Two successfully managed cases of esophageal replacement for cancer complicated by neoesophago-tracheal fistula are described. In both cases radical esophagectomy with a gastric pull-up was performed. In the postoperative period different complications necessitated prolonged ventilatory support and tracheostomy. In both cases a tracheo-gastric fistula developed probably because of the ischaemic effort of the tracheostomy tube and the nasogastric tube. At single stage repairs, the fistulae were divided and the gastric defects were closed directly. In the first case resection of four strictured tracheal rings and tracheal anastomosis had to be performed. In the second case the fistula was recognized earlier and stricture did not develop. The defect on the membranous trachea was patched with autologous fascia lata graft. A left pectoralis major muscle flap was interposed between the trachea and the pulled up stomach in both cases to prevent recurrence of the fistula. Treatment of this potentially life-threatening and rare condition yielded excellent results.

Introduction

Gastric pull-up or other visceral substitution of the esophagus resected for carcinoma is associated with many complications. One of the most dangerous, a benign respiratory-neoesophageal fistula is rare [13, 15]. The main causes of this fistula are tracheal erosion by the gastric staple line [4], gastric erosion by the tracheostomy tube, overinflation of the endotracheal tube balloon [5], preoperative radiotherapy [11], gastric-tube ulcers [12] and any local inflammatory process of the trachea, mediastinum or the neoesophagus.

Case Reports

Case 1. A 53-year-old male patient was accidentally found to have a middle third esophageal cancer during a routine check for thrombophilia suspected to be a paraneoplastic phenomenon. During the preoperative staging which revealed a T2N0M0 status, substotal pulmonary embolization developed resulting in a 1.5 months delay of the operation. This way the procedure took place in a more disadvantageous situation in terms of tumor stage (T4N0M0) than it could have been. Radical esophageal resection (R0) was performed through right

thoracotomy and intramediastinal gastric pull-up with cervical esophageal anastomosis in one layer.

Rapid deterioration of gas exchange due to aspiration, insufficient expectoration, atelectasis and hydrothorax made ventilatory support mandatory on the 2nd postoperative day. Three days later, the patient became septic and clinical signs suggested anastomotic insufficiency requiring reoperation. The disintegrated anterior wall of the esophago-gastric anastomosis was completely reconstructed through a cervical approach. Five days later a formal tracheostomy had to be performed.

On the 16th postoperative day following successful weaning from ventilation, introduction of enteral feeding and mobilization, the patient was discharged from the intensive care unit. The tracheostomy tube was removed and attempts at oral feeding were started, but failed, because the patient regularly had coughing attacks during swallowing. Endoscopies and functional X-ray tests to search for the cause were performed but only a moderate anastomotic stricture was found. After a series of endoscopic dilatations the patient was discharged on the 35th postoperative day with a thin nasogastric feeding tube because of the high risk of aspiration.

Two weeks later he was admitted again with stridor and dyspnea. Emergency bronchoscopy revealed a severe tracheal stricture at the level of the preceding tracheostomy and a tracheo-gastric fistula just below the strictured segment. Multiple biopsies did not reveal malignancy. The patient was operated upon. Exploration via a wide collar incision revealed the tracheal structure at the level of the third and fourth rings mainly anterior. A neoesophago-tracheal fistula, 2.5 cm in diameter between the pulled-up stomach and the membranous part of the trachea complicated the anatomical situation. After dividing the organs at the level of the fistula, the stomach was directly closed in two layers. Using cross field intubation, the four strictured tracheal rings were resected. After standard tracheal mobilization, the cartilaginous part of the tracheal ends could be brought together. The missing posterior tracheal wall required a prosthesis as the discontinuity of the membranous part was too large to be eliminated by circumferential resection of the involved rings. Autologous fascia lata was used to replace this defective portion of the posterior tracheal wall. Left pectoralis major muscle flap was prepared to separate the suture lines and further patch the defect. Following reconstruction of the posterior tracheal wall, the tracheal rings were anastomosed in the usual manner with interrupted 3/0 Vicryl stitches with the knots outside and without tension. A Montgomery T tube was left behind as a safety measure, because of the delayed reconstruction. It was planned to be left there for months to decompress and splint the tracheal anastomosis. The interposed pectoralis flap was wound around the trachea in the last step to strengthen the anastomosis with an additional layer (Fig. 1).

Only a minor fluid discharge was noted and the cervical wound healed by secondary intention. The patient was discharged – after a swallowing study revealed no leak – 22 days following the tracheal resection.

Case 2. A 46-year-old man was admitted with gradual dysphagia and weight loss caused by a middle third esophageal cancer at T3N1M0 stage. Radical esophageal resection and gastric pull-up was performed with cervical esophago-gastric anastomosis. In the postoperative period the respiratory complications needed to be managed. In spite of the high dose

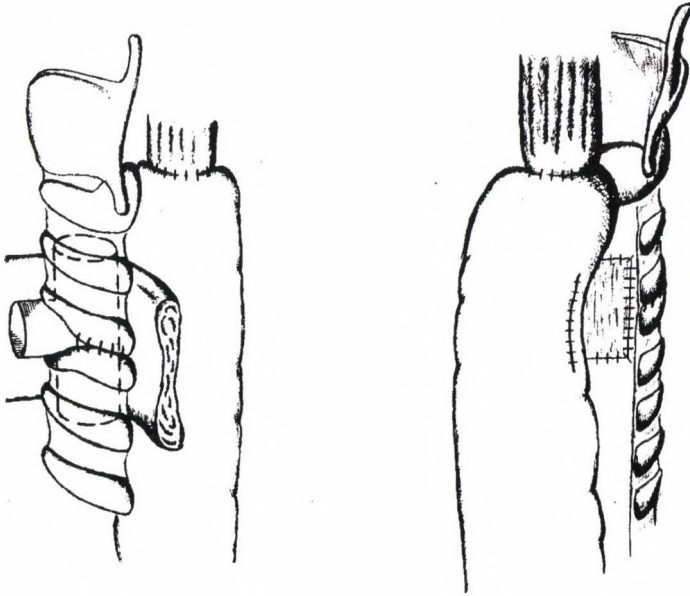


Fig. 1. Topographical sketch of the reconstruction. The tracheal anastomosis with the Montgomery T tube and the interposed muscle flap – anterolateral view (left). The sutured gastric wall and the membranous trachea patched with fascia lata – posterolateral view (right)

mucolytics and physiotherapy expectation remained insufficient. The patient became feverish and chest radiography revealed a bronchopneumonia.

One week after the operation tracheostomy was performed but because episodes of desaturation still occurred, artificial ventilation has to be used. During the next two weeks weaning from ventilation was attempted several times with only temporary success. On the 15th postoperative day bronchoscopy revealed a circumscribed defect of the posterior tracheal wall at the point where the tracheostomy tube pressed against the wall.

As soon as the patient's performance status allowed a trial for reconstruction he was operated upon.

On the 24th postoperative day exploration and reconstruction was performed. Through a collar incision the gastro-tracheal fistula was divided. A membranous tracheal defect, 1.5 cm in diameter was found. During dissection the inflamed membranous trachea was injured, and a further 1 cm tracheal tear was caused.

The tear and the neoesophageal defect were closed directly. The membranous tracheal defect was patched with autologous fascia lata. A left pectoralis major muscle flap was prepared to separate the suture lines and further patch the tracheal defect.

A barium swallow study a week later confirmed that the fistula had healed. The patient was discharged 21 days after tracheal surgery.

Discussion

Fistula formation between the respiratory and gastrointestinal tract is a potentially fatal complication requiring early intervention. In patients with history of a previous esophagectomy for carcinoma, recognition of a tracheo-neoesophageal fistula suggests recurrence of the malignant disease [2]. Benign fistulae also occur but much less frequently [13, 15]. These develop days, weeks or even years after esophagectomy for cancer, caustic or peptic structures regardless of the form of replacement with colon, jejunum or stomach [15].

As was mentioned in the introduction, the general cause of benign fistula formation is any local inflammatory process of the trachea, mediastinum or neoesophagus. In our cases, the tracheostomy tube was the supposed cause. This is the most frequent cause in cases where fistula formation occurs in the early postoperative period following prolonged ventilatory support [6].

The typical localisation of the fistula is on the membranous part of the trachea a few centimeters below the level of the tracheostomy where the lower end of the cannula touches the posterior wall of the trachea (Fig. 2). When the patient with a tracheostomy needs a

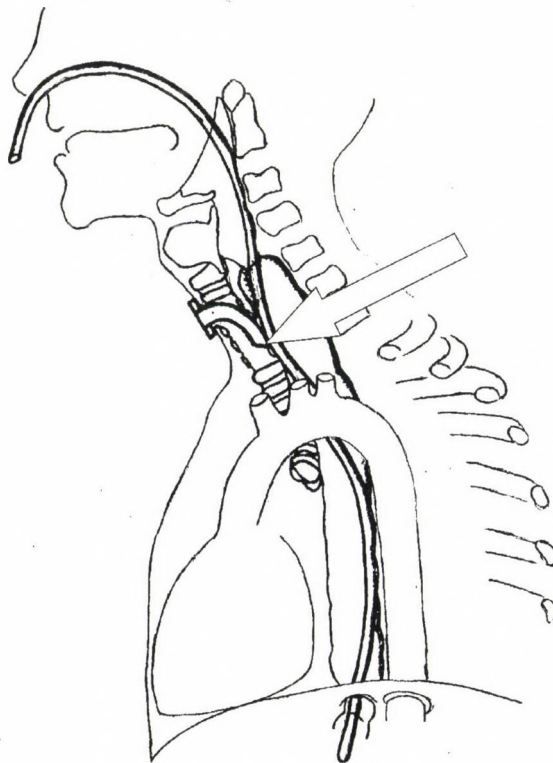


Fig. 2. Hypothetical mechanism of the tracheo-(neo)esophageal fistula formation

nasogastric tube the risk of fistula formation is especially high at the critical point where the mucosa of the tracheal and (neo)esophageal wall are under pressure from both sides at the same time [14]. This life threatening complication can be prevented by avoiding overinflation of the endotracheal tube cuff and the concomitant use of a stiff nasogastric tube [14] or to use low pressure or pressure controlled cuffs. The tilted metal tracheostomy tube can also cause a tracheo-gastric fistula if it is used permanently or for an unnecessarily long time [3].

Patients usually present with a sudden increase in tracheal secretions causing dyspnea, acute respiratory distress, aspiration pneumonia or coughing attacks after drinking. The plain chest radiograph may demonstrate a dilated, air-filled (neo)esophagus below the level of the fistula [6]. Barium contrast studies in most cases demonstrate the fistula. The higher the level of the fistula, the more difficult it is to image it with a barium contrast study because the patient is more likely to have a coughing attack early in the course of examination. Endoscopy and bronchoscopy can directly visualize the defect. In small fistulae to improve the sensitivity, methylene blue dye can be administered to the esophagus during bronchoscopy [6] or saline can be instilled into the esophagus during endoscopy coupled with positive pressure ventilation to promote bubble formation [1].

It can be difficult to differentiate between several causes of aspiration in patients with esophageal replacement. The misdirection of fluid into the trachea may be functional due to prolonged ventilation or organic due to anastomotic stricture or recurrent nerve palsy, and finally an esophago-tracheal fistula can also explain the signs of aspiration. In our first case, the anastomotic stricture was the suspected cause of misswallow supported by its relatively higher occurrence and by the patient's history of suture line insufficiency and the endoscopic finding of mild esophagogastric anastomosis stricture.

Once the diagnosis of tracheo-esophageal fistula has been established, measures have to be immediately taken [6, 7]. These measures aim to prevent soiling of the tracheo-bronchial tree and depend on the type of the fistula and the general condition of the patient. In benign fistulae, most authors suggest an early single stage repair [6, 7], Mathisen and Grillo [6] add that if the patient is still mechanically ventilated, conservative approach should be chosen and after weaning from ventilation, a successful operative repair can be performed.

Conservative management during ventilatory support consists of placing the tracheal tube balloon below the fistula, elevating the head of the bed, inserting a gastrostomy tube for drainage and a jejunostomy tube for nutrition.

The keywords of repair are:

- identification and division of the fistula,
- direct closure of the (neo)esophageal defect in two layers,
- resection of the damaged portion of the trachea,
- tracheal anastomosis (one layer with interrupted sutures),
- separating and buttressing the suture lines with a pedicled muscle flap.

At the presented cases, the large defect on the membranous trachea made it inevitable to have to search for some suitable substitute. To replace the missing membranous wall, a patch of autologous fascia lata was sutured in the defect. In the first case delayed recognition allowed the inflammation to progress, which is why a Montgomery T tube was left behind to prevent collapse of the airways [6]. At the second patient the fistula was recognised and reconstructed soon after it developed, therefore this safety measure was not necessary. We

strengthened the tracheal wall with a left pectoralis major muscle flap which was used to separate the trachea and neoesophagus to prevent recurrence of the fistula.

To our knowledge 9 authors have reported 11 cases of successful repair of benign gastro-tracheal [4, 5, 8, 10–13, 15] and one colo-bronchial [9] fistula. According to the time of manifestation of the fistula there are two main groups: early fistula formation occurs 1–2 weeks postoperatively with sudden respiratory distress. Late fistula formation presents with less severe symptoms of aspiration years after the esophageal replacement. In the former, the endotracheal tube is usually accused of promoting fistula formation and in the latter, chronic irritation [4], inflammation, ulceration [11, 12] are the supposed reasons. In two of the published cases the fistula occurred at the level of the esophago-gastric anastomosis [5]. In these cases the anastomosis was completely redone and separated from the trachea with a pedicled muscle flap. In the other cases where the gastric tube was involved in the fistula formation, direct closure was the chosen solution. The respiratory part of the fistula was the membranous trachea in seven cases, and the bronchus in the rest. A large defect forced the authors to use patch of autologous pericardium [4, 5], pleura [4, 5] or bovine pericardium [15] to replace the missing membranous part of the trachea.

In summary, we present two cases of tracheo-gastric fistula after esophagectomy and gastric pull-up for esophageal cancer. The fistulae were thought to be caused by tracheostomy tube irritation and were managed through a single stage repair. The extension of the tracheal injury forced us to resect the trachea and replace the membranous part with fascia lata. The patients successfully recovered from this severe complication of esophageal replacement.

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CLINICAL NUTRITION IN LIVER AND PANCREATIC DISEASES

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According to international and national surveys, 5–15% of patients admitted to hospitals require partial or total artificial nutrition. The development or progression of malnutrition influences patients' lives significantly and also increases the costs of their treatment substantially and unnecessarily. Nutrition therapy, meaning a balanced intake of food or provision of nutrients, is an essential part of the critically ill patient's care. The proper concern of physicians today is not whether nutritional support is indicated in hepatic and pancreatic diseases, but when and how it should be given.

Author, therefore, gives guidelines to the nutritional therapy of patients suffering from liver and pancreatic diseases since their metabolic support still remains the most challenging problems in clinical nutrition.

Introduction

Nutrition influences clinical practice in all branches of medicine and is important in all stages of life. *Clinical nutrition* is the application of the principles of nutrition science and medical practice to the diagnosis, treatment and prevention of human disease caused by the deficiency, excess or metabolic imbalance of nutrients. *Malnutrition* results from an imbalance between the body's actual needs and the intake of nutrients, which can lead to syndromes of deficiency, toxicity or obesity. Malnutrition includes *undernutrition*, in which macro- or micronutrients are undersupplied, and *overnutrition*, in which nutrients are oversupplied. According to international and national surveys, 5–15% of patients admitted to hospitals require partial or total artificial nutrition. The development or progression of malnutrition influences patients' lives significantly and also increases the costs of their treatment substantially and unnecessarily. *Nutrition therapy*, meaning a balanced intake of food or provision of nutrients, is an essential part of the critically ill patient's care. Nutritional support, administered via either the gastrointestinal route (*enteral nutrition* = EN) or intravenously (*parenteral nutrition* = PN, *total parenteral nutrition* = TPN) by maintenance of an adequate nutritional status may also improve the outcome of care, reduce complications, shorten length of hospital stay and reduce treatment-related costs. Adequate nutritional support alone, however, is not intended to cure critical illnesses *per se*, but to prevent the loss of important lean body mass and to maintain the energetics of the patient [1, 6].

The proper concern of physicians today is not whether nutritional support is indicated in hepatic and pancreatic diseases, but *when and how* it should be given.

1. Nutritional Support in Liver Failure

The liver plays a central role in nutrient metabolism which becomes increasingly disordered as the severity of the liver disease progresses. *Acute liver failure* is rarely associated with relevant alterations in the nutritional state. However, in patients with *chronic liver disease*, mixed protein-energy malnutrition is a frequent finding. Its prevalence and severity are positively related to an advanced clinical stage of liver disease but does not appear to relate to the etiology *per se*. The most frequent cause of hepatic failure in critically ill patients is pre-existing liver disease and the consequent chronic hepatic cellular damage. In the Eastern European region, alcoholic cirrhosis is the most common cause of hepatic failure in the presence of a critical illness.

1.1. Chronic Parenchymal Liver Disease

It has been recognised for many years that patients with chronic parenchymal liver disease are malnourished. The cause of malnutrition in patients with chronic liver disease is multifactorial. Poor dietary intake is one of the principal causes of malnutrition and arises either due to associated anorexia and nausea or because dietary protein intake is restricted for therapeutic reasons as part of the management of encephalopathy.

Whole body protein synthesis and breakdown rates are increased in patients with severely impaired liver function. This will result in an additional loss of amino acids and depletion of tissue protein stores [9]. It has been known for quite some time that energy expenditure is significantly increased in patients with decompensated cirrhosis [3]. Other causes of malnutrition include malabsorption and vitamin and trace element deficiencies.

The consequences of protein-calorie malnutrition due to chronic liver disease (apathy, depression, impaired cardiac muscle function and impairment of skeletal muscle function) are no different than that caused by any other illnesses. Recent studies suggest that malnourished patients with chronic liver failure will develop impaired immune resistance. This malnourishment also causes alterations in the structure and function of the gut. This process results in an increased likelihood of the entry and spread of intestinal bacteria, thus worsening the patient's general condition.

It is a feature of the natural course of chronic liver failure that most patients will develop hepatic encephalopathy at some stage. The most common actual precipitating causes are infection, electrolyte abnormalities, variceal bleeding, drug abuse, surgery and constipation. One of the greatest dilemmas in the metabolic care of cirrhotic patients is the need to restrict protein intake in an already malnourished patient in an attempt to improve the symptoms of encephalopathy. Thus, while the mental state of such patients may improve, their nutritional state may further deteriorate because of the restriction of dietary protein.

Table 1 shows the recommendations of the European Society for Parenteral and Enteral Nutrition (ESPEN) Consensus Group for nutritional support in chronic liver disease.

Table 1
Nutrition in chronic liver disease

Disease state	Non-protein energy (kcal/kgBW/day)	Protein or AA (gram/kgBW/day)
Compensated cirrhosis	25–35	1.0–1.2
Complications Inadequate intake	35–40	1.5
Malnutrition		
Encephalopathy Grades I–II	25–35	0.5–1.5 Note: vegetable protein or BCAA
Encephalopathy Grades III–IV	25–35	0.5–1.2 BCAA-enriched solution

Nutritional Support in the Absence of Encephalopathy

The average amount of amino acids required to achieve nitrogen equilibrium in chronic liver disease appears to increase from 0.8 grams/kg of body weight/day in the unstressed patient to an average of approximately 1.1 grams/kg of body weight/kg. When possible, the patients should be encouraged to take food orally. This may not be possible, for example, because the patient is unable or unwilling to take sufficient nutrients orally to meet his requirements. In this case, tube feeding should be considered. Percutaneous endoscopic gastrostomy is theoretically the preferred method of long-term tube feeding; however, one must remember that this technique is contraindicated in the presence of ascites [10].

Nutritional Support in the Presence of Encephalopathy

Patients suffering from hepatic encephalopathy usually have an abnormal plasma amino acid pattern characterised by elevated levels of methionine, aromatic amino acids (phenylalanine, tyrosine, free tryptophan) and subnormal levels of branched-chain amino acids (= BCAA) such as leucine, isoleucine and valine. In patients suffering from fulminate liver cell necrosis, the plasma levels of all amino acids are usually increased.

Patients intolerant of a daily protein intake of 1.0 gram/kg of body weight/day of dietary protein may need to be reduced to an intake of 0.5 grams/kg of body weight/day, but this should be avoided at all costs. In this situation, positive nitrogen balance and an improvement in nitrogen intake can be achieved by oral supplementation of BCAA at 0.25 grams/kg of body weight/day without an undue risk of hepatic encephalopathy. Long-term BCAA

supplementation seems to be associated with better nitrogen accretion, improved liver function and positive effects on the patient's mental state.

Oral lactulose should also be given to comatose patients via feeding tube. This synthetic disaccharide syrup alters the pH of the colonic flora and also acts as an osmotic cathartic. The initial dosage of 30–40 ml should be adjusted to maintain two or three soft stools daily. Many patients prefer the taste of lactilol, a lactulose analogue, which appears to be equally effective as lactulose. Oral neomycin, 4–6 grams/day in four divided doses, helps minimise bacterial toxins and can be used instead of lactulose, but nephro- and ototoxicity limits its value [5, 10].

1.2. Nutritional Support in Fulminant Hepatic Failure

Although most of these patients are in good nutritional shape, prior to admission they rapidly become severely catabolic and develop protein-calorie malnutrition. Muscle wasting becomes apparent within a few days. Many problems arise due to the delivery technique of the nutrients to these patients. Venous access may be problematic due to the haemodynamic instability of the patient and often causes septic complications. The enteral route, though the preferred method wherever possible, may not be feasible if intestinal failure has occurred. It is also important not to cause diarrhoea. Unfortunately, unlike renal or sometimes cardiac failure, mechanical or metabolic support of liver function is neither available nor particularly effective as yet.

Current estimates of energy needs do not exceed 30 kcal/kg of body weight/day in these patients. Recent studies indicate that fat emulsions are satisfactorily cleared in these patients, therefore, they are appropriate source of energy [1, 10].

1.3. Nutritional Support and Liver Transplantation

Most of the patients treated by liver transplantation are significantly malnourished prior to surgery. On the other hand, however, an increase in the metabolic rate after major liver surgery as well as in sepsis and organ failure due to accidental postoperative complications is well documented. Preoperative malnutrition is associated with significantly poorer outcome, but malnutrition *per se* is not a general contraindication to transplantation. For these reasons, early postoperative feeding is vital in order to avoid the nutrition-related complications of liver transplantation.

The actual protein and energy needs of these patients should be calculated using the tried and true Harris–Benedict or Stein–Levine formulas on the basis of the patient's anthropometric and laboratory results.

Traditionally patients undergoing liver transplantation have received nutritional support parenterally. It has already been proven that enteral feeding is also well tolerated in these patients [10, 12].

2. Nutritional Support in Pancreatic Disease

Pancreatitis is classified as being either acute or chronic. *Acute pancreatitis* (AP) refers to an acute inflammation that resolves both clinically and histologically. *Chronic pancreatitis* (CH) is characterised by histologic changes that persist even after the cause has been removed. *Exocrine tumors* of the pancreas develop from ductal and acinar cells, while *endocrine tumors* arise from islet and gastrin-producing cells.

The morphologic and histologic changes in the pancreas are usually irreversible and tend to progress, resulting in serious deterioration of exocrine and endocrine pancreatic function. The necessity of nutritional support in acute and chronic pancreatic disease depends on the aetiology and the severity of the illness, as well as the patient's underlying nutritional status. Before nutritional therapy it is also important to determine whether there are local or systemic complications of the primary illness such as organ failures, fistulas, abscesses and sepsis. Metabolic support of patients suffering from pancreatic disease remains one of the most challenging problems in clinical nutrition.

Table 2 shows the indications for nutritional support in different pancreatic pathologies.

Table 2
Indications for nutritional support in pancreatic disease

1. In acute pancreatitis (and also in pancreatic trauma):
• while oral feeding is contraindicated,
• if energy needs are increased due to sepsis,
• if organ failure occurs as a complication
2. In chronic pancreatitis:
• as a part of conservative treatment,
• during preoperative care,
• during postoperative care
3. In pancreatic tumors:
• during preoperative care,
• during postoperative care,
• as a part of oncologic care

2.1. Acute Pancreatitis

The course of AP is still unpredictable, ranging from mild to severe disease states. Most patients have a mild to moderate disease course. In these patients no study indicates whether any type of nutritional support improves the natural course of the illness or not. Severe, necrotising pancreatitis represents about 10–15% of all AP cases with mortality ranging from 1–40% in the literature. It is associated with marked hypercatabolism, equal to that occurring in burns. Nutritional support for patients with severe AP theoretically may prevent nutrient deficiencies, may preserve lean body mass and functional capacity – if the altered metabolism can be supplied with the required substrates.

To this day no specific pharmacotherapy is available for the treatment of AP, therefore, all effective nonspecific therapeutic methods have a great importance. The beneficial effect of appropriate artificial nutrition on the natural course of AP derives from the fact that by avoiding stimulation of the exocrine function of the gland, the pancreas can be put to secretory rest. If digestive enzyme secretion can be successfully decreased, the patient may be protected from the untreatable autodigestive process, resulting in necrosis. The outcome depends chiefly upon whether there is infected necrosis and to some degree upon the extent of the necrosis. From the nutritionist's point of view, of critical importance is the fact that according to literature sepsis in AP patients has an intestinal origin [2].

The *pathophysiological background* of these principles appears in as follows:

1. Food and digestive products in the duodenum are the major stimuli for the productions of pancreatic enzymes. The cephalic-gastric-duodenal phases of pancreatic secretion must, therefore, be bypassed during nutritional therapy. *By continuously administering diet into the second jejunal loop*, the above criteria are optimally fulfilled, TPN does not influence exocrine pancreatic secretion either [4, 7].

2. The digested bolus entering the ileum elicits negative feed-back on exocrine pancreatic secretion (and on gastric and bile secretion as well) by causing the release of several enterohormonal inhibitory factors, such as peptide-YY, glucagon, enteroglucagon. This process is called the "ileal-break" mechanism. Consequently, *jejunal feeding* not only does not stimulate the exocrine pancreas, but also suppresses it at the same time [4, 7].

3. Morphologic and functional damage of the intestinal mucosa occurs after 4–7 days of fasting and leads to the translocation of bacteria, endotoxins and antigens resulting in SIRS, sepsis and multiple organ failure [2]. Enteral substrate delivery maintains gut integrity by preventing mucosal damage in patients undergoing artificial nutrition [11]. For that reason *jejunal feeding* is superior to TPN in AP patients, too.

4. Disturbances of CH and lipid metabolism are common during AP.

5. Septic complications such as infected necrosis, pseudocysts and abscesses result in markedly increased energy needs.

6. AP patients with organ failure (renal, pulmonary, liver, central nervous system, etc.) have special substrate requirements.

Table 3 summarises the advantages of jejunal feeding in AP patients

Table 3
Effects and advantages of jejunal feeding in AP

<ul style="list-style-type: none"> • Activates the "ileal-break" mechanism → indirectly inhibits exocrine pancreatic secretion • Provides appropriate protein-calorie supply (in combination with TPN when required) • Adequate for feeding MOF patients using organ specific diets ("disease specific formulas") • Maintains gut integrity → prevents translocation → decreases the frequency of sepsis • Results in significant cost savings as compared to TPN
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Table 4 gives recommendations regarding the substrate needs of patients suffering from severe AP. This protocol is modified according to the patient's requirements. Lipid emulsion is contraindicated as a calorie source for patients receiving artificial nutrition who have hyperlipidaemia and who may have impaired clearance of lipid particles. The monitoring of serum triglycerides should be a routine part of patient management. Acceptable levels should be < 4 kg/l during infusion and < 2.5 g/l four hours after infusion.

Table 4
The substrate requirements of nutritional support in AP (in adults)

• TOTAL ENERGY: 30–35 kcal/kg body weight/day
• CH: > 5 grams/kg body weight /day + exogenous insulin (Note: insulin-resistance is quite common!)
• FAT: 1–1.5 grams/kg body weight/day under daily control of se-trygliceride levels
• PROTEIN: 1.2–2 grams/kg body weight/day
• VITAMINS, TRACE ELEMENTS
• SPECIAL DRUGS (antioxidants, immunonutrients)

As has been shown, jejunal feeding is the preferred method of delivery. The optimal technique is the 24-hour continuous administration of nutrients into the second jejunal loop below the ligament of Treitz via a jejunal feeding tube or a fine-needle-catheter jejunostomy controlled by a feeding pump. Nutritional support with elemental or perhaps immunoenhancing diet should immediately be started after successful fluid resuscitation in order to prevent the adverse effects of nutrient deprivation. TPN is the method of choice only when EN is contraindicated due to severe intestinal failure (peritonitis, enteral obstruction and/or fistula, etc.). If TPN is indicated, it should be managed via a central venous catheter with "all-in-one-bag" admixtures. The two methods can sometimes be used to complement each other [8].

Careful, "round-the-clock" monitoring is crucial during the nutritional support of an AP patient. Until the patient's metabolism stabilises, it is recommended that laboratory controls be performed at least daily.

2.2. Chronic Pancreatitis

The pathoanatomical basis for CP is the progressive fibrosis and calcification of the gland. During the natural, progressive course of the disease, insufficient enzyme secretion is the essential factor resulting in maldigestion and malabsorption with slowly, but continuously worsening steatorrhoea and paucity of fat-soluble vitamins. Pain and glucose intolerance are further factors interfering with nutritional support. Dietary recommendations, enzyme supplements and administration of fat-soluble vitamins are the cornerstones of nutritional support in CP. Pain reduction occurs in mild to moderate CP (but not in severe disease) with appropriate treatment.

When weight loss is evident, a high caloric intake of 30–35 kcal/kg body weight/day is necessary. The diet should consist principally of carbohydrates and proteins. To reach the

necessary caloric goal, fat must also be given. In general, a diet of 50 g/day of fat is well tolerated, especially one rich in vegetable fat. Medium chain triglycerides may be used to increase fat absorption. However, their use is limited because they are unpalatable and often cause bloating.

When a patient is not able to eat due to pain and/or obstruction, EN should be started using a feeding tube introduced distal to the stenosis. Polymeric formula is frequently well tolerated and only a minority of patients need oligopeptide formula.

As patients with advanced CP are commonly malnourished, deficiency in energy and proteins as well as depletion of electrolytes must be supposed and compensated before major surgery [1, 8].

2.3. *Pancreatic Tumors*

The multifactorial etiology of pancreatic cancer associated with malnutrition involves:

1. Inadequate food intake secondary to tumor-induced anorexia.
2. Tumor-induced catabolic effects on host tissues.
3. Abnormal utilisation of nutrients.
4. Anorexia, diarrhoea and malabsorption secondary to chemo- and/or radiotherapy.

Therefore, nutritional support for cancer patients seems necessary. However, both the indications and the modalities for nutritional therapy in these patients is still controversial. There is indeed no evidence that the survival of these patients is significantly increased by forced nutrition, however, their quality of life seems to be better.

Because of the lack of established guidelines on this topic, a clinical decision needs to be made on an individual basis after careful evaluation of both possible risks and potential benefits. Nutritional assessment (patient history, dietary record, anthropometry and biochemical profile, etc.) represents the first step in treating the patient. If the indication of nutritional support has been established, caloric needs and substrate composition should be determined by according to the established protocols.

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TESTICULAR BIOPSY HELPING ASSISTED REPRODUCTION

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Authors have performed testis biopsy on 21 male patients according to the predesigned protocol. The biopsy has been carried out from scrotal excision, with the exposure of both testis with microsurgical method. The results have been evaluated according to the spermogram groups. Correlation of FSH values and histological appearance of both testis was analyzed. Their method and experiences have been evaluated the effectiveness of assisted reproduction.

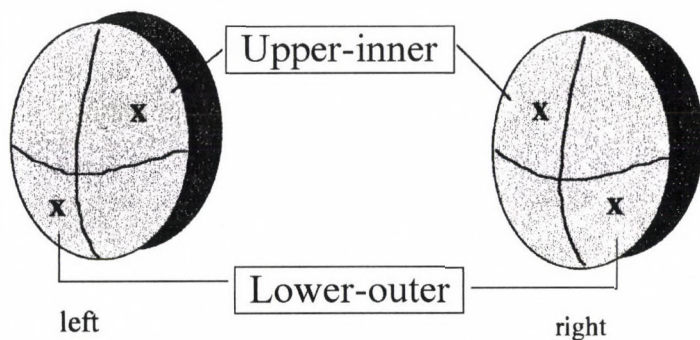


Fig. 1. Schematic picture of testis biopsy

Introduction

Evaluation of testicular biopsies for the treatment of male infertility was started in the late 1930s.

Charny [3], Hotchkiss [6] and Engle have performed the first testicular biopsy. The first papers in this topic were published by them between 1940-42. Testicular biopsy was believed a completely known as examination method. The technique was described and the method was used by everyone interested in male infertility [1, 9, 10, 13].

The basic method in the diagnosis of male infertility is the sperm examination. However, in many cases it gives no information for the spermium producing capacity of the testis, like by azoospermic and gravis oligozoospermic patients. In cases like this testicular biopsy is an essential method. The basic method of histological examination remained unchanged but because of the developing of the science some rules should be reviewed. The role of testicular biopsy was also changed by the development and widespread use of assistant reproduction techniques [15].

It is a well-known phenomenon among the specialists dealing with assisted reproduction that the number of deliveries decreases in many countries, in some countries it has reached the critical level. This tendency is to see in Hungary as well.

With the development of reproduction techniques new methods like microassisted methods presented to help human reproduction [14]. The most modern technique called ICSI combined with the sperm extraction directly from testicular tissue (TESE, Devroey 1995) has given a new role improving its importance. It has not only a diagnostic value but a therapeutic as well [17].

Materials and Methods

In our institution testicular biopsy was performed by 23 men between 1997 and June 1998. We evaluated 21 of them. The examination of patients followed a prescribed management which included anamnesis, physical examination, sperm analysis, scrotal ultrasound, hormone levels and genetic examination [20].

Table 1
Distribution according spermogram

Group		No. of cases	Concentration
I	Azoospermia	4	0/0.9
II	Severe oligozoospermia	4	1/4.9
III	Oligozoospermia	12	5/12
IV	Asthenoteratozoospermia (with normal sperm count)	1	> 20
Total		21	

The distribution of the patients according the spermogram and spermatocytogram are shown in Table 1. The rate of azoospermic and severe oligozoospermic patients visiting our andrology clinic was 38%. In the oligozoospermic group (57%) the sperm concentration was less than 12 million/ml.

Technique of Testicular Biopsy

The method used by authors is a bilateral open surgical biopsy technique. Scrotal exploration is performed with an incision in the line of the raphe. By scrotal exploration the advantages of perioperative diagnostics can be used [5], the turgor and the state of the epididymis can be recorded. Changes which remain hidden for the imaging techniques can also be seen [18]. The more accurate grading of varicocele is also possible. By more than the third of the patients the sperm analysis showed severe alterations, so the additional diagnostic information gained by scrotal exploration is extremely useful. Two biopsy samples are taken from both testis usually from the inner upper and lower outer quadrant using atraumatic microsurgery. The predesigned protocol was changed only if the method described above cannot be carried out. For the testis incision 6/0 atraumatic resorbable suture, for the tunica 5/0 atraumatic resorbable suture is used.

Our previous cooperation studies with foreign andrological centre showed that the spermatogenesis in the testis is inhomogeneous, so the multiple biopsies taken from different sites give additional information. The aim of this study is to clarify the differences of the samples taken from different sites and the correlation of the histological appearance and the FSH levels.

Results

Data were evaluated by groups according to the spermogram.

The azoospermic group consisted of 4 patients, all of them with a karyotype of 46 XY. The FSH levels and histology results are summarized in Table 2. The FSH levels ranged between 7.2–24.5 U/l, so there were patients with normal, mildly and severely increased FSH levels. One of the azoospermic patients Sertoli Cell Only Syndrome (SCOS) in all of his 4 samples (Fig. 2).

Table 2
Azoospermic patients, FSH values and histology
No. of patients: 4/21, karyotype 46XY

No.	FSH	Histological	Appearance	
	U/l	Left testis	Right testis	Quadrant
1	12.9	removed	34	Upper inner
3	17.1	SCO 100%	SCO 100%	Upper inner
		SCO 100%	SCO 100%	Lower outer
10	7.2	0 (stc) 100%	7 (std) 30%	Upper inner
		(stc) 100%	8 (stc) 5%	Lower outer
15	24.5	0 (stc) 100%	0 (stc) 100%	Upper inner
		0 (stc) 100%	23 60%	Lower outer

Stc: spermatocyte, std: spermatide

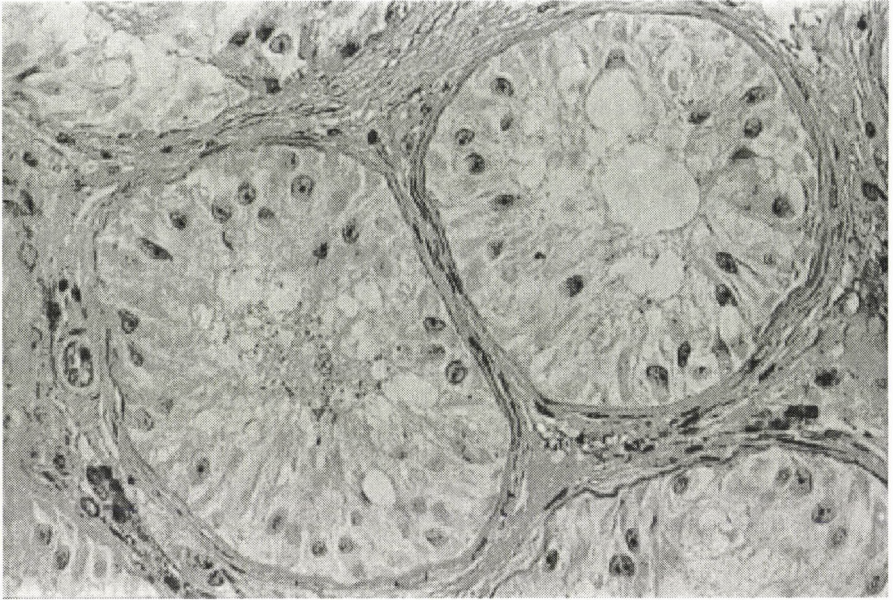


Fig. 2. Sertoli cell only syndrome, hematoxylin-eosin, $\times 300$ magnification

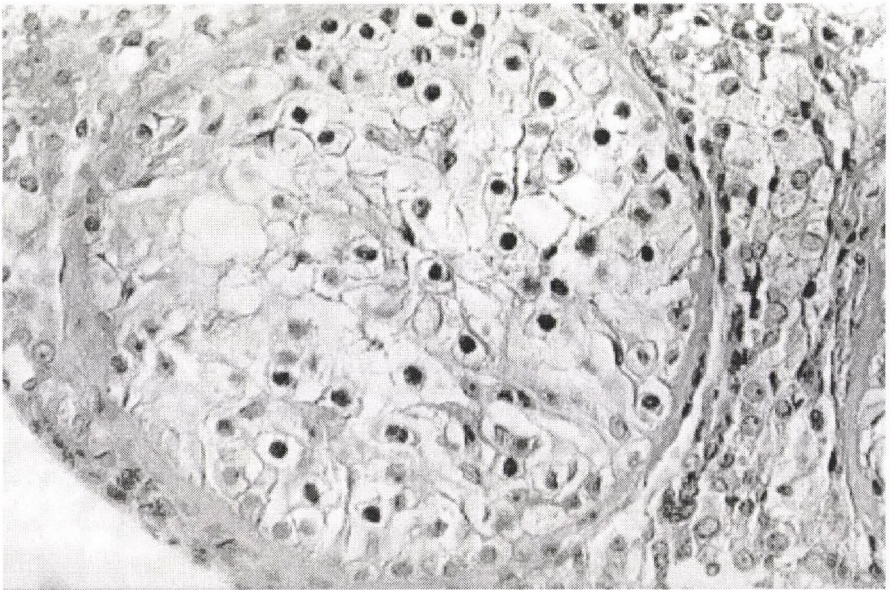


Fig. 3. Early maturation arrest, hematoxylin-eosin, $\times 300$ magnification

In another case there was no evidence of mature spermatozoa in any sample of one testis, histology showed early maturation arrest (Fig. 3).

In the other testis decreased spermatogenetic activity was present with mixed maturation arrest [12]. By the highest FSH level in 3 of the 4 quadrant of the 2 testis there was no mature spermatozoa, but maturation arrest could be seen. In the fifth quadrant histology concerned normal spermatogenesis. Table 2 shows the FSH levels and histological appearance of the azoospermic patients. The percent value shows that the biopsy sample taken from the actual location how many percent represents the histological picture.

The number of our severe oligozoospermic patients was also 4. By this patients the sperm concentration was less than 5 million/ml. The karyotype was 46 XY by all of them. Data are shown in Table 3. By two of them all samples showed decreased spermatogenesis with early and later maturation arrest, in Figs 3 and 4.

In one case with increased FSH level in one of the 4 biopsies (left testis lower outer quadrant) sufficient spermatogenesis was found without maturation arrest.

The moderate oligozoospermic group consisted of 12 patients. In our cases sperm concentration was less than 12 million/ml (ranged 5–12 million/ml). The FSH level was normal in 11 of the 12 cases. By 8 of the 12 patients normal spermatogenesis was present with no maturation arrest (Fig. 5).

The distribution of spermatogenesis was homogeneous with an average number of spermatozoa ranged 24–33/tubule. In 4 other cases the spermatogenesis was inhomogeneous with a variable amount of spermatozoa/tubule. This value ranged 0–37 and maturation arrest and decreased spermatogenesis was also present [13].

Table 3
Severe oligozoospermic patients, FSH and histology
No. of patients: 4/21: karyotype 46 XY

No.	FSH	Histological	Appearance	
	U/l	Left testis	Right testis	Quadrant
4	5.9	0 100%	0 100%	Upper inner
		27 (std) 77%	8 10%	Lower outer
9	27.5	0 100%	0 100%	Upper inner
		23 100%	0 (stc) 100%	Lower inner
13	8.5	0 100%	13 84%	Upper inner
		—	37 100%	Lower outer
21	7.8	—	8 (stc) 60%	Upper inner
		—	2 (stc) 35%	Lower outer

Stc: spermatocyte, std: spermatide

One patient presented with asthenoteratozoospermia with normal sperm count and FSH level. Histology showed normal spermatogenesis with no evidence of maturation arrest (Fig. 5).

Table 4
Oligozoospermic patients, FSH values and histology

Sperm concentration	< 12 M/ml
No. of patients	12/21
Normal FSH	11/12
Karyotype	12/46 XY
Without maturation arrest	8/12 [2, 5, 11, 16–20] histology: even distribution, sufficient spermatogenesis in all samples (24–33 spermatozoa/tubule)
With maturation arrest	4/12 [6–8, 14] histology: inhomogeneous distribution, spermatozoa/tubule ranged 0–37

Discussion

Since the introduction of intracytoplasmic sperm injection theoretically one spermatozoa is enough to fertilize the ovum. In azoospermic and severe oligozoospermic patients the fertilizing spermatozoa can be extracted directly from the testis [14, 19]. Some authors have reported successful fertilization by round spermatide, most specialists suggest mature elongated spermatozoa for the micromanipulation. There are more criteria to fulfil for the start of the development of a healthy embryo, for the occurrence of biological pregnancy and the

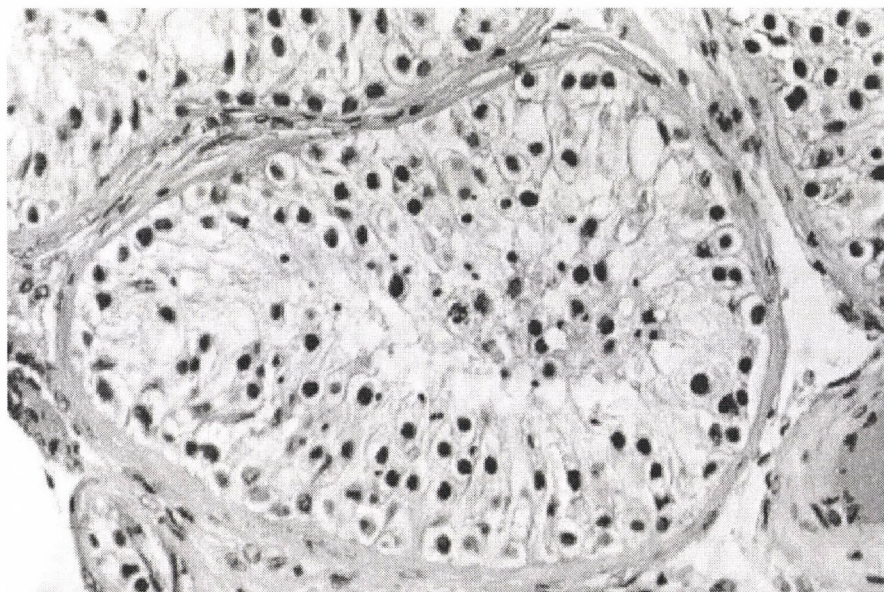


Fig. 4. Late maturation arrest, hematoxylin-eosin, $\times 300$ magnification

delivery of a healthy baby. If these criteria are not fulfilled, only *in vitro* fecondation occurs after the micromanipulation. The most principal criterion is the presence of good quality germ cells from both maternal and paternal side. Spermatozoa need sufficient hormone levels and stable microenvironment [11] for their development. The sufficient microcirculation of testicular tissue is essential. The state of microcirculation is diagnosed from the testicular biopsy, so surgical correction is an important point of the therapy [2, 20].

Conclusions

Our results and other internationally known authors results confirmed that high FSH level is not a contraindication of testicular biopsy [15, 17]. By a high (more than the double of the normal FSH level) at least in one of the 4 samples satisfactory spermatogenesis could be found [5].

Although we have just a low number of cases, our tables show that there is no linear correlation between the increase of the FSH level and the grade of the tubular damage (Tables 2 and 3).

In our opinion by infertile males diagnostic testicular biopsy should always done before the therateutic one [20]. Histology helps to clarify the functional state of the testis. Our and international data suggest that one sample is not enough for the correct evaluation of testicular function. Multiple diagnostic sampling gives the opportunity to find the optimal site where the therapeutic sample for fertilization should be taken from.

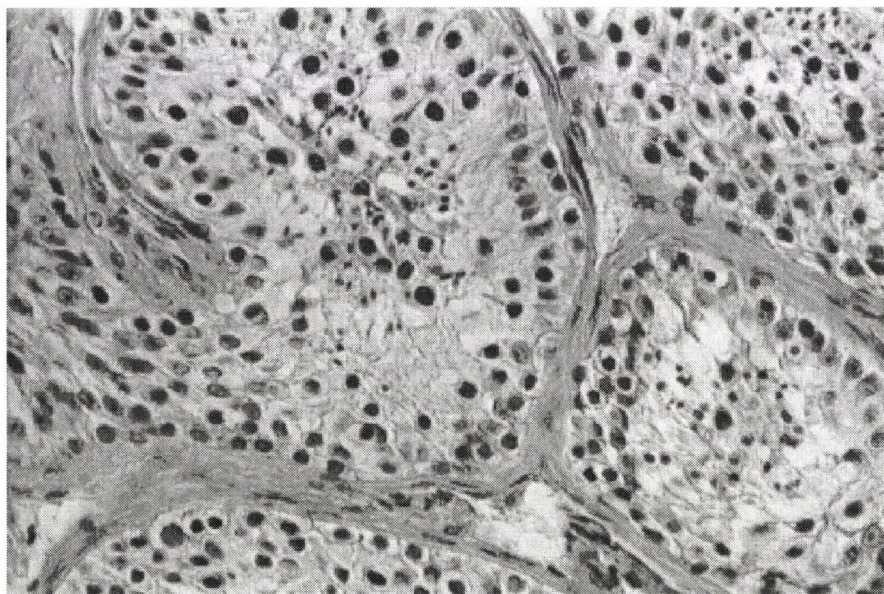


Fig. 5. Normal spermatogenesis, hematoxylin-eosin, $\times 300$ magnification

In the examination of couples involved in the fertilization program the histologist plays an important role. Interdisciplinary teamwork improves the effectiveness of his work.

High quality collaboration of the involved specialists is important for the effectiveness of assisted reproduction techniques. But even by the use of the most sophisticated methods we should not forget that successful therapy may only follow an adequate diagnosis.

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A CASE OF A CALCIFIED RENAL CYST

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Authors review a case of a calcified renal cyst. The literary data at hand give evidence that the spreading processes in the kidney can be benign or malignant according to their form of calcification and their localisation. Despite the modern diagnostic techniques, it is not easy to set up the diagnosis or to avoid the need for surgery, as was the case in the present report.

Introduction

The significance of the form and localisation of calcium depositing in the kidney is still a matter of interest when diagnosing the spreading processes of the kidney, despite the available up-to-date examining devices. There are those who look upon calcium as a sign of malignity, while others hold calcification to be characteristic to benign processes [15].

According to Lang, an egg-shaped peripheral calcification signals a benign renal cyst, whereas a rough, thick-walled calcified mass of similar localisation is characteristic to a neoplasm [6–8]. Simpson reported on five cases where the calcification appeared to be peripheral curvilinear-like, but upon operation the process proved to be a renal carcinoma [2, 3, 13–15].

The present case is one of a peripheral, thick, rough-walled eggshell-like calcified mass found in the right kidney, proving to be a benign cyst by histologic examination. Since the tests – iv. urography, CT – and the histologic diagnosis were contradictory, furthermore, preoperative differential diagnosis was questionable – tumor or cyst? – we present the case in order to add to the information at hand on such processes.

Case Report

A 66-year-old female patient was admitted to our Department on 22nd June, 1998. *Anamnesis*: Discus hernia in 1996, which cured upon conservative treatment. Then cholecystectomy in 1997. Her hypertony has been treated for years. A few months earlier lumber pains necessitated examination, which showed the following results.

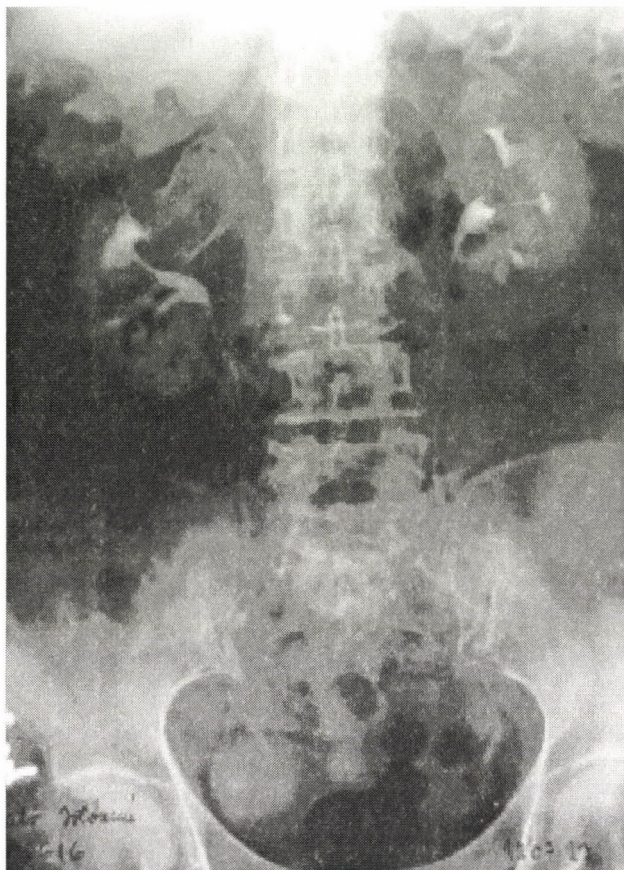


Fig. 1. Iv. urography shows the egg-sized, thick-walled calcified cyst originating from the upper median pole of the right kidney

Status: no pathologic alterations. *Laboratory tests:* urine: fe: slightly op., sediment: 20–25 leukocytes, amorphous granules. *Test results. Iv. urography:* native renal picture revealed a 4×5 cm sized calcified mass on the right upper pole, and a 1 cm sized one on the left upper pole. Good secretion was found on both sides. The urographs were regular, the ureters had normal dilatation. Flow towards the bladder was found to be unhindered (Fig. 1). *CT:* The calcification manifest near the left renal upper pole was in the tail region of the pancreas. An oval, thick, calcified, rough-walled mass, on average 4 cm in diameter, protruded from the median-upper contour of the right kidney, which only minimally dislocated the upper calyx group. The cavity systems on both sides were intact. The ureters were normally dilated, with no visible obstruction to the course of flow (Fig. 2).

The uncertain findings went with the suspicion of malignity, surgery was therefore done on 26th June, 1998. The right kidney was exposed by means of right-sided lateral supracostal

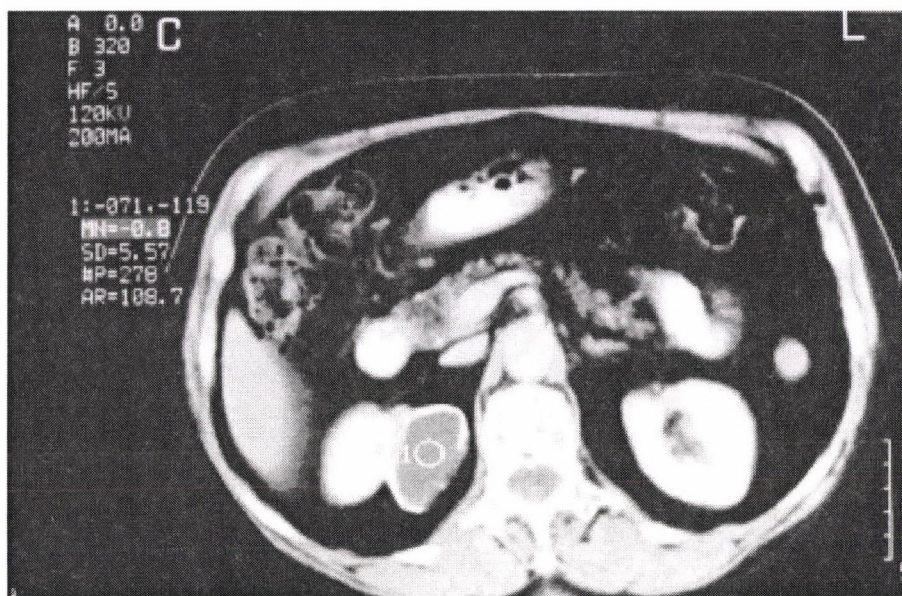


Fig. 2. CT imaging shows the egg-sized cyst localised on the upper pole of the right kidney



Fig. 3. Cut section of the egg-sized renal cyst removed from the upper pole of the right kidney. The white calcification is well observable on the periphery and the median section

incision, and when prepared from its fatty capsule, a palpable, firm, egg-sized mass was found attached to the upper pole. From here it was detached, and resected into the intact. The pair of arteries linked to the upper pole of the kidney had to be tied down during the preparation stage, the blood supply in the upper third of the kidney was therefore damaged. The slight bleeding in the intact parenchyma was seen to using 6-0 stitches, the removed mass was substituted for spongostan, and the wound was closed in layers, above the drain led from a separate opening. The cystic mass contained yellowish-white, obscure, mortar-like matter (Fig. 3).

The postoperative period was eventless, the patient left hospital recovered on the 11th postoperative day.

Histologic diagnosis: Cysta renis l.d.

Discussion

The form and localisation of renal calcification could be indicative of the nature of the disease.

The calcification can be

- peripheral in location,
- curvilinear-like,
- non-peripheral,
- or combined (Fig. 4).

As regards form, it may be amorphous, variegated, spot- or map-like, or undulating [15] (Fig. 5). According to a 10-year material of the Mayo Clinic, 2709 kidneys were studied in view of calcification, from which 560 proved to be renal cell carcinomas, with calcification found in 58 of the cases (10.3%); whereas another author found calcification in 14–22% of the tumors [1, 8, 9]. In most carcinoma cases the calcium is localised in the substance of the kidney tumor. Accordingly the calcification appearing in the renal substance in dense, spot-like or other form refers to a malignant process in the majority of the cases. On rare cases, however, a similar appearance might be evidenced in a low percentage, possibly being the remnant of an earlier inflammation. From the 2709 kidneys studied by William et al. [15] 1682 were simple cysts, with the number of cases showing calcification totalling 58, i.e. 10.3%. The same authors found 4 cases of calcification among 14 sarcomatoid cases of their carcinoma cases [15]. According to Csákány [1], calcification occurs in 6% of renal carcinomas and 3% of renal cysts.

Upon pathologic examination, the calcium occurring in calcified renal carcinomas might on many occasions be localised as a reactive fibrous zone, pseudocapsule [15] (Fig. 6).

In squamous cell carcinomas the calcification might be found localised in the renal pelvis and calys groups, without extending into the renal substance [15].

From the 2709 patients of William, 38 were cases of intrarenal abscess and 24 were Wilm tumors, without any calcium content [15]. On the contrary, Harrel et al. [5] found calcification in 17% of Wilm tumor cases. William et al. [15] found tumor metastases to the kidney in 11 of his cases, from which calcification in the tumor occurred in only 1 cases which was a

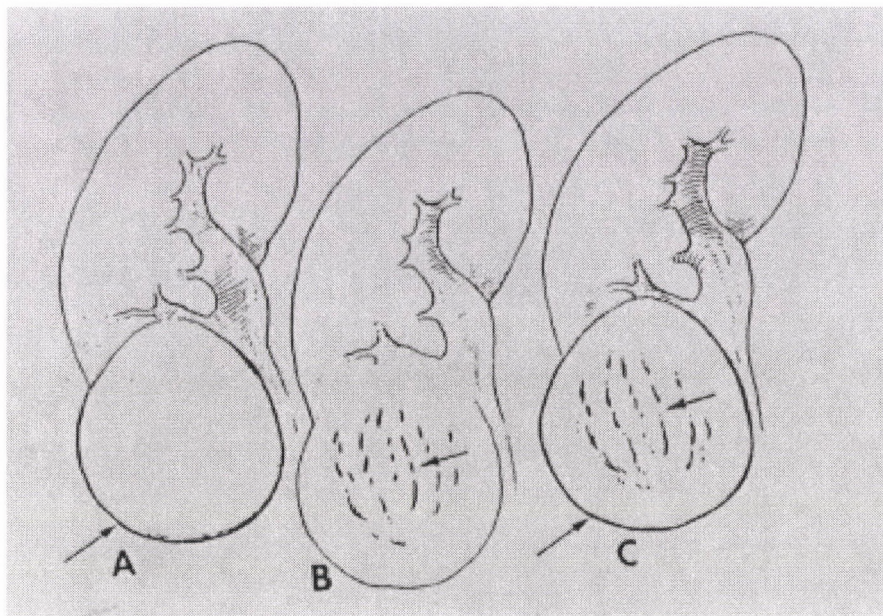


Fig. 4. The different forms of calcification: A) peripheral, B) non-peripheral, eggshell-like, C) combined form

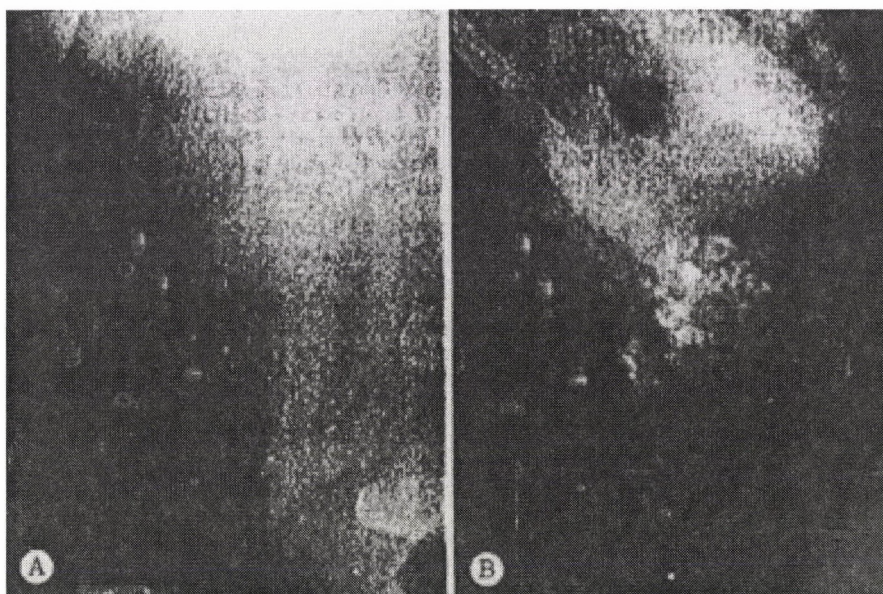


Fig. 5. In the renal carcinoma A) there can be thin variegated or spot-like calcification, B) spot-like calcification can be seen

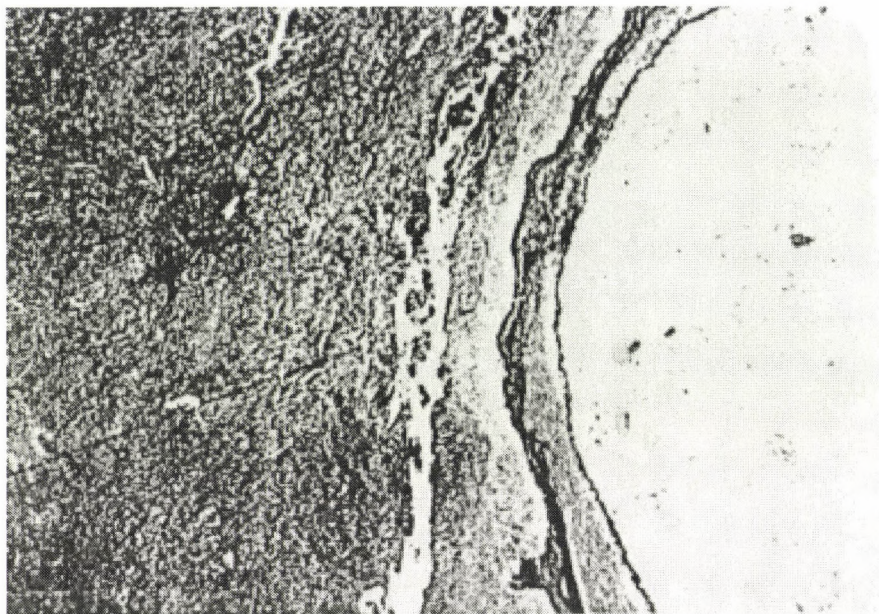


Fig. 6. The fine line calcification zone is visible separated from the tumor necrosis by fibrous septum (HE staining, magnification: $\times 14$)

hemangiopericytoma. It is worthy of note that from the 2709 kidneys studied by William, 10 were multicystic, from which 3 contained calcium.

Calcification may also be present in xantogranulomatous pyelonephritis, either in the form of dense and spotty, or renal stone-like appearance [15].

Certain authors have found calcification in cases of hematomas, echinococcal cysts, intrarenal neuroblastomas and hemangioendotheliomas. Contrary to this, no signs of calcification have been found in renal adenomas, hamartomas, liposarcomas, granulomas, leiomyosarcomas, rhabdomyosarcomas, undifferentiated adenocarcinomas, actinomycosis cases or reticular cell sarcomas [10, 12, 13]. It is not an easy task to differentiate between the various kidney diseases, as for example in our case. Nonetheless, if there are signs of renal calcification, the suspicion of malignity should emerge to a certain degree. Even if we think of a simple renal cyst upon finding eggshell-like, fine-lined, peripherally located calcification, the chance of malignancy might be around 20% [15]. Renal cysts not accompanied by calcification may also be combined with malignant tumors, since on occasions tumorous tissue can be found on the wall or surface of the cyst [11]. If, therefore, the wall of a renal cyst is irregular, thick, malignancy should be suspected [11]. In our case the calcified renal cyst of the patient had a rough wall and thick shell, surgical intervention was therefore necessitated.

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ANATOMIC VARIATIONS IN PATIENTS OPERATED FOR BLADDER SUBSTITUTION

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Authors review the anatomic variations observed throughout orthotopic ileal neobladder formation in 38 cases following radical cystectomy. A part of the variations was necessitated because of deviation from the classic Hautmann-type surgical technique: in 6 cases the site of ileal resection was modified due to abnormal mesenterial art. course, on 2 occasions Meckel diverticules were detected while cutting the ileal neobladder, in 13 cases the laterally adhered sigma bladder necessitated the left-sided ureter to be pulled through beneath the mesosigma for the purpose of making sure the ureter – ileal neobladder anastomosis became free of any tension, while on 1 occasion the left ureteral preparations went with some injury. Since the left ureter became short, ureter replacement variation was needed, similar to the Studer method of ileal neobladder formation. All these variations, however, did not implicate the essence of the Hautmann technique. Follow-up of the patients did not reveal high frequency of occurrence of any complications.

Introduction

Following cystectomy due to T1G3, T4 infiltrative bladder tumors, the surgeon is to provide for urinary diversion, for which many methods are known [1–4, 6]. The method chosen is determined by the anatomic state observed during the course of surgery, the seen condition often necessitating deviation from the practised surgical steps. The aim is to provide the patient with an optimal urinary diversion, taking into consideration future quality of life as well as expected duration of life. It is our opinion that this can mostly be reached by means of orthotopic ileal bladder formation in the majority of the cases. At our Department, it is routine procedure to perform ileal neobladder substitution according to Hautmann [1, 2]. No changes have been fundamentally made to this technique first described in 1988. There have, however, been slight modifications. The surgical technique used by us has previously been reported on [5, 6]. On some occasions, such anatomic variations have been detected during the course of ileal neobladder formation which make necessary a few modifications as to the classic method. These variations are reviewed in the following.

Patients, Methods and Results

Between 1st January, 1996 and 1st February, 1999, a total of 38 radical cystectomies due to infiltrative bladder carcinoma were performed at the Department of Urology of the Saint Stephen Hospital. The average age of the patients was 64 years (46–80). Among the orthotopic methods of bladder substitution, the one practised by us is the Hautmann-type ileal neobladder replacement technique, with which we have gained favourable experiences [1, 2, 5, 6]. On occasions as listed, in accordance with the given situation, the surgical technique had been partially and slightly modified.

1. On six cases the site of ileal replacement became modified due to abnormal mesenterial art. course (Fig. 1).

The start of the 50–60 cm long ileal neobladder segment resection was in two cases 35 cm from, in 3 cases 45 cm from, and in 1 case 65 cm from the ileocecal region.

No significant deviations in laboratory findings or any acid-based shifts were observed in either of our cases during regular check-ups (routine laboratory tests, Astrup), as compared to ileal resection started 20 cm from the ileocecal region.

2. On two cases the detection of Meckel diverticule was to be taken into consideration when forming the ileal neobladder (Fig. 2).

The skelitized ileal segment on which the Meckel diverticule “sat” was cut in the usual longitudinal manner at the antimesenterial side. In such way the opened intestinal processes, intestinal wall details could also be made use of in forming the W or M shaped ileal neobladder.



Fig. 1. Arch-like arterial mesenterial branch supplying the ileum

No notable wettings or acid-based disturbances in balance were manifest in either of the two cases.

3. The freed left-sided ureter needed to be pulled through beneath the mesosigma in 23 cases, being the only way it could be placed into the neobladder without any tension.

Reflux was not recognized in any of the cases. A single event of ureter-neobladder anastomosis strangulation and two cases of ureter strangulation occurred, opinionated to be caused by medium degree cavity system stagnation during the late postoperative period. This opinion was based on subsequent cystography and intravenous urography.

4. On one case, damage and thus shortness of the left-sided ureter made substitution necessary.

The missing ureter segment was replaced by a part of the neobladder according to the method of Studer [10, 11]. Intravenous urography one month after surgery, and regular ultrasound controls revealed unhindered contrast material and urinary passage.

Discussion

1. One of the keys to the success of orthotopic ileal neobladder formation is the good blood supply of the skeletized ileal segment. The mesenterial arteries are made visible during surgery by lifting the ileum and illuminating the mesentery [2]. The arteriae ilei derives

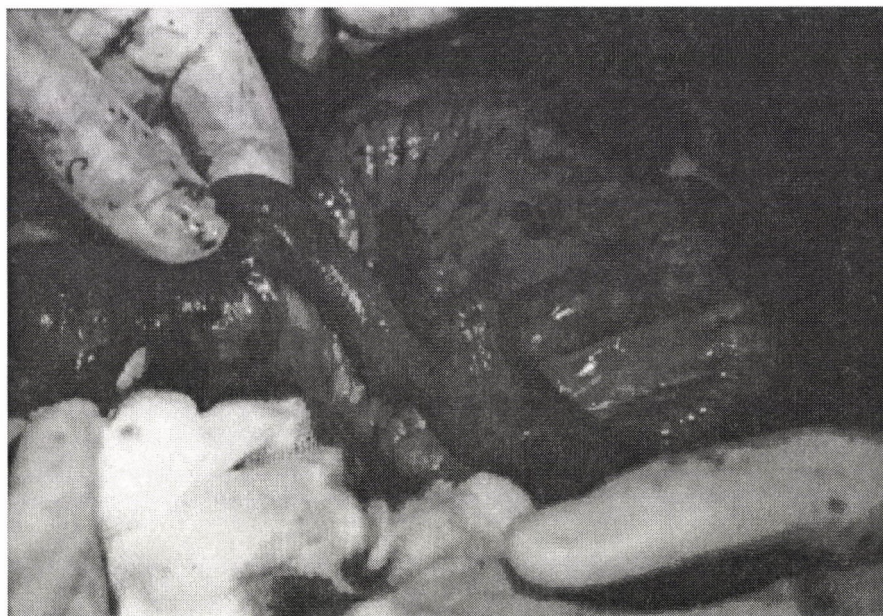


Fig. 2. Meckel diverticule

from the branch system of the mesenteric artery. The smaller arteries branch from the main stem, forming anastomosis in an arch-like fashion while heading towards the intestines. The classic surgical-technical – as well as our own – recommendation places the resection of the ileum around 15–20 cm from the caecum, however, there are occasions when the site needs to be changed in accordance with variations of the blood supply. This terminal ileal segment may only get an arch-like mesenteric branch which would not provide proper blood supply. The mesenteric pedicle requires at least one or better still, two radial main artery stems. For such reasons, in six of our cases the site of ileal resection had to be placed 35 to 65 cm proximally from the caecum. But even in these cases the skeletized ileal segment was 60–70 cm long, ensuring proper W or M form ileal neobladder, not sewn tightly to the urethra stump.

2. Diverticula may occur in high numbers on the small and large intestinal sections. Those on the small intestines frequently do not cause any symptoms, and remain undetected. The “blind intestinal cirrus syndrome” might, however, develop. The only diverticulum that has any significance though, is the Meckel-diverticulum.

The so-called Meckel-diverticulum is the remnant of the ductus omphalomesentericus, which disappears within a few weeks after birth under normal conditions. It is a fibrous tube, sometimes only a bundle, deriving from the ileum around 40–60 cm above the Baughin valve. Sectional statistics places its occurrence around the figure of 4%. On the one hand, its significance lies in its causing volvulus, strangulation ileus, and intussusception, respectively, by binding the intestinal cirrus and becoming invaginated. On the other hand, inflammation, ulcer might arise in the diverticulum. Frequently, tissue identical to the stomach mucous membrane might occur in the diverticulum, also producing hydrochloric acid. Other diverticula of the small intestine occur in the upper part of the jejunum [8].

In the case of Hautmann surgery, the skeletized ileal segment corresponds to the area of occurrence of the Meckel diverticulum. Based on the surgical-technical recommendation, the skeletized ileal segment should be arranged in W or M form so as to ensure optimal anastomosis to the urethra stump. The antimesenteric side is to be cut in longitudinal direction. During the course of our 38 cases of orthotopic ileal neobladder formation, a Meckel diverticulum was found twice to occur at the section of the skeletized ileum. Upon “opening” the diverticulum, the two protruding intestinal wall details were also made use of in the formation of ileal neobladder.

3. A tension free result is a basic requirement in every case of surgical anastomosis, especially important for the freed left ureter as well as for the developed ileal neobladder [2]. The wall of the neobladder may move to a considerable degree upon filling with urine, which may lead to ureter strangulation, renal cavity system stagnation. The frequently observed wide mesosigma may be an obstacle to the formation of an optimal uretero-intestinal anastomosis. To avoid this happening, the left ureter should be pulled through beneath the mesosigma.

In this regard, there are three viewpoints to be considered [2, 7]:

- a) the retroperitoneal tunnel formed in such manner should be the width of at least 3 fingers,
- b) the tunnel should not cross the inferior mesenteric artery, but rather be caudally located from that,
- c) the position of the tunnel should be beneath the derivation from the inferior mesenteric artery and of the sigmoid artery.

4. The next surgical step following the opening of the abdominal cavity is in general to find the ureters and resect them as close to the bladder as possible. Anatomic orientation could be made difficult by the v. ovarica, v. testicularis, ductus deferens, the bladder arteries as well as banal bleedings [9]. In one of our cases we had to discard the ball-shaped formation of ileal neobladder because of severe injury to the left ureter. The classic W and M forms, respectively, did not ensure that the ureteral and urethral anastomosis would be simultaneously free of any tension. The short left-sided ureter led us to form a longer left side of the letter W from the ileum (to a length in accordance with the missing ureter segment), without having to make a slit. Applying the method of Studer, the left-sided ureter was anastomized from end to side in this bladder tube [10, 11]. The rest of the ileum was cut on the antimesenterial side formed to a spherical shape as reviewed earlier, into the right side of which the right ureter was seated. The rest of the surgery proceeded in the usual fashion.

Conclusions

The Hautmann type orthotopic urinary diversion ileal neobladder formation is a surgical technique acknowledged worldwide. The method is not one free of any complications, it does, however, ensure excellent low pressure of the bladder, provide continence as well as an acceptable quality of life for the patient. The previously described anatomic variations (the different from usual course of the art. mesenterica branches, of inferior mesenteric artery Meckel diverticule, wide mesosigma, short but movable ureter) either do not influence the basic, so-called critical steps of the surgery (see the first two cases), or can be accomplished with slight modifications (retroperitoneal tunnel formation combined with the Studer type ileal neobladder). Accordingly, a higher occurrence of complications related to this type of surgery was not manifest in our cases.

It could be said in general that the success of a therapy mostly depends on whether it is optimally suited to the needs of the individual. Certain surgical-technical principles, which form the critical steps of the procedure, cannot be disregarded, while other do not influence the outcome of the surgery. The present paper has called attention to anatomic variations observed throughout the course of 38 cases of orthotopic ileal neobladder formation, which had finally not hindered the process of bladder substitution.

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EOSINOPHILIC CYSTITIS

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Authors report on two rare cases of eosinophilic cystitis, giving a review of the etiologic assumptions and pathogenetic, pathologic aspects of the disease, based on the available literary data. The course of the disease can be either acute or subacute, and is most often chronic. Relapse and progression can interchange in irregular manner, attention is therefore called to the importance of follow-ups. Resection deep into the intact – also containing muscle fibre – as well as histologic examination are considered essential as the only method of differentiation, giving precise diagnosis in the present two cases, too.

Introduction

Eosinophilic cystitis is the rare inflammation of the bladder where cellular infiltration is mostly composed of eosinophilic granulocytes. The lesion can occur in both males and females in childhood as well as adulthood [4, 16, 23, 26, 27]. Most often the disease presents with micturition complaints, frequent painful urination, haematuria. The eosinophilic infiltration may cause the protrusion of the bladder wall, raising the suspicion of a bladder tumor [4, 18, 20, 23, 27]. The disease was first described by Brown in 1960, following which around fifty cases have been reported on in the literature [4, 27].

The process of the disease is described in relation to two cases, in view of the rarity as well as problematical differentiation of the entity.

Case Report

Case 1. A 73-year-old male patient, admitted to our Department because of complete urinary retention and ischuria. The patient's case history included exudative pleuritis at the age of 10 and surgery for pancreatic inflammation 36 years ago. A year later cholecystitis was performed due to bile stones, following which gastric haemorrhaging appeared the next year, healing upon conservative treatment. In 1987 the patient had another gastric haemorrhage, also responding to conservative treatment. Allergic symptoms appeared in 1997 all over the body, the eyelids, lips, fingers became swollen. The cause of these symptoms re-

mained unclear, six months of hospitalisation followed, which is when the urologic complaints started. There were urgency urges to urinate day and night, urination turned to a dropping consistency, then dripped away unnoticed. The patient has been a diabetic for 21 years, has had hypertension for 10 years and is being kept in balance with medication. The patient's condition: anaemic, with blood-filled mucous membranes, no other pathologic alterations visible.

Laboratory findings: abdominal ultrasound revealed a cyst 8 cm in diameter in the lower part of the kidneys on both sides. No other alterations were noted. Slight dilatation of the cavity system was observable on the left side. Examination of the prostate revealed it to be 45 mm in size, with an homogeneous echostructure. Laboratory findings: urine: 30–35 red blood cells, 2–3 white blood cells. Blood sugar level: 9 mmol/l, leukocyte count: 11 mmol/l, quantitative blood count, electrolytes without deviations. Qualitative blood count: NE: 78%, LY: 12, 45%. MONO: 7.98%, EOS: 36%, BASO: 55% – i.e. showing eosinophilia. Sedimentation: 34 mm/h.

Cytoscopy: revealed multiplex solid, velvety-red plaque-like lesions in the bladder 8–20 mm in diameter. The right bladder wall, posterior wall and base were interspersed with foreign tissue. Both the vertex and left bladder wall displayed tumorous structures, the ureteric orifices could not be distinguished. On April 14, 1999 because of suspicion of a bladder tumor, TUR biopsy was done from the right bladder wall for diagnostic purposes, taken right until the visible normal tissue.

By histology granuloma and connective tissue details were recognisable in the sections, covered by regular urothelium. The mesenchymal substance was oedematous, loose, elsewhere the connective tissue was infiltrated with lymphocytes, plasma cells and a notably high amount of eosinophilic cells. The epithelium was found to be regular, its polarity and lamination were seen as being well preserved. There were no histologic signs of malignity or any specific processes. In certain areas eosinophilic infiltration was found to be spreading inbetween the muscle layers (Fig. 1). *Diagnosis:* by histology the bladder corresponded to so-called eosinophilic cystitis, without any signs of malignant or specific processes.

The patient was discharged on April 19, 1999 with an indwelling catheter, but was back again on May 5, 1999 but with no temperature. *Qualitative blood count:* NEU: 52.2%, LIMFO: 35%, MONO: 8.71%, EO: 2.01%, BASO: 1.4%.

With consideration of the patient's total urinary retention and the obtained histologic findings, transurethral prostate resection was done in May, 1999 during which an improved cystoscopic picture was seen. Bullous oedema was only seen on the right bladder wall, with only slight oedematous changes visible sporadically on the mucous membrane. The qualitative blood count also showed vast improvement, the earlier 36% of EOS became normalised at 2.0%. Later control examinations displayed complete recovery on every occasion.

Case 2. A 70-year-old woman, admitted to our Department on May 3, 1999.

Anamnesis: included a 20-year history of diabetes mellitus, being kept in balance with medication. She has been having chronic tracheitis, spondylosis, coxarthrosis and degenerative locomotor complaints for 15 years. In 1995 she had acute pyelonephritis, treated with cardiac decompensation. In 1992 she was operated on for laryngeal cyst, and thyroidectomy

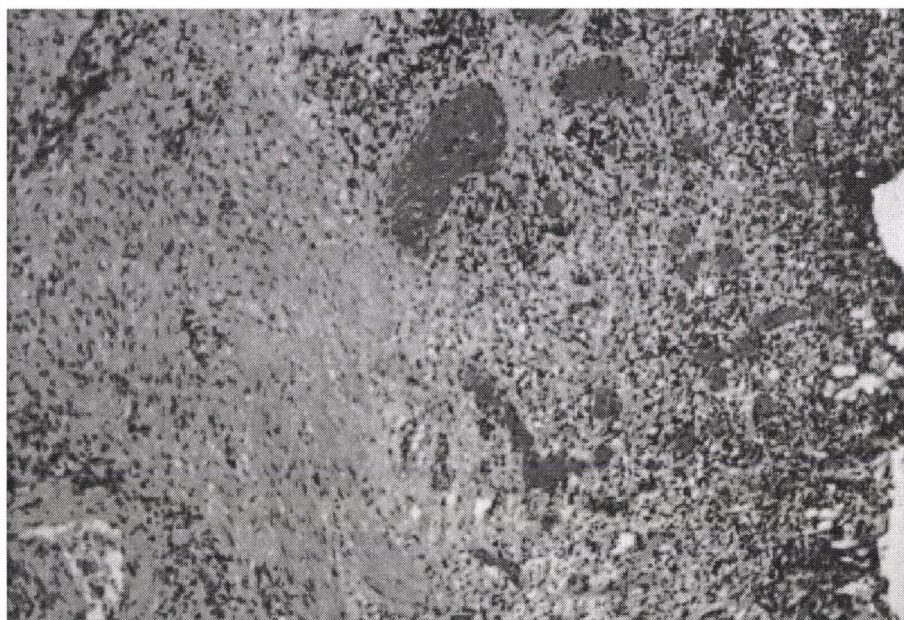


Fig. 1. Detail of bladder mucous membrane in connection with muscle wall detail. Both mucous membrane and muscle layer display inflammatory infiltration composed of lymphocytes, plasma cells and eosinophilic granulocytes. HE staining, 10-fold magnification

was performed in 1975. In 1998 the suspicion of a bladder tumor called for a biopsy of the bladder. Histologic diagnosis: follicular urocystitis without any signs of malignity.

Upon current admission she complained of left-sided abdominal, sacral pains with frequent painful micturition. *Condition*: without any pathologic alterations. Examinations included: *chest radiogram* revealing a slightly larger heart, moderate stagnation of the lungs. No other pathologic signs visible. *Abdominal ultrasound* showed a normal sized liver with focal fatty deposits in an area of 1.6 cm near the liver entrance. The cholecyst contained fluid with visible sludge within. A 1.3 cm sized cyst was detectable in the median third of the right kidney. The bladder contained some urine, the wall seemed to be somewhat thicker, to the left of the vertex a $5 \times 3 \times 3 \times 8$ cm sized cystic area could be seen, well isolated from the bladder (Fig. 2). *Laboratory findings* revealed normal electrolyte values. Blood sugar: 9.6 mmol/l. Alpha HBDH: 190 U/l, cholesterine: 6.3 mmol/l, carbamide: 10.0 mmol/l, creatinine: 143 mmol/l. Quantitative blood count: without any pathologic changes. Qualitative blood count: NEU: 70.1%, LY: 19.1%, MONO: 3.5%, EO: 6.9%, BASO: 0.4%. Sedimentation: 28 mm/h.

By *cystoscopy* an expansive oedematous, bullous area was detectable on the posterior bladder wall. The rest of the mucous membrane was found to be intact. The orifices were seen to the normal, with cavity-like structure.

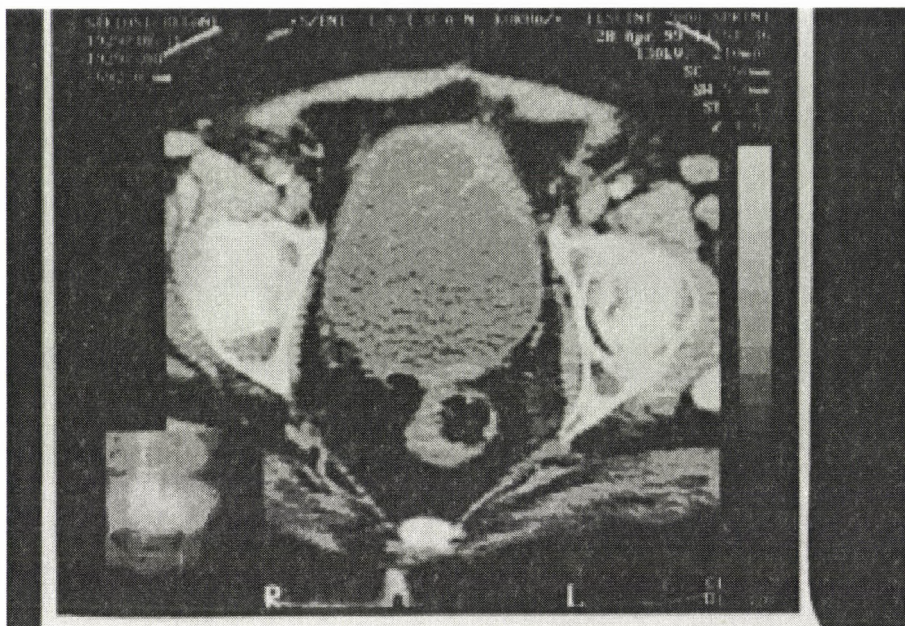


Fig. 2. By computed tomography the bladder wall is seen to be concentrically thickened, particularly in the posterior left section

On May 4, 1999 TUR biopsy was taken from the bullous oedematous area of the posterior bladder wall, reaching well into the muscle layer.

On May 6, 1999 the patient was transferred to the Department of Internal Medicine due to a cardiac condition.

Histologic findings: by microscopy, torn bladder mucous membrane details were seen in connection with a relatively larger muscle detail. The surface of the epithelium details showed ulceration, the stroma displayed venous proliferative tissue within which a relatively large number of eosinophilic granulocytes was observable. Apart from this the deeper layers and at places the muscle layers showed inflammatory infiltration of lobular character, consisting of lymphocytes, plasma cells and many eosinophilic granulocytes. A relatively high amount of mastocytes could be identified among the lobular cells. No tumorous tissue was found.

Diagnosis: eosinophilic cystitis.

Further control studies performed at the outpatient's department verified a healed process.

Discussion

The first report of the presence of an eosinophilic cell group was in pneumonia by Leoffler in 1932, described as pneumonitis – since then it is known in the literature as the Leoffler-syndrome [3]. In 1985 Peterson gave account of eosinophilic gastroenteritis [18–21]. A case

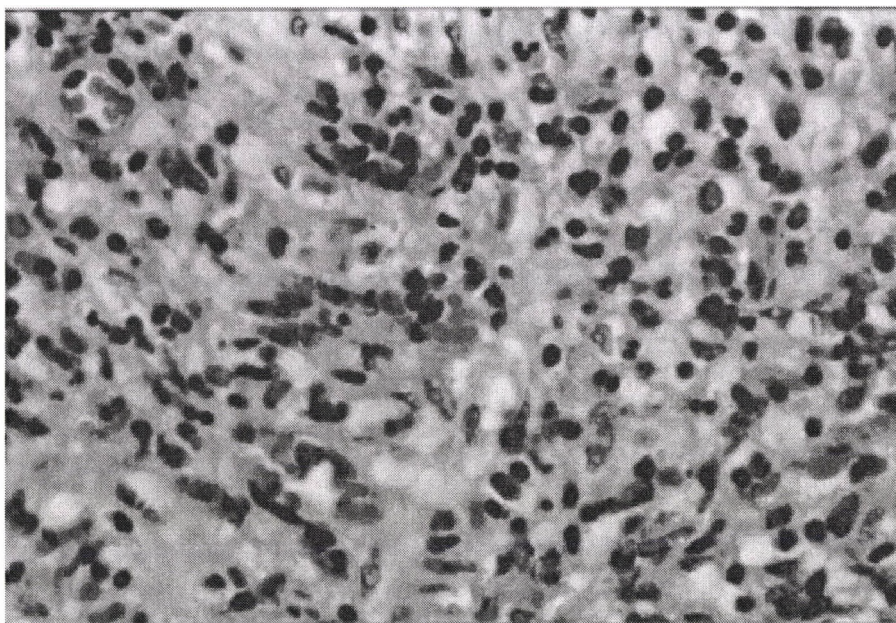


Fig. 3. The mucous membrane is seen infiltrated with lymphocytes, plasma cells and a large number of eosinophilic granulocytes. HE staining, 60-fold magnification

of eosinophilic granulomatosa of the bladder was reported on by Brown in 1960, from which date around fifty publications have seen daylight [4]. Eosinophilic cystitis has no exact drafting, its etiology is unclear and there is no specific therapy for the disease [4–7, 15, 27]. It may develop upon asthma, allergy, rheumatism, and apart from its appearance in the bladder, the gastrointestinal form is also known [8, 10, 13, 20, 21]. It may accompany systemic lupus erythematoses (SLE), but may also occur following urethral constriction or trauma of the bladder and it may also go with hyperplasia of the prostate [2, 4, 22, 27]. As seen in our first case, the patient had previous allergic reactions and hyperplasia of the prostate. Case history may include a neurogenic bladder, as well as bladder carcinoma and interstitial cystitis [17, 27].

The bladder infiltration is often diffuse, though it may also be nodular [15, 27]. Hellström *et al.* [6] divided the process into two groups, with one comprising mostly women and children whose case history included allergy and peripheral eosinophilia. The other group consisted of males with previous bladder complaints but without allergic symptoms and peripheral eosinophilia [6, 22, 27].

The presented two cases do not correspond to the above grouping. The first patient was a male having a case history of allergic symptoms of unclear origin as well as hyperplasia of the prostate. The second female patient had no previous symptoms of allergy, though her peripheral blood showed elevated eosinophilic cell count.

The cause of this elevation could be the IgE mediator-induced allergic reaction [4, 6, 12, 15, 22].

Keszler et al. [11] reported on a case of eosinophilic cystitis in a 5-day-old infant, despite the fact that IgE production is minimal at infancy and there are no data so far as to IgE passing through the placenta. According to a certain author, there is correlation between liver decay and eosinophilic cystitis [9]. It is known that schistosomiasis and filariasis, are endemic in Nigeria, but there have been no case reports on eosinophilic cystitis [10]. It is also known that contact dermatitis can be a causal factor [4, 12]. Relationship has been found between the various rheumatic diseases and eosinophilic cystitis [27].

Our second patient had chronic rheumatic ailments.

By histology, a characteristic feature of eosinophilic infiltration is to be rich in eosinophilic cells. However, lymphocytes, plasma cells, histiocytes, giant cells and mast cells may also be present, occupying the subepithelial connective tissue, but with infiltration also around the muscles and in the lower urethral section. The number of eosinophilic cells varies. Each section contains differing amounts of cells (Fig. 3). On rare occasions the bladder may become fibrotic and bladder atrophy may develop [15, 27].

The symptoms of eosinophilic cystitis are frequent or painful micturition, haematuria, abdominal and bladder regional pain, a palpable abdominal tumor [4, 6, 9, 11, 27]. In childhood, eosinophilic cystitis may raise the suspicion of a bladder tumor or sarcoma [27]. According to the observations of Castillo et al., radiogram, iv. urography, and even cystourography are often unable to reveal pathologic changes in eosinophilic cystitis cases [4, 5]. There have been reports on palpable tumors, however, where iv. urography failed to reveal any pathologic alterations [4, 24, 27]. Even computed tomography has been without any pathologic findings [27].

The CT image obtained from the second patient showed a concentrically thickened bladder wall (Fig. 2). Abdominal ultrasound, computed tomography can therefore have some role in diagnosing eosinophilic cystitis in certain cases [4].

The cystoscopic image is rather varied in eosinophilic cystitis. In a large part of the cases changes in epithelium are evidenced, with visible velvety-red areas resembling *in situ* carcinoma [4–6, 18, 19]. Yellowish vesicles, diffuse hyperanaemic epithelium, surface ulcerations are observable. In certain cases, however, the appearance can be that of an invasive bladder tumor [4, 5, 16, 17, 26, 27].

The two presented cases showed cystoscopic appearances similar to a bladder tumor, and only histologic examination verified eosinophilic cystitis. The biopsy sample should therefore also contain muscle tissue, since a misleading result could be obtained if biopsy is not taken deep enough. No particularly fundamental information is provided by electron microscopy [4, 27].

There is no specific therapy available for eosinophilic cystitis. Treatments with steroids and antihistamines are not always successful [27]. Bothma et al. achieved recovery with prednisolon given in a daily dose of 40 mg for two weeks [2, 4, 27]. Others have not found prednisolon to be an effective treatment [24] and even if there is improvement on the effect of steroids, recurrences may occur [8]. Spontaneous recovery has also been reported on, without any given medication [11]. This was the case with our first patient.

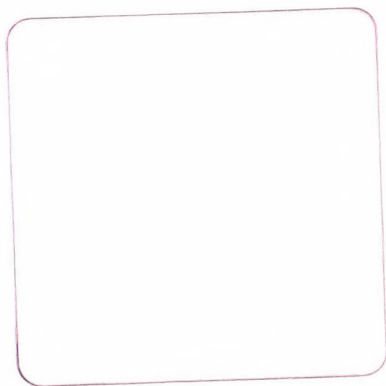
On several occasions partial or total cystectomy and urinary diversion performed due to haematuria and bladder atrophy [24]. There are known cases of ureter implantations being done after ureteric obstruction [17] and because of nephrotomic kidney malfunction [14]. Certain authors have reported on other medical treatment methods as well, like the administration of dimethylsulphide. Treatments also include irradiation [4, 5], chemotherapy with cyclophosphamide and Actinomycin D furthermore, silver nitrate intravesicular instillation [4, 27].

Eosinophilic cystitis may take up an acute or subacute form, but is most often a chronic process – follow-up of the cases is therefore important. There are frequent occurrences of spontaneous recovery in childhood [4, 25–27]. Relapse and progression are joint occurrences in the process of the treatment [2]. Recovery often goes with fibrosis, leading to limited kidney function, renal insufficiency in some instances [4, 27]. There are no suitable methods available to conclude on whether the lesion is a relapse or is progressing [4, 14, 24]. At follow-ups, it is important to assess the general condition of the patient, do a cystoscopy, check the eosinophilic cell count as well as the fall in the amount of red blood cells. These are all necessitated in order to form an opinion on the stage of the process [4, 27].

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COMPARISON OF MORBIDITY OF LUMBAR FLANK APPROACH AND TRANSPERITONEAL APPROACH FOR RADICAL NEPHRECTOMY

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Purpose: This is a retrospective study comparing the clinical data and morbidity of transperitoneal radical nephrectomy (TRN) and simple nephrectomy.

Material and methods: From 1st January, 1989 to 1st January, 1996 a total of 90 simple nephrectomies and from 1st January, 1996 to 1st August, 1999 a number of 85 TRN were performed at the Department of Urology of the Saint Stephen Hospital. The analysis of clinical data included operative time, length of analgesics, postoperative hospital stay and blood loss, as well as morbidity.

Results: The mean operative time for TRN was 170 min., being 95 min. for simple nephrectomy. The mean blood loss for TRN was 250 ml, and 400 ml for simple nephrectomy. There were different types of morbidity for TRN and simple nephrectomy. The complications of TRN mean minimal risk and easy correctability.

Conclusion: Our results demonstrate an overall clear advantage of TRN when compared to simple nephrectomy.

Introduction

The single most effective treatment method for renal cell carcinoma is radical nephrectomy. This type of surgery necessitates transperitoneal or thoracoabdominal exploration, though the last few years have been authors according to whom the procedure can be performed retroperitoneally [7, 8].

Transperitoneal surgery is not favoured by many urologists because of the complications likely to occur, but the subjective decision made by the operator can also be raised [29]. This attitude seems to have been supported lately by published data which question the oncological practicality of radical nephrectomy [8, 29].

The world literature has presented us with contradictory results, and it seems that this problem has no answer, or the possibilities for any are quite uncertain. It is our opinion that the currently used methods of patient selection, statistics and survival are not exactly suitable for proving the value of radical nephrectomy [24–27].

Authors are unable to undertake this task in the present study, they do, however, investigate the differences arising in respect to the complications of simple and radical, transperitoneal nephrectomy.

Patients and Methods

Between 1st January, 1996 and 1st August, 1999, a total of 85 transperitoneal radical nephrectomies (TRN) were performed due to renal cell carcinoma at the Department of Urology of the Saint Stephen Hospital, Budapest. Simple nephrectomies were carried out in 90 patients from 1st January, 1989 to 1st January, 1996, two patient groups were therefore given. The group 1 (TRN) comprised 55 male and 30 female patients (ratio: 1.83), the group 2 (simple) was made up of 60 males and 30 females (ratio: 2.0).

The mean age of the group 1 was 62 years (45–82 years of age), that of the group 2 was 61 years (51–78 years of age).

All patients of the survey had unilateral kidney tumor. The tumorous cases involving thoracotomy, invading the vena cava, infiltrating the neighbouring organ (e.g. colon) were not included. There were no characteristic differences as to the side infected.

Preoperative examination included complete laboratory tests, as well as image scanning (ultrasound, iv. urography, chest radiogram, CT, MRI on occasions).

Comparison between the two groups was based on factors as: operation time, blood loss, quantity of analgesics, time spent in hospital, and complications. These data are shown in Table 1.

Table 1
Operative parameters for radical and simple nephrectomy

	RTN*	SN**
No. of patients	85	90
Mean age	59.7 years (27–81 years)	62.2 years (38–79 years)
Type of exploration	Chevron Modified Chevron	"Oblique lumbotomy" (lateral subcostal)
Mean operation time	170 min. (120–320 min.)	95 min. (70–180 min.)
Average blood loss	250 ml (0–750 ml)	400 ml (0–1250 ml)
Days of hospital care	8 days (7–14 days)	13 days (9–24 days)
Days of postoperative analgesics	3 days (2–6 days)	3 days (1–6 days)

* RTN = Radical transperitoneal nephrectomy

** SN = Simple nephrectomy

All complications in relative tight correlation with the operation were noted, grouped into two (intra- and postoperative complications) and listed in Tables 2 and 3.

Table 2
Intraoperative complications

	RTN* (n=85)	SN** (n=91)
<i>Vascular lesion</i>		
v. cava split	2 (2.4 %)	—
accessorius nesevena, lumbar vein v. spermatica	—	6 (6.7%)
v. linealis split	1 (1.2%)	—
renal peduncular bleeding	—	11 (12%)
injury due to split or unsatisfactory ligature		
aorta injury	1 (1.2%)	—
<i>Spleen injury</i>	1 (1.2%)	—
<i>Liver injury</i>	1 (1.2%)	—
<i>Pneumothorax, chylothorax</i>	—	1 (1.1%)
<i>Stomach, intestinal, pancreas injuries</i>	—	—

* RTN = Radical transperitoneal nephrectomy

** SN = Simple nephrectomy

Table 3
Postoperative complications

	RTN*	SN**
Wound suppuration	—	12 (13.3%)
Ileus	—	—
Hernia	3 (4%)	10 (11%)
Abdominal discomfort (10%)	34 (40%)	9
Infarct of the gastrointestinal tract	—	—

* RTN = Radical transperitoneal nephrectomy

** SN = Simple nephrectomy

Results

Surgical and other parameters

1. *Operation time.* As seen from Table 1, it is striking that the average length of the operations of transperitoneal radical nephrectomy [170 min. (120 min.–320 min.) (n=85)] was much longer (almost the double) than that of simple nephrectomies [95 min. (70 min.–180 min.) (n=90)]. The cause of this is the technique being much slower, needing more care

as well as preparation. The length of surgery naturally depends a lot on the case at hand: intraabdominal adhesions, tumor size, state of lymph nodes.

2. *Blood loss.* Our results show slight deviation in favour of the transperitoneal method, regarding the need for transfusion: 250 ml (0 ml–750 ml) versus 400 ml (0 ml–1250 ml). It is our opinion that this result can also come from the “early” ligating of the renal vessels.

3. *Postoperative analgesia.* As seen from Table 1, both techniques are the same in respect to postoperative pain and its need to be alleviated.

4. *Days of hospital treatment.* The obtained data – 8 days (7–14 days) versus 13 days (9–24 days) – express the advantage of the transperitoneal technique. It should be noted, however, that in accordance with the habits of the profession, the group of simple nephrectomy cases was kept in hospital care for longer period of time.

Nevertheless, there is no doubt as to the fact that the found difference comes mostly from the transperitoneal radical operation being much better and faster in respect to wound healing. This is because this most sanitary surgical technique does not leave any tissue in the renal bed which could later necrotize.

Complications

1. *Intraoperative complications.* Table 2 gives a summary of these data, which show essential differences between the two operation types – firstly in respect to vascular lesions and bleeding. It is understandable that in case of transperitoneal radical nephrectomy such danger is present, due to having to clean the aorta and the vena cava [15, 22, 23].

Nevertheless, such occurrence only amounted to 1.2–2.4% in our cases, and were all attended to without a fault. The same could be said regarding the rare events of spleen- or liver injuries, too.

It is striking that the simple nephrectomy cases revealed a rather high probability of peduncular lesions, bleeding; since the anatomical sites like lumbar vein, gonadal vein, variational, accessory veins cannot be prepared in an absolutely clean manner, thus injury to these could be quite common and mostly unexpected.

2. *Postoperative complications.* Table 3 reveals that incisional hernia occurs more frequently in the classic nephrectomy cases (11% versus 4%), in which evidently nerve injuries play role.

The frequent occurrence of wound suppuration, protracted wound healing could be caused by a left in capsula detail, but insufficient asepsis cannot be excluded either.

A rather frequent late complication of transperitoneal surgery is abdominal discomfort, swelling (40%). This is caused by the mobilization of the colon, manipulation of the intestines, leading to the development of adhesions.

This is quite a disadvantage which, however, will cease in due course. As a possible serious complication though, ileus was not observed in any of our cases.

Discussion

The first ever nephrectomy was performed in 1861 by Wolcott of Milwaukee by means of transperitoneal exploration, though not as an intended operation since the preoperative diagnosis was a liver cyst [18]. The first planned nephrectomy was performed in Heidelberg by Simon in 1869 from retroperitoneal exploration, but not due to a tumor (fistula) [30]. In 1876, Kocher did a nephrectomy due to a tumor by means of anteromedian laparotomy [33]. These patients died on the third postoperative day due to diffuse peritonitis [33]. Because of the high mortality rate the transperitoneal mode of kidney removal did not become widespread, though the method became used again in the 1920s [3], and thanks to Young and Davis [34].

Almost 100 years have past since the concept of radical nephrectomy was first proclaimed by Gregoir in 1905 [33]. Later, the “early ligating” of the renal arteries was suggested by Judd and Hand in 1929 [13]. The need to remove the kidney and its fatty tissue capsule “en bloc” was pointed out by Beare and McDonald in 1949 [1]. In 1960, Poutasse [20] recommended antero-subcostal exploration, then in 1963 Robson *et al.* [28] reported on excellent results gained with abdominal thoracoabdominal, radical nephrectomy. Since then, this technique has gained worldwide acceptance [2, 5].

The definition of radical nephrectomy can briefly be described as follows: the simultaneous removal of the kidney and its fatty tissue capsule, together with the Gerota fascia, following the primary ligature of the renal arteries. Lymphadenectomy may also be performed during the course of the operation. The definition makes no mention as to the mode of exploration prior to surgery.

We do not always keep ourselves to this modest definition, as when the same-sided adrenal gland is not removed, neither is the Gerota fascia “in toto”, since the adrenal gland is occupied within.

The aforementioned conditions, however, have their fundamentally important purpose: ablaticity, tumor-free state. Reaching this means a surgical technique essentially differing from the simple, classic form of nephrectomy. The term “radical nephrectomy” is a surgical term, not being the synonym of ablatic surgery. The patient might not become tumor-free after a radical nephrectomy – e.g. because of micrometastases – all the same, a simple nephrectomy can also result a tumorless condition.

Based on the original concepts, the oncological advantages of radical nephrectomy can be explained by three basic factors [9, 10, 12, 28, 31].

The primary ligature of the artery and renal vein, in order to lessen the risk and probability of hematogeneous dispersion during surgery,

1. complete, “en bloc” kidney removal together with the fatty tissue capsule as well as
2. the Gerota fascia, to decrease the possibility of remaining tumor,
3. lymphadenectomy.

Ad 1. It is a general oncological hypothesis that the interference, operational manipulation of a tumor increases the risk of dispersion. The renal cell carcinoma is no exception, though years and decades have passed without verification of this phenomenon in a direct manner. Tumorous cell dispersion has not been found by experimental methods, despite

which – in lack of absolute proof – we do not regard the question to be settled. Nonetheless, we do accept that there is a slight possibility of metastatization caused by intraoperative manipulation.

Beyond this dilemma we do, however, approve of taking primary care of the arteries, since this makes possible – and at the same time – easy the intact removal of the Gerota fascia and its contents.

It should be remarked as a technical rule that the artery is first to be bound and incised, and only then the vein – otherwise the tumorous kidney might become filled and bleeding may arise. On rare occasions, however, it is difficult to prepare the artery behind the vein, in which event a change in order is allowed. In such cases, we recommend the following quick movements: three threads pulled through beneath the well-mobilized vein, which is then incised, making possible the immediate ligature of the freed artery.

Ad 2. It has been demonstrated that over 20% of renal cell carcinomas with connective tissue capsules, pseudocapsules microscopically infiltrate their capsules and environs [1]. The T1-2 stage tumors appear to be within the fibrous capsule, we cannot know, however, whether the fatty tissue has already been involved or not. Their complete removal in whole, therefore – keeping the Gerota fascia intact – is necessary, even in the T1-2 stages. If the fatty tissue capsule falls apart, there is an increased probability of tumor implantation, local recurrence.

Droller [8] and Creagh [6, 7] performed radical nephrectomy by means of retroperitoneal exploration. The procedure was done by carefully preparing the Gerota fascia from the peritoneal wall and the posterior abdominal wall muscles. They emphasize that the tumor during surgery is less likely to be pressed and tumor dispersion can be avoided in such manner. Taking care of the veins is not primary in this method, but according to the authors the Gerota fascia remains intact.

Accordingly, the 2nd condition can be realised, the significance of which is beyond doubt.

Ad 3. The recommendation of radical nephrectomy made by Robson includes lymphadenectomy, the necessity of which has been supported by convincing survival data of numerous authors [14, 16, 18, 19, 21]. The surgeons holding radical views stand for expansive lymphadenectomy: believing the need for laterocaval, retrocaval, precaval, interaortocaval and preaortic resection in case of right-sided tumors and lateroaortic, preaortic, retroaortic, interaortocaval and precaval resection in case of left-sided tumors – with resection from the case till the bifurcation of the aorta [10, 12].

Other authors (as well as the DGU – German methodic guideline) recommend a much more limited lymphadenectomy: for left-sided tumors paraaortal, for right-sided tumors paracaval and interaortocaval resection, in the cranial and distal fields 2–3 cm from the renal arteries [29].

There are authors who do not perform lymphadenectomy at all, or only in case of suspicion for staging purposes. Giuliani and Herrlinger found significant survival results in the event of expansive lymphadenectomy [10, 12]. The survival rates of others have not supported the therapeutic significance of lymphadenectomy [29].

According to our opinion, this question remains open. In our practice, lymph-node resection is done in accord with the above described standard surgical technique: para-, pre- and interaortocaval lymphadenectomy in the event of right-sided tumors, with the lower boundary being the art. mesent. inf. origin, and the upper boundary the art. mesent. sup. origin.

Summarizing the oncological advantages of radical nephrectomy:

1. The hypothesis according to which primary vein provision prevents tumor dispersion has not been proved, the question is still an open one. It is our opinion, however, that primarily taking care of the veins is a necessary step in all cases, even if only for the purpose of being able to remove the Gerota fascia in whole.

2. Disregarding exceptional cases, the safest mode of intact removal in whole of the Gerota fascia and its contents is the transperitoneal mode.

3. In respect to the significance of lymphadenectomy, it would be hard to take a definite position since there is so much deviation regarding international opinions. Nevertheless, we do perform regional – nonexpansive – lymphadenectomy for the simple reason that it is worthwhile if the gain is ablaticity.

This is, a matter of fact, mostly reached in the course of nephrectomy, as preparation of the renal arteries involves previous preparations along the wall of the aorta or the vena cava, the consequence of which is that the majority of the lymphoid tissue (para- and preaortal or -caval) belongs to the surgical preparation. Following kidney removal, what needs to be cleansed is the interaortocaval area and perhaps the remaining fatty tissue.

The present study involves analysis of our patient material in respect to the consequences and other relevant data of transperitoneal radical nephrectomy and classic nephrectomy.

The differences manifest in the obtained results of the two surgical types are essential ones. In Table 1 the almost double surgery time can be evaluated as a disadvantage of transperitoneal surgery. The mean blood loss, however, is an advantage of the procedure (250 ml versus 400 ml), an explanation to which is presumably the primary artery provision and in most cases, the avoidance of any injuries to the parasitic, dilated veins of the fatty tissue capsule. The found deviations are also due to the fact that the renal arteries can be selectively well taken care of by means of the preparative technique, whereas with the Guyon method the ligature of the hilum may often be inadequate. Table 1 demonstrates notable differences in respect to days spent in hospital care, to which we have no comments other than that this could be explained in part by the wound suppuration, lengthy wound healing time manifest in Table 3.

As seen from Table 2, different forms of intraoperative complication should be reckoned with concerning the two types of surgery. Risk factors during the course of transdominal surgery include injuries to the spleen, liver, large arteries, duodenum, small and large intestines, and pancreas. It is firstly the renal peduncle and the fatty tissue capsule that may suffer injury during the course of classic nephrectomy. These are only seemingly out of danger since they may cause considerable blood loss and subsequently taking care of them also involves a certain degree of danger. According to the literature, occurrence of around 20% is acceptable [33]. In our survey the figure was found to be 8.4%, presumably due to the careful and safe procedure of the technique, even though this makes operation time considerably longer (Table 1). The relatively low number of intraoperative injuries listed in Table 2

was in all cases successfully attended to without causing any disadvantages in the healing process.

Postoperative complications. Based on the literary data, the complications listed in Table 3 occur in around 20% of the cases [4, 17, 33]. In our material only "abdominal discomfort" was noted to be frequent in occurrence (40%). It should be remarked, however, that this category included even the slightest complaints and the symptoms gradually ceased within a few months in all cases.

In our classic nephrectomy cases, mostly wound suppuration and nerve injuries due to hernia were found to occur more frequently.

Consequences

The complications of TRN basically differ from those of classic nephrectomy, which comes from the intraabdominal nature of the intervention.

These complications can be reduced to the minimum, i.e. they are preventable and easy to take care of. This, however, requires good skills in surgery and vascular surgery, as well as careful preparative surgical technique.

The correct procedure of radical nephrectomy is much easier by means of transperitoneal than by retroperitoneal exploration.

TRN has the following oncological advantages:

- a) ablative surgery (prevention of local recurrences),
- b) prevention of intraoperative metastatic dispersion (?),
- c) possibility of lymphadenectomy.

Ad a: this requirement necessitates a tumorous kidney and the damage-free removal of the Gerota fascia, which is the most easily carried out by means of taking primary care of the renal arteries. This method also reduces the risk of blood loss.

Ad b: that intraoperative surgery would cause cell dispersion has not been proved as yet, but neither have we direct proof of the contrary, thus this question is still open. Primarily taking care of the arteries has therefore not much role in this, its technical significance, however, is unambiguous (see *Ad a*).

Ad c: the therapeutic efficacy of lymphadenectomy has not been verified yet, furthermore, the literary data are contradictory. It is our opinion, however, that the presently described mode of lymphadenectomy can not only be staging, but curative as well.

We therefore think that radical nephrectomy is much easier to perform by transperitoneal rather than by retroperitoneal exploration. For this purpose we find the Chevron or modified Chevron resection the most suitable method, though in rare cases thoracoabdominal exploration is needed.

Transperitoneal radical nephrectomy does not go with a higher risk of complications as compared to simple nephrectomy, we should therefore only disregard the technique in case of special causes.

Despite the negative – and contradictory – results which are to be found nowadays in the literature, we still recommend transperitoneal exploration, since the technique is simple and easy, and goes with good wound healing and few complications.

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METABOLIC CONSEQUENCES OF ORTHOTOPIC ILEAL NEOBLADDER

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Purpose: Orthotopic ileal bladder substitution is a well accepted form of urinary diversion providing high quality of life. However, potential metabolic consequences remain a serious problem. These complications are discussed in the present article.

Material and methods: Authors review the metabolic complications of 45 orthotopic ileal neobladder cases.

Results: Insufficient absorption (malabsorption) associated with ileal resection is quite rare, while hyperchloremic metabolic acidosis after ileal neobladder is a rather common phenomenon (55%).

Conclusion: Authors suggest careful patient selection, correct operative technique and vigilant follow-up for successful treatment of metabolic complications.

Introduction

The curative treatment of muscle invasive bladder cancer is radical cystectomy performed in time so as to save the patient's life if there is no tumor progression or any other severe complication. Nevertheless, the most successful cases may also go with metabolic consequences, which left unattended could endanger the patient's life. Regular follow-ups make the detection and treatment of these complications easy.

In the following, authors review the metabolic data pertaining to 45 of their orthotopic ileal neobladder cases.

Patients and Methods

Orthotopic ileal bladder substitution following radical cystectomy was achieved in 45 patients (42 males and 3 females) between the 1st January, 1996 and 1 June, 1999 at our Department.

The mean age of the patients was 64 years (52–81).

Indication of cystectomy was urothelial carcinoma ($T_1G_3 - T_4, N_{0-2}, M_0$). All cases involved orthotopic ileal neobladder prepared according to Hautmann using standard technique [17, 18].

After removal of the catheter, the patients were checked once a week for 6 weeks, once a month for 6 months and then once every 3 months.

All check ups included ultrasound, urine sampling, complete blood count, serum electrolyte, carbamide, creatinine, alkaline phosphatase as well as liver function tests.

Blood gas was also analysed, with an > 3 mmol/l base excess value being regarded as negative.

Clinical symptoms, complaints were also taken into consideration, firstly any changes in bowel movements, any neurological symptoms (paraesthesia), the presence of oedema, or anasarca. If any such changes were observed, serum calcium, magnesium, cholesterol, triglyceride, as well as complete serum protein tests were done.

The follow-up period was 6 to 40 months.

The present work does not include analysis of oncological aspects, survival data, or early and late complications, but involves only the scope of metabolic consequences.

Results

Tables show our patients compensated with bicarbonate and those without any treatment in relation to continence (Table 1), kidney function (Table 2) and resected ileal segment (Table 3).

Table 1
Acid-based condition of our 45 patients in relation to continence

	Patient No.	Continence	Incontinence	Hypercontinence
Bicarbonate-compensated	25	22	3	—
Compensated without bicarbonate	20	13	6	1
Total	45	35	9	1

Table 2
Acid-based condition of our 45 patients in relation to renal function

	Patient No.	Insufficient renal function	Normal renal function
		(Se K > 140 mmol/l)	
Bicarbonate-compensated	25	3	22
Compensated without carbonate	20	0	20
Total	45	3	42

As seen from Table 1, more than half the patients (25/45 – 55%) were in need of a per os dose of bicarbonate. From 25 of the patients taking an alkalizing drug, 22 were continent and

3 incontinent, while in the group of 20 taking no drugs, 13 were continent, 6 incontinent and 1 hypercontinent.

Grouping was according to the following definition:

Continence:

- total continence day and night,
- not complete, but satisfactory continence (1–1 diaper during the day and/or during the night),
- occasional need of a diaper without causing any social problems for the patient.

Incontinence:

- the need for more than 1 diaper a day.

Hypercontinence:

- total retention or residue above 300 ml.

Table 3
Acid-based condition of our 45 patients in relation to the eliminated ileal segment

	No.	Length of ileal segment used		
		45–50 cm	50–60 cm	Above 60 cm
Bicarbonate-compensated	25	2	3	20
Compensated without bicarbonate	20	2	5	13
Total	45	4	8	33

One of the patients needs a constant catheter and is in balance without alkalizing medication. A patient had to be hospitalised and given infusional alkalization on one occasion a week after removal of the catheter because of acute symptoms of severe acidosis. It is also worthy of note that this patient had limited renal function.

Table 2 demonstrates that all three of the patients with decreased renal function (Se K above 150) required alkalization by means of medication.

Table 3 shows our patients distributed according to the eliminated ileal segment, also showing data regarding the necessity of alkalization. There seems to be a shift in the ratio of bicarbonate-treated and nontreated patients, i.e. the longer the ileum, the higher the probability of acidosis. Our small case number, however, is not sufficient to make for this assumption.

No symptoms of vitamin B₁₂ deficiency, Ca-metabolic disturbances or drug reabsorption-related toxic symptoms were detected among our patients.

Discussion

The patient's quality of life following radical cystectomy is greatly determined by the success of bladder substitution [10, 17, 18, 21]. Despite overcoming and avoiding several surgical-technical difficulties and complications, i.e. even besides an optimally functioning

ileal neobladder, certain metabolic disorders may develop which make regular check-ups and treatment necessary [14–16].

These complications have basically two causes:

1. Decreased absorption due to the eliminated ileal segment (malabsorption).
2. Reabsorption of certain urinary matter through the ileal neobladder.

Ad 1. The function of the eliminated ileal segment can be substituted by the remaining tract by dilatation, elongation and the villous hypertrophy of the mucous membrane [12]. These processes may significantly diminish due to earlier operations and/or irradiation, so an enhanced risk of metabolic complications must be accounted for [2].

The resection of different ileal segments goes with various absorption insufficiencies [1]. Table 4 lists the type of substances absorbed in the different sections of the gastrointestinal tract.

Table 4
The substances absorbed in the various sections of the gastrointestinal tract*

Material	Stomach	Duodenum	Jejunum	Ileum	Terminal ileum	Colon
Carbohydrates	x	x	x	x		
Proteins		x	x	x		
Lipids		x	x	x	(x)	
Calcium		(x)	(x)			
Iron		(x)	(x)			
Water soluble vitamins			x	x		
Liposoluble vitamins			x	x		
Vitamin B12				((x))	x	
Bile acid				(x)	x	
Sodium-, chloride-, ions, water				x	x	x

x = considerable absorption

(x) = decreased absorption

((x)) = slight degree of absorption

* Based on Mills [15]

Consequently it is logical which alterations are to be accounted for upon elimination of the ileum.

It is a fact that in 95%, Vitamin B₁₂ and the bile acids are absorbed by means of the terminal ileal segment, the ileocecal orificium, which function cannot be replaced by other segments of the intestinal tract [8, 23]. It is therefore of great importance, if possible, to leave intact the last few centimetres of the terminal ileum [8, 23]. A 10 to 15 cm length of the terminal ileal segment as well as the intact ileocecal valve are capable of compensating an even 60 cm long, proximally resected ileal segment in its function, it is thus a very important segment. An ileum resection over 60 cm in length can give rise to hypertriglyceridaemia and a decrease in the serum cholesterol level [15]. Upon eliminating a lengthy ileal segment and the terminal ileum, there may be a decrease in bile acid resorption. As a result, reabsorption of natrium is restrained by the bile acids in the colon, the consequence likely being decreased

water reabsorption as well (diarrhoea, desiccation). Under normal conditions most of the bile acids return to the liver – enterohepatic circulation. With loss of bile acids, the liver is not capable of entirely compensating this by means of enhancing bile acid production. What follows is a decrease in the amount of bile acids in the ileum, which also goes with reduced digestion and absorption of the lipids. The amount of lipids increases in the stool, and as a consequence of lipid malabsorption a lack in liposoluble vitamins is also to be accounted for [15].

Lipid malabsorption can increase the probability of cholelithiasis as well [4, 11]. Though not proved as yet, in theory it can enhance oxalate depletion in the urine, thus chancing a higher risk of cholelithiasis [6]. Further factors promoting gall stone formation are dehydration, hypercalciuria, hypersulphaturia and hypocituria, the primary cause for these being acidosis [6, 15]. Apart from the listing, chronic urethral inflammation – a frequent occurrence in ileal neobladder – can also increase the probability of cholelithiasis [6, 15].

Substitution might become necessary in cases of reduced reabsorption and deficiency symptoms appearing after elimination of the ileum, the terminal ileum. Considering that the greater part of vitamin B₁₂ and bile acid absorption is done by the last 6–8 cm section of the ileum, preservation of this segment is of great importance in the formation of ileal neobladder [8, 15].

Rarely, hypomagnesaemia can develop, the cause of which is malabsorption and acidosis, when there is a decrease in the tubular reabsorption of the kidneys. In such cases neuromuscular symptoms occur, as tremor, muscle twitch, tetany, psychic symptoms (changes in personality) [15].

Ad 2. Through the wall of the reservoir prepared from the ileum, urine – water and various soluble matter – can be reabsorbed, whereby the metabolism can be thrown out of balance. This process depends on the type and length of the ileal segment, as well as on the period of urine retention. The mucous membrane shows various structure in accordance with the state of the intestinal tract – stomach, jejunum, ileum, colon [5].

The epithelial cells lining the intestines are packed close to each other. There is a tight junction between the cells, isolating the intercellular space from the intraluminal space. Water resorption does not primarily take place in and through the cells but on the intestinal wall in the intercellular space, in accord with the osmotic gradient.

The looseness or tightness of the intercellular junction varies from proximal towards distal: being tighter in the colon than in the ileum, which in turn has tighter intercellular junction than the jejunum. Water transport is thus the quickest and most effective in the jejunum, is less effective in the ileum, and the least effective in the colon [5].

Water flows in also transcellularly, in such mode preserving cellular isotony though this is negligible in quantity. Water flow in large quantity takes place in the paracellular space according to the osmotic gradient, by means of passive transportation. Soluble matter and ions are also capable of such transportation in accordance with the electrochemical gradient, though this is less effective. Active transport is needed for resorption of certain ions, taking place in opposition to the concentration gradient and requiring energy (ATP) [5].

The ileum in particular is capable of absorbing the carbamide, ammonium and chloride ions found in urine, by means of active transport [9]. This can consequently lead to hyper-

chloraemic acidosis. Metabolic acidosis can occur in 10–15% of ileal conduit cases, and in at least 50% of orthotopic ileal neobladder cases [3, 20]. This incidence is also dependant on the length of the eliminated ileal segment: significant differences have been found in 40 and 60 cm long segments [22]. Though from this point of view elimination of a relatively short ileum part is an advantage, a length of at least 60 cm is necessary for the formation of ileal neobladder in order to achieve the appropriate capacity [18].

This metabolic disorder has quite a wide variety of clinical symptoms: nausea, vomiting, depression, myasthenia, diffuse abdominal pain. It is not rare for the state of confusion to occur as well [10, 13, 24].

These symptoms are likely to appear after the removal of permanent catheters, which is understandable since the ileal neobladder is constantly empty with a catheter, making car-bamide resorption minimal [10, 22].

It is therefore important during this period to check upon any kind of residue, the renal function values, and last but not least to do a blood gas analysis (ASTRUP).

Therapy. Hyperchloraemic acidosis can fundamentally be treated with alkalization and chloride-transport blocking agents. Sodium bicarbonate given as an infusion, then later in *per os* dosage is almost in all cases effective. In case of wind colic as a side-effect, sodium citrate can be given. A rise in blood pressure, liquid retention, or even lung oedema may, however, occur on some occasions due to the large amount of sodium intake. Chlorpromazine or nicotinic acid administration may help in such cases, resulting a decrease in chloride transport, and though not being able to correct the acidosis, they do decrease the necessary dose of sodium to a considerable degree [14]. Besides drug therapy, it is absolutely important to drain the ileal neobladder and to keep it empty.

Apart from the above, hepatic coma may also develop, the cause of which is that ammonia gets into the liver from the ileal neobladder, by means of the portal circulation. Under normal conditions, the ammonia metabolises there, insufficient liver function, however, results the development of hyperammonaemia. Due to infection caused by urease-producing *Proteus* strains, the ammonia content may rise to such an extent in the urine, that it floods the liver, which the metabolic process is unable to cope with [15].

The long-term, appropriate disinfection of the urine is therefore most important, since the ileal neobladder is quite prone to infection.

Apart from hyperchloraemic acidosis and other complications, resorption through the ileal neobladder of certain drugs which empty with urine should also be reckoned with, since they may have toxic effects. Changing or decreasing the usual dosage is particularly important in case of chemotherapy and antibiotic administration [5, 7, 19].

Based on our results, it can be seen that the probability of metabolic consequences to occur after ileal neobladder formation is more than 50%. The complications may arise in numerous forms, but the most probable to occur is hyperchloraemic acidosis, which can quite readily be compensated. For this to happen though, the patients need to be regularly checked and their cases followed.

Conclusions

Orthotopic ileal neobladder following radical cystectomy may be accompanied by several complications, among which are metabolic consequences of slighter or severer forms. To prevent these, the following recommendations are made:

Prevention:

- selected patients:
 - good renal function
 - good liver function,
 - intact intestinal tract,
 - good general condition
- surgical technique:
 - preservation of the ileocecal tract,
 - neither short, nor long ileal segment resection (60 cm),
- follow-up of patients:
 - complete, residue-free urine depletion,
 - catheterization,
 - ensuring sterile urine,
 - blood gas analysis.

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ISOLATED URETHRAL AMYLOIDOSIS

(Case Report)

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A case of urethral amyloidosis is presented in a 31-year-old male patient. Through this case, authors draw attention to the recommended forms of examination in the event of this illness being suspected, and also discuss problems in differential diagnosis. A reviewed the relevant data in the literature is also provided.

Introduction

Primary isolated urethral amyloidosis is a rare disease. Its symptoms can mimic a tumor causing problem in differential diagnosis [5, 6, 8, 12, 14, 15–17]. The first case was described by Tilp in 1909, and since then no more than 2 further cases have been reported [1, 2, 8, 10]. In this report authors present their own case and review the literature.

Case Report

A 31-year-old male patient was admitted to our Department. There was no history of any relevant internal illness, gonorrhoea or urethritis of other origin.

One year ago, the patient showed a swelling in the region of the external opening of the urethra. A few weeks before admission into hospital other local symptoms manifested themselves: in the region of the gland the urethra became compacted, the patients complained of a burning sensation and pain in the urethrae (postcoital, spontaneous, and in response to pressure). He noticed a flushed appearance in the area around the opening of the urethra. There were neither general symptoms, nor complaints regarding urination.

Laboratory examination did not reveal any morbid deviations. Erythrocyte sedimentation rate 5 mm/h, sediment of urine one or two RBC as well as WBC. The immunoelectrophoretic examination showed a weak rise in IgA level.

Abdominal US examination did not reveal morbidity either.

During urethrocystoscopy it was only possible to introduce the instrument into the urethrae to a depth of 2–3 cm, stricture prevented further progress. Retrograde urethrography showed a healthy section of urethra above this area of thickening.

Acting on the suspicion of a urethral tumor, exploration was carried out under lumbar anaesthesia. During the course of external urethrotomy a 4 mm long thickened, compact, leathery, mosaic like mucosal membrane was witnessed starting from the meatus (Fig. 1). We removed other granular material for tissue analysis, and excised the area impinging on the condyloma in the meatus. The other part of the urethra was examined optically, and using the cystoscope it appeared to be healthy. In the area of the diseased urethra, a marsupialation and an artificial hypospadias were performed.

The patient went home after the operation with no further problems.

Histological examinations were performed: great amount of eosinophilic material between the collagenous bundles and sometimes in the wall of the vessels (Fig. 2). This material showed positivity of staining by Congo.

Fibrillary material was showed by EM study: fibrillary material by electronmicroscopy. On the electronmicroscopic photos the characteristic of amyloidosis is discovered namely, amyloid deposits as accumulations of linear, non-branching fibrils of indefinite length and 8–10 nm with (Fig. 3).

Thinking of the secondary possibilities of the process, we searched for its cause. The search for tumor proved negative; during the course of the source of infection, light was thrown on chronic tonsillitis a tonsillectomy was performed. The systemic character of the basic illness could be ruled out on the basis of the negative result of rectal biopsy. We examined the patient at regular intervals. Half a year after the operation, we established that since the artificial hypospadias did not disturb the patient, either in urination or in his sexual life,

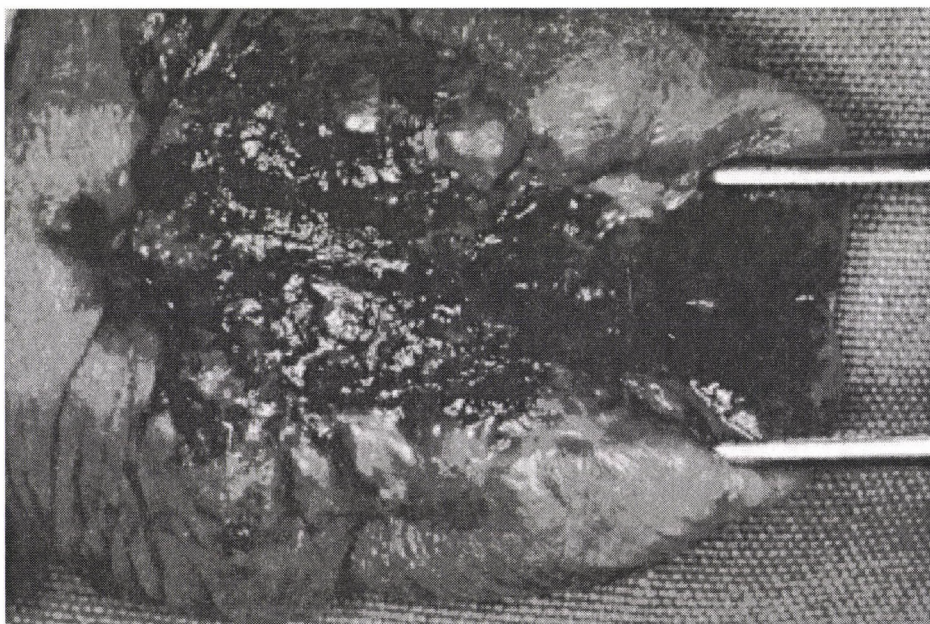


Fig. 1. Artefact hypospadias (external urethrotomy) – tumor-like formation of urethra

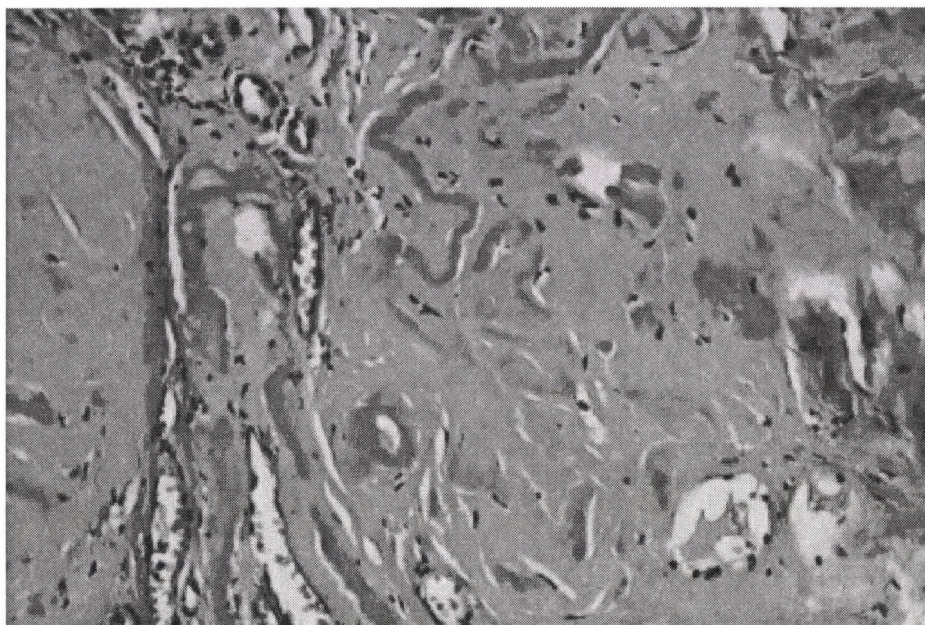


Fig. 2. Great amount of eosinophilic material between collagenous hundles. HE $\times 400$

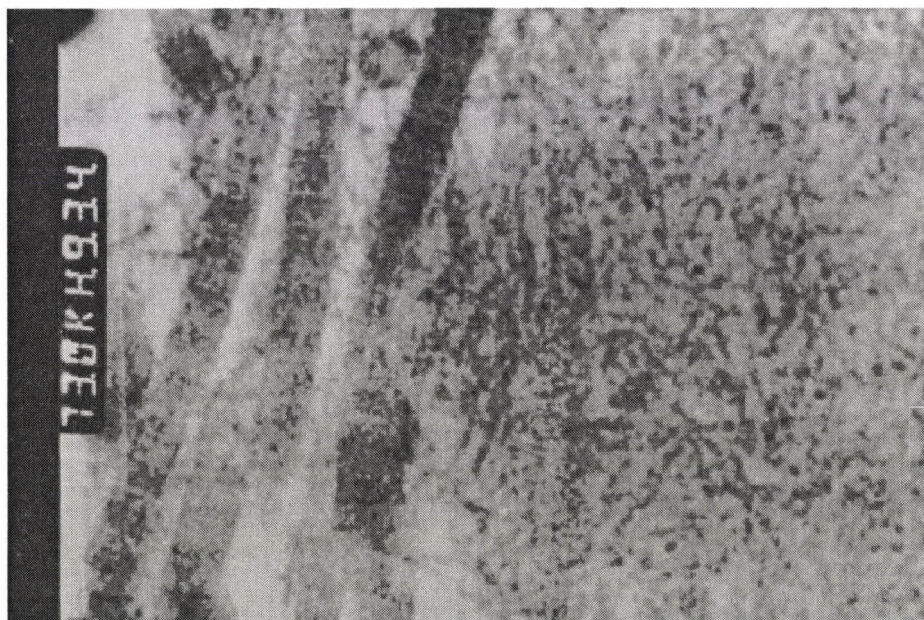


Fig. 3. Fibrillary material by electronmicroscopy

we would refrain from reconstruction for the time being. According to repeated urethroscopy (late in November 1996) in the dilated part of the urethra, the alteration of the amyloidosis has not increased, nor has any regression been witnessed.

Currently the patient is complaint free.

Discussion

It is known that in amyloidosis characteristic glycoproteins, consisting of light lambda chains and IgG fragments accumulate in the tissue. Localised form of the urethra is extremely rare [1–3, 6–10].

According to one of the classifications the disease exists in two forms: primary, behind which other causes cannot be found, and secondary, in which chronic inflammation or neoplasm is the likely background [5, 6, 16].

In systemic amyloidosis general symptoms can be observed. The immunoelectrophoresis shows a rise in the 2a globulin level, while the local symptoms, the changes characteristic of a given organ, can be observed in localised form – kidney, bladder, urethra [2, 12, 16, 17].

In the presentation of the disease, for ruling out systemic characteristics, exploration of chronic inflammation (the search for the focus of infections), preparation for immunoelectrophoresis of serum protein, and examination of the protein in 24-hour urine samples are necessary. In addition, the performance of a biopsy from the rectal wall can give complete proof.

The kongo probe is useful for the diagnosis of amyloid.

Amyloidosis localised in the urethra is a very rare disease and can mimic the symptoms of a tumor. In its isolation, besides radiological and endoscopic methods, immunohistochemical techniques and immunoelectronmicroscopic examination. As well as histology may be of help [1–5, 7, 12–15, 17].

Benign and spontaneous regression of the illness has also been described in relation to this, therefore we can be conservative in its treatment depending on the symptoms [5, 6, 8–10].

When the illness leads to an obstruction of the lower part of the urethra surgical intervention becomes a necessity. Depending on the position and spread of the changed tissue internal urethrotomy, excision, external urethrotomy and urethral reconstruction may be justified [1, 2, 5, 7, 11].

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HETEROMORPHIC GRADE OF RENAL CELL CANCER

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The present study demonstrates by means of histopathologic analysis that most of the renal adenocarcinomas are microscopically heterogeneous – named by authors as heteromorphic. This heteromorphism means the mixture of different cell types, histological patterns and fields of tumor with different nuclear atypia.

300 surgical specimens of renal cell cancer (RCC) were reclassified retrospectively. The histologic classification was as follows:

1. Nuclear atypia (nuclear grading according to Skinner);
2. Histological structure (compact, tubular, papillary, cystic);
3. Tumor cell types (clear, chromophobe, chromophilic basophilic, chromophilic eosinophilic).

Homogeneous tumors consist of the three categories of this basic classifications. Heteromorphic tumors have combinations the three categories: different cell types (clear and granular) and/or histological elements (tubulopapillary) and/or nuclear structure.

Heteromorphism of RCC can be graded as:

G-I: homogeneous structure (three patterns, one-one pattern of the three categories);

G-II: 3+1 patterns ...

G-III: 3+2 patterns ...

G-IV: 3+3 or more patterns of the classification given above.

This grading system is recommended for the heteromorphism of renal adenocarcinomas.

Introduction

Histological and cytological morphology is one of the important reference points in the examination of the prognosis and nature of renal cancer [1–4, 17]. Over the past six years, numerous histological classifications have been worked out. The various grading systems usually rank differentiations of renal tumors, but the question remains: what does differentiation actually mean in the case of renal cancer? It is difficult to answer this because renal cancer can take a multitude of forms, and in any given case of renal cancer, a number of structures can be present.

The histological grading of renal cancer is usually based on histological structure, cell typology and nuclear polymorphism. Besides these three basic approaches, the authors of this paper wish to point out the significance of heteromorphism and suggests a method for grading divisions.

Materials and Methods

275 renal adenocarcinomas – removed by radical nephrectomy – were histologically reclassified by retrospective analysis. Samples (5 or more pieces $2 \times 1 \times 1$ cm in size) were taken from different regions of every tumor. The specimens were fixed in formaldehyde and embedded in paraffin. The sections were stained in hematoxylin-eosin.

Reclassification was achieved according to the following considerations:

1. *Nuclear atypia, nuclear grade* (according to Skinner):

- G-1: Small nuclei indistinguishable from those seen in normal tubular epithelial cells;
- G-2: Slightly irregular nuclei without abnormal nucleoli;
- G-3: Enlarged, pleomorphic nuclei with prominent nucleoli;
- G-4: Extremely bizarre giant nuclei.

When the tumor contains different areas according to the nuclear classification, it should be categorized into the higher grade.

When a tumor contains areas belonging to the nuclear grade G1, and also areas with a nuclear grade of G3, the tumor is to be grouped into the G3 (the present highest) category.

In this system there is no labelling as G1-3; one single category is to be chosen.

2. *Histological structure*

- 1. Compact, solid architecture;
- 2. Tubular, adenomatoid ...
- 3. Papillary ...
- 4. Cystic histological structure.

3. *Tumor cell type* (partially according to Thoenes):

- 1. Clear cell;
- 2. Chromophobe type;
- 3. Chromophilic basophilic type;
- 4. Chromophilic eosinophilic cell type.

Sometimes several categories are found mixed in one and the same tumor (e.g. tubular and papillary, i.e. tubulopapillary or solid and tubular). In this case a selection must be made since the tumor is only to be grouped into a single category.

Regarding the classification according to histological structure and tumor cell type, if different categories are mixed, the category with the higher “nuclear grade” should be taken into account.

For example: Tubular areas and solid areas are present in one and the same tumor. The nuclear grade of the tubular area is G1, while that of the solid area is G3. Here the tumor is to be placed into the “solid compact” group.

According to the rules of the categorisation, the classification systems. 1–3 do not label whether the structure is mixed or not. Grade 4 (grade of heteromorphism) is to be applied for

labelling the mixed structures, which depends on the number of the mixed various components (categories).

Homogeneous tumors contain three categories according to these three basic classifications. Heteromorphic tumors have a combination of more of the following three categories: different cell types (clear and granular) and/or histological elements (tubulo-papillary) and/or structure of the nuclei.

The grade of this mixture, heteromorphism can be classified as follows:

4. *Grade of heteromorphism*

1. Homogeneous structure (one of each categories – i.e. three);
2. a mixture of 3+1 categories;
3. a mixture of 3+2 categories;
4. a mixture of 3+3 or more different categories.

Results

275 removed kidney tumors were reclassified histologically. The male/female ratio was 170/105 (1.62%).

The number of cases with homogeneous structure was relatively few (26.9%), contrary to cases with heterogenous structure (73.1%).

Numerical distribution of presented areas of categories by different classifications independent of the range of defined classifications. 90% of the tumor specimens contained areas of solid structure, while 88% showed areas of clear cell type (Table 1). Chromophobe cell type was very rare (0.2%).

Table 1 shows the number of cases (tumors) in which other categories (4–4–4) of the classification system are present at all! Here the percentage means that in case of the entire number of mixed structures, several categories may be present at the same time in one and the same tumor. Accordingly, in this Table the total of the different percentage values is not 100%, but more than that!

The percentage distribution of the classified categories – according to the previously given classifications – is listed in Table 2. This Table shows the distribution of the cases actually grouped according to the 1, 2, 3 and 4 classification systems. Here, the total of the various percentage values is 100%.

When grouping in case of a mixed tumor, only one category is to be identified, i.e. in the presence of several categories, the category with the highest “nuclear grade” should be taken into account.

It is remarkable that most of the cases classified by histological structure were solid, compact (85.4%). This frequency value also resulted from the fact that areas with higher nuclear grade are more often associated with solid structure in case of mixed structures. The “clear” cell type also occurred in a relatively high percentage (69.1%), the reason being the same as explained above.

Table 1
Percentage frequency of areas of different histological structure, cell type and nuclear grade

Type	N	%
I. Histological structure		
1. Solid, compact	249	90
2. Tubular, adenomatoid	71	26
3. Papillary	57	21
4. Cystic	61	22
II. Tumor cell types		
1. Clear	242	88
2. Chromophobe	6	2
3. Chromophilic-basophilic	49	18
4. Chromophilic-eosinophilic	57	21
III. Nuclear grade		
1. G1: Small nuclei indistinguishable from those seen in normal tubular epithelial cells	149	54
2. G2: Slightly irregular nuclei without abnormal nucleoli	164	60
3. G3: Enlarged, pleomorphic nuclei with prominent nucleoli	88	32
4. G4: Extremely bizarre giant nuclei	21	8

Table 2
Classified categories – percentage distribution

Type	N	%
I. Histological structure		
1. Solid, compact	235	85.4
2. Tubular, adenomatoid	15	5.4
3. Papillary	16	5.8
4. Cystic	9	3.4
II. Tumor cell types		
1. Clear	190	69.1
2. Chromophobe	4	1.5
3. Chromophilic-basophilic	37	13.4
4. Chromophilic-eosinophilic	44	16.0
III. Nuclear grade		
1. G1: Small nuclei indistinguishable from those seen in normal tubular epithelial cells	61	22.2
2. G2: Slightly irregular nuclei without abnormal nucleoli	109	39.6
3. G3: Enlarged, pleomorphic nuclei with prominent nucleoli	85	31.0
4. G4: Extremely bizarre giant nuclei	20	7.2
IV. Heteromorphism		
1. Homogeneous structure	74	26.9
2. 3+1=4 patterns mixed	86	31.3
3. 3+2=5 patterns mixed	58	21.1
4. 3+3 or more patterns mixed	57	20.7

Almost half of the cases contained more than one category ("heteromorphic") according to histological classification (49.8%) and nuclear grade (47.6%), showing mixed structures (Table 3). This phenomenon was less according to the classification by cytoplasmic type: 26.2%.

Table 3
Distribution of heteromorphism of different histologic categories

Histologic categories	%	
1. Histological structure	49.8	(137)
2. Tumor cell type	26.2	(72)
3. Nuclear grade	47.6	(131)

Discussion

For decades, the histological grading of renal cell carcinomas has caused problems for pathologists. Already in 1932 Hand and Broders [7] devised a four-division system on the basis of the degrees of differentiation. A three-division structure was recommended by Riches [15].

Later, Amerer divided the second group of the three malignancy grading according to a demarcation, creating further two categories, therefore using four categories in all. A complicated, combined grading system was worked out by Syrjänen [18], grading renal carcinomas according to other points of view. Skinner [16] suggested a "nuclear grading" system, based upon the structure of the cell nuclei [5, 12]. Hermanek et al. [8] primarily graded according to histological type. Mostofi [14] and Fuselier [6] maintained that renal carcinoma could assume such a multitude of forms that it is not possible to carry out correct classification: it is enough to have two categories: well- and badly differentiated forms. Later, Thoenes et al. [19] worked out a very detailed classification system. There are also some classification system based on cytogenetic data [9–11].

It is possible usually to classify renal carcinomas according to three considerations.

1. Histological type: compact, solid, acinaris, trabecularis, papillary, tubular, cystic.
2. Cytoplasmic structure: clear, granulated, oncocytic.
3. Polymorphism of cell nuclei: nuclear grade.

Histological structure, cell type and nuclear grade can easily be determined by examination with a light microscope. In rare cases, differences in cytological morphology can only be disclosed using specialised staining techniques and electronmicroscopy. For example, the chromophilic acidophilic (in accordance with Thoenes), oncocyte-like and oncocyte cell types differ from each other in that the size of the mitochondria contained in the cytoplasm is different: oncocytes contain larger sized mitochondria.

The most basic problem, however, is that renal carcinoma regularly demonstrates such heteromorphism that categorisation is virtually impossible. This problem applies to all the categorising systems mentioned so far. So-called heteromorphism can appear from the as-

pect of all three of the above-mentioned categorisations. The same tumor can contain adenomatoid, solid and papillary areas. Furthermore, multiple cell types (clear, granulated) can be mixed in the tumor, and it is also not uncommon for bizarre nuclear – higher grade – areas to be present alongside areas of low nuclear grading. Numerous authors have tried to solve the problem of heteromorphism.

Thoenes *et al.* [19] used an “adenopapillary” category besides the adenomatoid and papillary categories. All over the world, the phenomenon of mixing between cell types (clear and granulated) has commonly earned the affixation: “mixed”. Riches [15], Arner [1], Böttiger [3] have grouped the tumor into the category according to cell type, meaning that 80 percent of a cell type is present. In the case of smaller ratios, the tumor falls into the “mixed” category.

The judgement of the above ratio in percentage terms cannot, however, always be correct since a few cross-sections are unable to represent reliably the tumor in its entirety. In addition to all this, it is questionable why 80 percent was chosen as a border.

Heteromorphism therefore can mean a complicated multiplicity of tissue structures, cell types and nuclear grades, and this characterises the tumor. The authors believe that the use of a separate grade system to nominate degrees of heteromorphism is justified. A separate system is created because it indicates the degrees of multiplicity independent of other grading considerations.

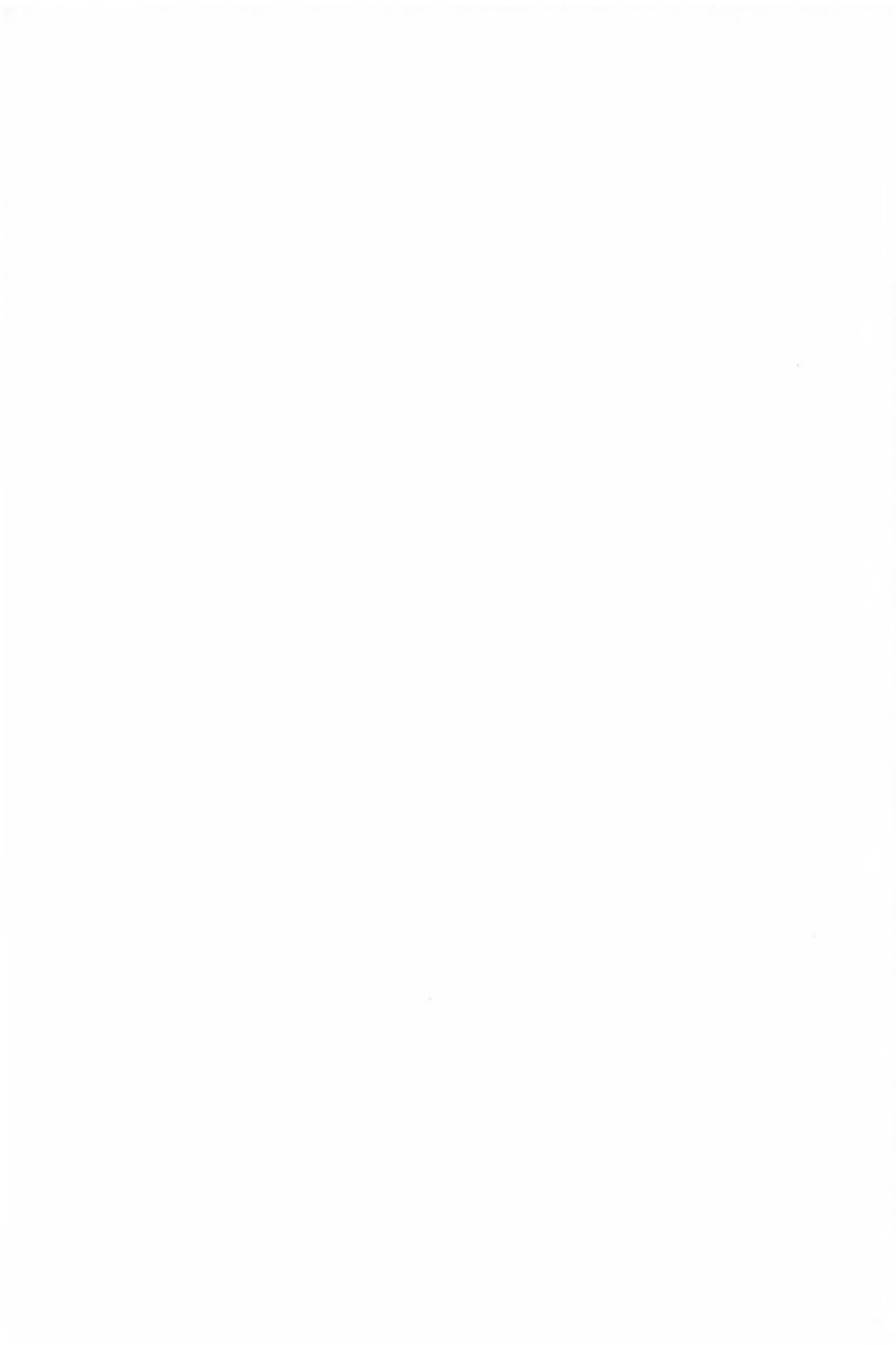
Grading on the basis of the above considerations is suggested because of the following advantages:

1. Routine light microscopic examination is sufficient.
2. The multiple nature of the tumor can be appreciated, independent of other grading systems.
3. The categorisation is unambiguous and correct.

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FORGOTTEN RUBBER DRAIN IN THE ABDOMEN

(Case Report)

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Forgotten rubber drain in the abdomen is a rarely seen situation after the abdominal operations. In this article, a case of “forgotten rubber drain in the abdomen after a liver hydatid cyst operation” was presented. The clinical significance of the case was discussed by surveying all literature.

Introduction

It is a fact that after abdominal operations forgotten foreign objects in the peritoneal cavity could cause rarely seen complications, showing confusing chronic symptoms. These patients may remain asymptomatic long after undergoing abdominal operations. Symptoms such as obscure abdominal pain, nausea, feeling of abdominal discomfort can be seen. In addition to this, forgotten foreign objects can cause various complications like adhesions, intestinal obstruction intraabdominal abscess, peritonitis [1, 2, 4–7].

In this article, a case of cutaneous sinus caused by forgotten drain in the abdomen after a liver hydatid cyst operation was presented.

Case Report

A 26-year-old woman patient came to our polyclinic with complaints of abdominal pain and purulent discharge from abdominal wall. It is understood from her history of complaints that she underwent an abdominal operation with a diagnosis of hydatid cyst in the liver four years ago, and did not have any complaints for three years after it. She had continuous right upper quadrant and epigastric blunt abdominal pain, along with nausea, since one year. In addition, there were a continuous purulent discharge with no cease from the upper right quadrant of the abdominal wall, along this complaints.

Physical examination showed the existence of right paramedian incision scar in the abdomen. A yellowish purulent discharge was flowing from the old drain site in the lateral of the incision scar. In deep palpation, there was tenderness in the right upper quadrant. Other system examinations and routine laboratory analysis were normal.

In the abdominal ultrasonography, there were a mass of regularly edged, heterogeneous in appearance with 5.5×5 cm dimensions in the lateral segment of left liver lobe and a calcified lesion of approximately 2 cm diameter in the anterior segment of right liver lobe.

The result of computerized abdominal tomography was similar like this: a surrounded smooth edged cystic lesion, showing extrahepatic expansion in 4×5 cm dimensions in the lateral segment of left liver lobe and a 2 cm diameter calcified lesion giving the impression of becoming fistulous to the outside, in the diaphragmatic surface of right liver lobe.

The patient has been underwent to operation with a diagnosis of recurrent liver hydatid cyst and for cutaneous sinus exploration in the abdominal wall. The abdomen was entered with a midline epigastric incision, under general anesthesia. A hydatid cyst in 5×5 cm dimensions in the anterior region of the left liver lobe was detected at exploration. 2/3 of the hydatid cyst localized extrahepatically. And, the sinus tractus in the right upper quadrant was going from the probable old drain site to the diaphragmatic surface of the right liver lobe. By exploring this sinus tractus with Ochsner flexible probe, the end point of the sinus tractus was reached. Sinus tractus was ending in a 2.5 cm diameter cavity which was full of pus and surrounded by fibrosis, located at the diaphragmatic surface of the right lobe of liver. In addition, when the mesocolon transversum was lifted, a 15 cm long rubber drain, covered with small intestine and omentum, starting from nearby place of Treitz's ligament going to ileocecal valve was encountered. There was no connection or relation between this drain and the sinus tractus (Fig. 1). After protecting surrounding of the hydatid cyst with hypertonic (15%) NaCl solution soak compresses, the cyst liquid was aspirated. Hypertonic NaCl solution was injected into the cyst. It was aspirated after waiting ten minutes. Aspiration entrance hole was broaden a bit and membrana germinative was removed. Extrahepatic part of the cyst was excised. Intrahepatic part of the cyst was sutured with continuous suture of obliterate cavity of the cyst. Then, the drain forgotten in the preceding operation of the patient under mesocolon transversum was taken out of the abdomen by separating its adhesions with neighbourhood tissues by means of tiny dissections (Fig. 2). Infectious sinus tractus in the right lateral lobe of liver and its outer opening was excised. Infected sinus cavity full of pus; was cleaned with drainage, partial excision and curettaging. At the same time, silk suture remainders of the preceding operation which was present in the cavity was taken out. Following hemostasis, a rubber drain and a penrose drain into the subhepatic space and into the sinus cavity were placed, respectively. The operation was ended. The patient whose postoperative clinic progression had gone on well was discharged from hospital in the postoperative seventh day with recovery.

Discussion

Today, forgotten foreign objects in the abdomen in abdominal operations, even rarely seen are among the problems we are facing in general surgery. Among those foreign objects are gauze sponge, laparotomy pad, various drains or surgical instruments such as hemostats [1–9].

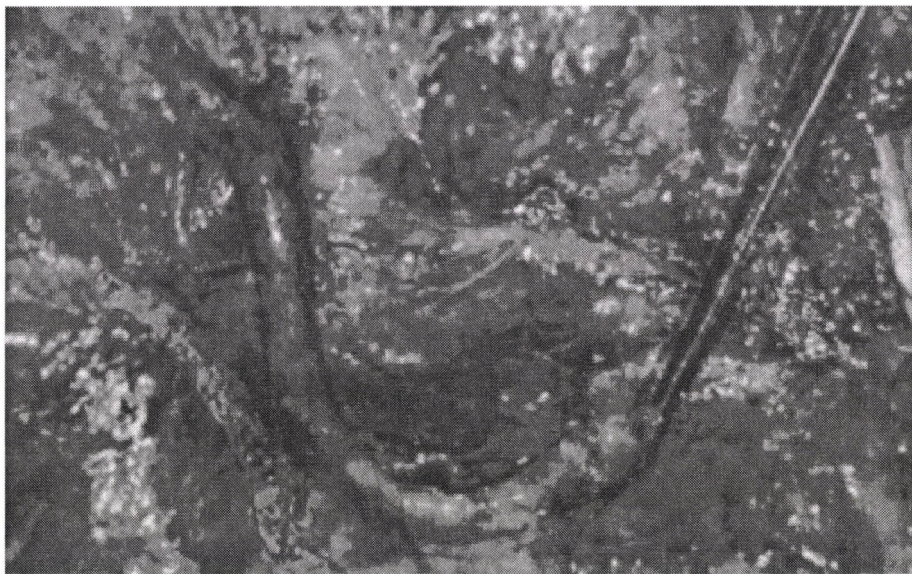


Fig. 1. Forgotten rubber drain in the abdomen under the transvers mesocolon

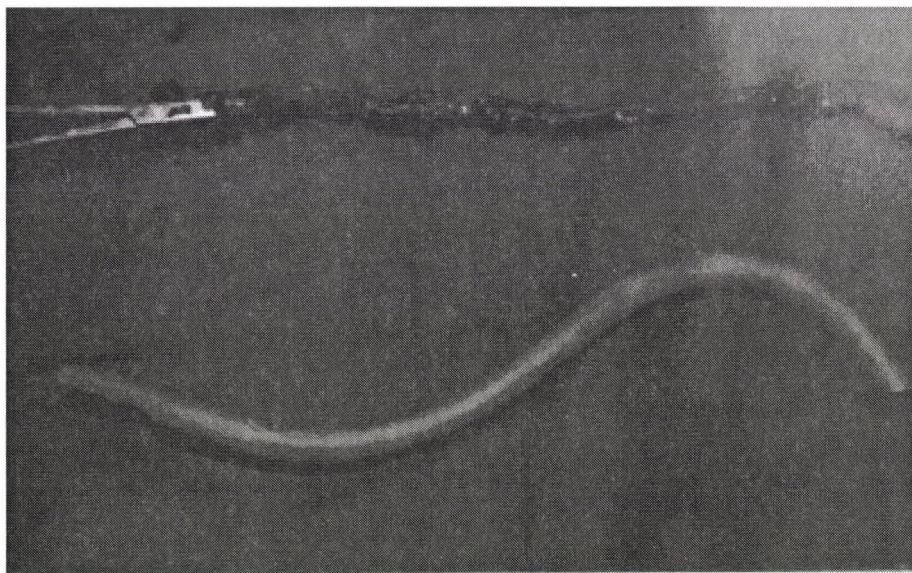


Fig. 2. Forgotten rubber drain in the abdomen after taken out of the abdomen

Forgotten foreign objects in the abdomen may not show any symptoms or they are encountered accidentally in a second abdominal operation or they can occur with various complications, causing different symptoms. Adhesions, intestinal obstruction, abscess formation, intestinal perforation, peritonitis and, fistula are frequently encountered ones of these complications. These complications could appear months or even years after original operation [1–9]. In the case presented here, too, an abdominal pain complaint and a chronic sinus development in the abdominal wall were seen after three years of symptom free period.

Forgotten rubber drain in the abdomen and the complications related to it are very rare cases. Rubber drains, firstly, causes inflammatory reaction around it and then they are surrounded by omentum and neighbourhood organs. This situation manifest itself as chronic abdominal pain and vague abdominal complaints. In this kind of cases, then, an intraabdominal abscess could be developed and after a while, this abscess could cause to fistula [2, 4–8]. For this reason, when has been encountered the patients underwent abdominal operations before, having vague abdominal pain and purulent discharged from the abdomen, such forgotten foreign objects or drains in the abdomen should be taken into account.

The patients' clinic progression turn into a good state after forgotten foreign objects are taken out of abdomen. When the time period between the first and the second operation takes too much, morbidity and mortality increase. It was reported that mortality goes up to 18% for the patients who have foreign objects forgotten in the abdomen a long time [1–9]. In the case presented here, there was a one-year morbidity period after three years of symptom free interval and, a rapid recovery was seen on the patient postoperatively, when the intraabdominal rubber drain was removed and the patient discharged uneventfully in the seventh postoperative day.

All operation team must be alert and careful not to face problems like this in surgery. To avoid drains to go into the abdomen, they must be fixed carefully, and in the postoperative period drain must be pulled by the operating surgeon on as a principle and it must be sure that the drain has been removed completely. Sometimes even though it is rare, drain may be broken off and remain in the abdomen. In our country, it is a fairly common practice that removing the sutures and pulling the drain out are made by assistant health personnel.

We believe that, this kind of wrong practices, may increase such complications and should be abandoned.

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ACTA CHIRURGICA HUNGARICA

VOLUME 38

INDEX

Chest wall deformities. <i>Y. Akçali, H. Ceyran and L. Hasdiraz</i>	1
Bronchopleural fistula after pneumonectomy: A major challenge. <i>K. Athanassiadi, G. Kalavrouziotis and I. Bellenis</i>	5
The role of CT examination in diagnostics and surgery of chronic emphysema thoracis. <i>G. Balogh, J. Mendly, Gy. Horváth and I. Repa</i>	9
Early oesophageal cancer. Does it exist? Why we cannot find it? <i>J. Błaszczuk and A. Adamus</i>	13
Extrapleural bullectomy or lung volume reduction: Air tight surgery for emphysema without strip-patch. <i>A. Busetto, R. Moretti, S. Barbaresco, P. Fontana and V. Pagan</i>	15
Pericardial abscess — A rare complication of sepsis. <i>I. Čapov, J. Wechsler, J. Šumbera, M. Pavlík and V. Jedlička</i>	19
Lung resection for the treatment of severe localised bronchiectasis in cystic fibrosis patients. <i>M. J. R. Dalrymple-Hay, J. Lucas, G. Connett and R. E. Lea</i>	23
Surgery for oesophageal carcinoma in the elderly. <i>M. J. R. Dalrymple-Hay, K. E. Evans and R. E. Lea</i>	27
High frequency jet ventilation in trachea reconstructions — Its advantages in our experience. <i>I. Džuberová, L'. Sabaková, O. Juráková, S. Haruštiak and I. Majer</i>	31
A pitfall with the use of ¹¹¹ In-pentetreotide scintigraphy in the resected bronchopulmonary carcinoids follow-up: A case report. <i>M. Grazia, L. Ansaloni, A. Bini, G. Grani, M. Mastroiilli, D. Pagani, F. Sellitri, F. Stella and R. Bazzocchi</i>	35
Difficulties with CT-guided needle biopsy and VATS, as combined approach for the diagnosis and treatment of peripheral pulmonary nodules: A case report. <i>M. Grazia, L. Ansaloni, A. Bini, G. Grani, M. Mastroiilli, D. Pagani, F. Sellitri, F. Stella and R. Bazzocchi</i>	39
War injuries to the chest. <i>N. Ilić, A. Petričević, S. Tanfara, Ž. Mimica, V. Radonić, A. Tripković and N. Frleta Ilić</i>	43

Limited resection of lung cancer. <i>A. Jackevicius, S. Cicenias and P. Naujokaitis</i> . . .	49
A case of a pulmonary arteriovenous malformation treated by lobectomy. <i>J. Wechsler, V. Jedlička, J. Kerwitzer, J. Novotný, M. Pavlík, A. Peštál and I. Čapov</i>	53
Pulmonary Leiomyomatosis in women after hysterectomy for uterine myoma. Benign metastasizing leiomyoma? <i>M. Kadry, C. Sievers and C. Engelmann</i>	57
Catamenial pneumothorax — 3 case reports and view of literature. <i>M. Kadry, K. Hässler and C. Engelmann</i>	63
Isolated chylothorax after penetrating trauma. <i>N. Karaoğlanoğlu, A. Eroğlu and A. Başoğlu</i>	67
The value of Asamura-Naruke type main bronchus stump closure and pleuro-pericardial flap covering by own method to avoid broncho-pleural fistula (BPF). <i>L. Kecskés, Gy. Bátori, P. Gehér and B. Kiss</i>	71
Five year study on the injury of the great thoracic vessels after penetrating chest injury. <i>S. Sz. Kiss, P. Tóth, S. Kollár, Z. Nábrádi and J. Bóni</i>	75
Videothoracoscopy and muscle flaps in the treatment of bronchial stump fistula. <i>J. Kowalewski, M. Brocki, M. Galikowski and K. Kapron</i>	79
Anterior transsternal approach to the upper thoracic spine. <i>A. Maciejczak, A. Radek, J. Kowalewski and A. Palewicz</i>	83
How should we treat malignant pleural mesothelioma (MPM)? <i>L. Lampl and R. Jakob</i>	87
The position of spiral CT in the complex diagnostics system for pulmonary embolism. <i>J. Mendly, G. Bajzik and I. Repa</i>	91
Predictive value of MRI in lung cancer. <i>T. F. Molnár, E. Juhász, I. Benkő and Ö. P. Horváth</i>	95
Risk of lung resections in patients after inductive chemotherapy of non-small cell bronchogenic cancer. <i>K. Novák and M. Pešek</i>	101
The improvement of arterial oxygenation during one-lung ventilation — Effect of different CPAP levels. <i>M. Pavlík, D. Čtvrtečková, V. Zvoníček, P. Ševčík, I. Čapov and V. Jedlička</i>	103
Penetrating thoraco-abdominal gun-shot wounds procedure. <i>T. Przystasz, E. Stanowski and A. Chmieliński</i>	107
Non-epithelial neoplasmas of the esophagus. <i>T. Przystasz and A. Chmieliński</i>	111
Extensive multiple and lobe-sparing pulmonary resections with the Nd:YAG laser and a new wavelength of 1318 nm. <i>A. Rolle and E. Eulerich</i>	115
Management of corrosive injuries of the esophagus. <i>A. Vereczkei, G. Varga, L. Pótó and Ö. P. Horváth</i>	119
Surgical aspects of gastro-esophageal reflux disease — Indication for surgery — An update. <i>A. Bálint, M. Máté, K. Szabó and L. Romics Jr.</i>	123
Treating morbid obesity with laparoscopically placed, adjustable gastric band. <i>J. Bende, M. Ursu, M. Csizsár and L. Ungar</i>	127
Palliative treatment of malignant pleural effusions by video-assisted thoracoscopic surgery. <i>I. Benkő, T. F. Molnár and Ö. P. Horváth</i>	131

Laparoscopic cholecystectomy in acute cholecystitis. <i>Sz. Bodnár, O. Kelemen, A. Füle, Gy. Kolonics, É. Simon and J. Bátorfi</i>	135
Video-choledochoscopy in bile duct surgery. <i>G. Csáky, J. Bezsilla and D. Tóth</i> ..	139
Sedation for ambulatory endoscopy. <i>K. Darvas, M. Tarjányi, Zs. Molnár, M. Borsodi, Zs. Éles and P. Kupcsulik</i>	143
Sequential treatment of the common bile duct stones and cholecystolithiasis. <i>I. Farkas, Á. Pap and J. Kamuti</i>	147
Video-assisted thoracic surgery (VATS) for the treatment of primary pneumothorax (PTX): Early indications and "blind resection". <i>J. Furák, I. Troján and T. Szőke</i>	151
Video-assisted thoracoscopic pleurodesis for malignant pleural effusions. <i>Á. Füredi, L. Kecskés, P. Gehér and B. Kiss</i>	155
The history and the future of teaching and training of laparoscopic surgery in Hungary. <i>I. Furka, E. M. Gamal, I. Mikó, P. Metzger, J. Sándor, I. Rózsa and J. Kiss</i>	159
Laparoscopic gastric surgery – Early experiences. <i>I. Gál, J. Szívós, A. Bálint, L. Hejjel, I. Győry and B. Nagy</i>	163
Laparoscopic wedge resection of the gastric wall for gastric benign tumour. The collaboration of the laparoscopic surgeon and the endoscopist. <i>E. M. Gamal, Á. Altorjay, I. Szántó, J. Garcia and J. Kiss</i>	167
The judgement of adhesion formation following laparoscopic and conventional cholecystectomy in an animal model. <i>E. M. Gamal, P. Metzger, I. Mikó, Gy. Szabó, E. Bráth, J. Kiss and I. Furka</i>	169
The importance of intraoperative endoscopy. <i>I. Győri, I. Gál, B. Nagy and Gy. Lukács Tóth</i>	173
Jejunum feeding in necrotising acute pancreatitis – A retrospective study. <i>J. Hamvas, R. Schwab and Á. Pap</i>	177
Laparoscopic surgery of focal lesions of the liver. <i>L. Kánya, Á. Botos, J. Bezsilla, I. Szederkényi and D. Tóth</i>	187
Successful thoracoscopic surgical treatment of oesophageal cyst. <i>Gy. Lázár, K. Szentpáli, I. Szántó, Zs. Palásthy and Á. Balogh</i>	191
The role of diagnostic laparoscopy in staging of pancreatic cancers. <i>A. Nagy, G. Pardavi and A. Oláh</i>	193
The laparoscopic technique for bilateral inguinal hernias. <i>A. Petőházi, É. Simon, O. Kelemen, I. Székely and J. Bátorfi</i>	197
New surgical procedures in postgraduate medical education. <i>E. Róth</i>	201
Synchronously performed laparoscopic cholecystectomy and hernioplasty. <i>É. Simon, O. Kelemen, J. Knausz, Sz. Bodnár and J. Bátorfi</i>	205
Laparoscopic adrenalectomy – New experiences. <i>R. Szilávik, J. Horányi, T. Tihanyi, R. Bukovác and K. Darvas</i>	209
Effect of laparoscopic antireflux operation on esophageal manometry, 24 hours pH-metry and quality of life in gastroesophageal reflux disease. <i>G. Varga, Á. Király, M. Moizs and Ö. P. Horváth</i>	213
First Hungarian, internet-based prospective, multicenter study: The hernia-project. <i>G. Weber, M. Kassai, Zs. Csontos, Cs. Czuczor and P. Ö. Horváth</i>	219

The laparoscopic treatment of non-parasitic liver cysts – Five years experience. <i>Z. Zalaba, T. F. Tihanyi, T. Winternitz, L. Nehéz and L. Flautner</i>	221
Corneal transplantation in children. <i>E. Balázs, K. Balázs, L. Takács and A. Berta</i> .	225
An unusual pulmonary perforation case after chest tube placement. <i>G. Yuncu, D. Aykanlı, S. Yaldız, M. Ülğan and H. Alper</i>	231
Relationship between the survival and the clinicopathological parameters of the patients with tumors in the pancreatic head region. <i>Cs. Berczi, J. Bocsi, K. Lapis and Gy. Balázs</i>	235
Surgically treated Hashimoto's thyroiditis. <i>F. Győry, G. Lukács, F. Juhász, E. Mezősi, Sz. Szakáll, T. Végh, J. Máth and Gy. Balázs</i>	243
Fibro-osseous lesion of rib. <i>S. Gürsoy, S. Yaldız, G. Yuncu, M. Ülğan, D. Aykanlı and A. G. Yener</i>	249
Eosinophilic cystitis in view of two cases. <i>F. Szabó, Zs. Simon and G. Arató</i>	253
Two cases of benign tracheo-gastric fistula following esophagectomy for cancer. <i>K. Kalmár, T. F. Molnár and Ö. P. Horváth</i>	261
Clinical nutrition in liver and pancreatic diseases. <i>L. Harsányi</i>	269
Testicular biopsy helping assisted reproduction. <i>E. Erdei, É. Magyar, I. Lellei, J. Rózsahegyi, A. Laki, A. Rusz and Gy. Papp</i>	279
A case of a calcified renal cyst. <i>D. L. Répássy, S. Csata and Gy. Tamás</i>	289
Anatomic variations in patients operated for bladder substitution. <i>Gy. Tamás and D. L. Répássy</i>	297
Eosinophilic cystitis. <i>S. Csata, D. L. Répássy, P. Hazslinszky and B. Járny</i>	303
Comparison of morbidity of lumbar flank approach and transperitoneal approach for radical nephrectomy. <i>D. L. Répássy, A. Bécsi, Gy. Tamás and T. Weninger</i>	311
Metabolic consequences of orthotopic ileal neobladder. <i>D. L. Répássy, A. Bécsi, Gy. Tamás and T. Weninger</i>	321
Isolated urethral amyloidosis (Case report). <i>D. L. Répássy, A. Tankó, T. Weninger, E. Babarczy and Gy. Tamás</i>	329
Heteromorphic grade of renal cell cancer. <i>D. L. Répássy, R. Gaál and J. Sebők</i> . . .	335
Forgotten rubber drain in the abdomen (Case report). <i>A. Gökalp and G. Maralcan</i>	343

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