ABSTRACTS

Results of modified minimally invasive correction of the funnel breast

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60 patients with this chest deformity were subjected to surgical treatment at the Pediatric Surgery Department of the SMZO Danube Hospital in Vienna. 13 patients were treated according to the Ravitch–Welsh–Rehbein method (Method I). At the time of surgery the patients were 12.8±6.3 years old. In 47 cases the minimally invasive procedure according to Nuss (Method II) was used. The patients' age at the time of surgery was 14.5±3.8 years. The minimally invasive method was modified by an additional sub-xiphoid incision with retrosternal preparatory mobilization of the pericardial sac and the sternal portion of the diaphragm. In cases with high-grade asymmetrical or mixed forms a subtotal sternal osteotomy was performed for elevation of the sternum. The duration of surgery was as follows: 3 hrs 40 min±30 min for method I, and 1 hour 42 min±15 min for method II. In method I, one patient had a hemorrhage that needed revision, and necrosis of the skin. In method II, one patient developed a mild contusion of the lower lobe of the lung on the right side (that did not require any treatment) and an infection of the base of the stabilizer plates (Staphylococcus epidermis) occurred in two cases. The infection healed after surgical drainage and antibiotic therapy. Explantation of the bar was needed in one patient with recurrent pleural effusions. Injury to the pericardial sac, the heart, or the large vessels was not observed. Both methods achieved satisfactory cosmetic results. Method II proved to be difficult in older patients (a more stiff thorax), in high-grade asymmetrical funnels and in mixed forms (chicken breast and funnel breast). In these cases the minimally invasive correction had to be completed with additional sternum-osteotomy, partial resection of deformed ribs (cartilaginous portion) or the implantation of two bars.The symmetrical pediatric funnel breast is the ideal indication for the minimally invasive method of correction. The operating time is markedly shorter. The use of a sub-xiphoid incision with mobilization of the pericardial sac and the diaphragm, and digital monitoring during placement of the intrathoracic brace will prevent severe intraoperative complications. Cosmetic results are well comparable with those after Ravitch–Welsh–Rehbein correction.

Modified plate shape provides better stability and favourable cosmetic results in minimally invasive repair of pectus excavatum

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Aim: The minimally invasive repair of pectus excavatum (MIRPE) has become a very popular technique worldwide, though still it holds some significant complications. Namely 5 % of plate displacement cases need reoperation, and overcorrection has occasionally seen by several groups. In order to further reduce these complications, the authors have modified the shape of the plate, which produces a better stability and more acceptable cosmetic outcome.

Method: During the last 3 years 119 patients were operated on using MIRPE technique in 2 Hungarian paediatric surgical units. 95 children were treated with a plate formed according to the original description and 24 with the modification. The middle part of the plate situated behind the sternum was depressed about 15 mm to produce a saddle-shaped plate.

Results: Among the 95 patients using the original technique plate displacement occurred in 6 cases (6 %), whereas none of the 24 children with saddle-shaped plate had this complication. Although the estimation of the cosmetic result is subjective (self/parent satisfactory rate 4.86 on a 5 grade scale) the most often observed pectus carinatum like overcorrection (20 %) has not occurred since the use of the modified shape plate.

Due to the promising early results the authors recommend the use of modification of the saddle-shaped plate for correction of pectus excavatum that solves the problem of instability in a simple way and improves the cosmetic results.

Basel experience of minimally invasive repair of pectus excavatum (MIRPE)

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Purpose: The popularity of minimally invasive repair of pectus excavatum (MIRPE), first reported in 1998 by D. Nuss, has increased dramatically during the last 3–4 years.The fact, that the cartilage resection and midline incision are not necessery,

made this new technique usefull and simple. Anyway some complications were described by different authors. Our retrospective study reports our own experience during the 3.5 years and modifications were made which were based on several complications.

Methods and patients: From February 2000 to August 2003, 30 patients (3 girls, 27 boys) underwent Nuss procedure. The patient's mean age was 16.1 years (10.7 to 20.3 years). Standardized preoperative evaluation included x-ray of the chest with 3D computerized tomography (CT), electrocardiogram with cardiac evaulation, pulmonary function tests, photo documentation and the physiotherapy control.

Indications for an operation was the massive psychological alteration and the fact that the patients were able to decide upon their operation.*Results:* Just once was need two bars to reach a good cosmetic results. Uni- or bi-lateral thoracoscopy was used in all cases. There were 1 case of trapping a left lung lobe under the bar detected intraoperatively by thoracoscopy. Lateral stabilisers were fixed by thoracoscopically placed non resorbable pericostal sutures. An additional small median incision was performed on 3 patients to help to elevate the sternum. In 2 patients (6.6 %) a redo-procedure was necessary due to bar displacement. Postoperative complications occured on 8 patients, (hematothorax or pneumothorax in 6 cases and pericardial effusion requiring no fenestration in 2 cases). Long-term good results were observed in all cases.

Conclusions: The MIRPE procedure is an effective method with elegant cosmetic results. Modifications of the original method can help to decrease the complications rate. Our own intra- and postoperative complications are demonstreted and strategies to their avoidance discussed.

Pectus excavatum: experience with nuss procedure in 91 patients

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Aim: Nuss procedure for pectus excavatum allows correction of funnel chest deformity without any cartilage resection or sternal osteotomy. This report evaluates a single-center experience emphasising initial outcome and complications.

Material and methods: Ninety one patients, 76 male and 15 female, age 5 to 38 years, underwent Nuss procedure for pectus excavatum from January 2000 to Mai 2003.

The median fronto sagital index was in mean 28 (normal chest >36). Decrease in stamina and endurance were reported in 24 patients, psychological or cosmetic concerns in all patients. All patients underwent Nuss procedure with right side thoracoscopy. The bar was fixed in 71 patients with a right side stabilizer and an additional cerclage wire. In 4 patients two bars were implanted.

Results: Operation time was 65 minutes (mean) and hospital stay 8 days (mean). Peridural analgesia was applied for 4 days (mean). As intraoperative complications occurred one heart perforation (thoracotomy and open placement of the bar), four pericardial lacerations, two diaphragmatic lacerations by misplaced thoracoscopy trocars and four intercostal muscle strips. As postoperative complications there were one deep infection including the bar (removal of the bar 3 weeks postoperatively), pleural effusion in five patients (evacuation by punction), dislocation of bar or stabilizer in 5 patients (refixation in 3, removal in 2) and costal erosion in 4 patients.

In most patients correction of the funnel chest was subjectively satisfactory and stamina were unreduced or increased postoperatively.

Conclusion: Minimal invasive correction by Nuss procedure allows correction of pectus excavatum without resection of cartilage or sternal osteotomy with good cosmetic results. Operation time and hospital stay is short. Despite the easy principle of Nuss procedure there are some method and learning curve dependent technical difficulties, which may lead to complications.

Pectus excavatum: 135 patients in 17 years

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Analysis of 17-year period experience with operations for pectus excavatum over the period from 1984–2000 is presented. The age at the time of surgery ranged from 3 y 4 m to 20 y 5 m, mean was 11 y 3 m. In a series of 135 children different approaches were used: Ravitch operation in 25 patients (18.5 %) and modified Ravitch repair with metall bar support in 110 patients (81.5 %). Stabilization of the anterior chest wall was achieved with retrosternal support bar in 67 patients (60.9 %) and presternal metall strut in 43 patients (39.1 %). Because of developing progressive sagging in later years after pectus excavatum correction in spite looking excellent at the operation table, authors tried to eliminate it, by elevation of perichondrial sheaths during surgery. They compare the results of different approaches of pectus excavatum repair in 84 investigated patients (62.2 %) and evaluate complications.

Our experiences in treating the congenital deformities of the thorax

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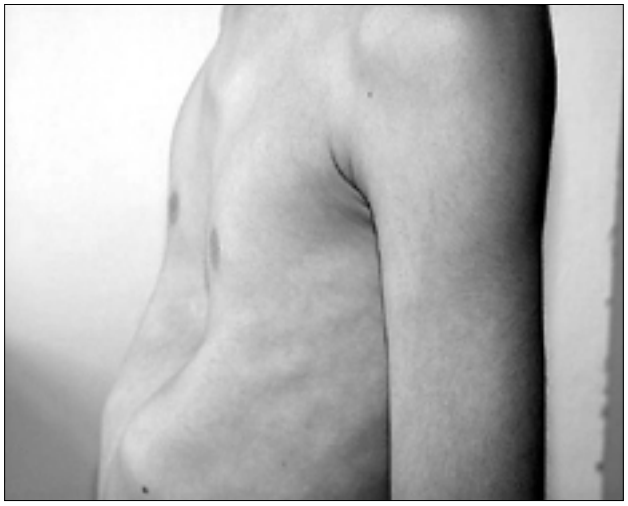
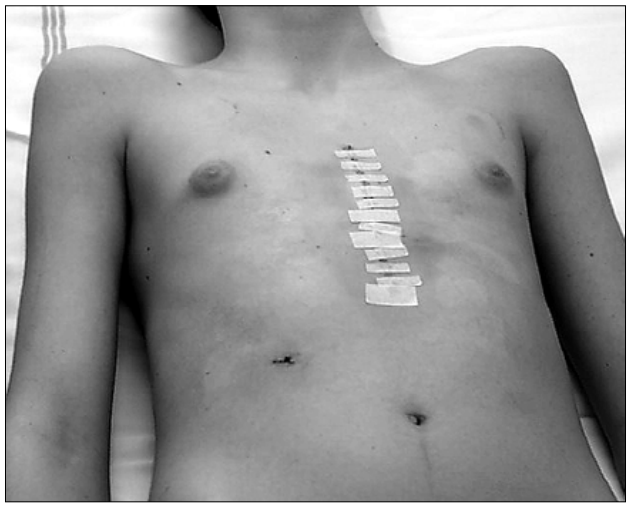
Congenital deformities of the thorax are relatively frequent anomaly by children. There occurs 1 per approx 400 childbirths. There is 5-times frequenter by boys than by girls. Most of the patients have no clinical condition. Rest of them can have various symptoms. There are various modifications used in the surgical treatment using the intra-thorax reinforces (metal bar) or without them. The latest mini-invasive approach is that according to Nuss.We present 11 patients (9 boys and 2 girls) with the congenital deformity of the thorax by whom we performed corrective surgery during the period of years 1997 to 2002. 10 patients were operated for pectus excavatum. We always used unified procedure and retro-sternal splinting by the means of Jansen's splint. 1 patient was operated for pectus carinatus by the





means of technique according to Ravitch, without splinting. Pre-operative preparation was made in accordance with the unified algorithm. Average of the patients was 11.09 years (7 to 16 years). Antibiotics were given during the average period of 7 days (6 to 10 days). Average stay in hospital lasted 12 days (8 to 16 days). We did not give any blood transfusion. *Pre-operatively we recorded associated diagnoses:* prolapse of the mitral valve, restrictive ventilation malfunction, deviation of the point of the heart, scoliosis, frequent respiration infects, imunodeficiency, gynaecomastia, tachycardia. Patients spent 2 to 3 days in the ICU after the surgery was made.3 patients had hypertrophycal scar. We did not record any other complications.

Simultaneous operations on congenital heart defects and chest wall deformities

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Introduction: In children affected chest wall deformities often co-exist with congenital heart defects that require surgical correction. Both operations could be performed simultaneously.

Patients and methods: The analysis of 35 (1968–2002) years with 853 patients with different chest wall deformities was performed. There were 504 (59.1 %) of them pectus excavatum, 342 (40.1 %) – pectus carinatum, 7 (0.82 %) – Poland's syndrome. In 14 (1.6 %) patients Marfan's syndrome was diagnosed. Apart from these 14 patients, 4 (28.6 %) more were examined for severe Marfan's syndrome.

Results: 4 (0.0468 %) patients were operated simultaneously for congenital heart disease and for chest wall deformity. 3 patients had pectus carinatum deformation, and one patient pectus excavatum. Parasternal thoracotomy for correction of the heart disease was performed for all 4 patients. Internal fixation of sternum with metallic bar was used for patient with pectus excavatum. For 2 patients (14.4 %) with pectus carinatum typi-

cal Ravitch–Handelsman operation were performed. One patient died before operation due to severe congenital heart disease.

Conclusions: 1) Time of simultaneous operation must determinate cardiologist based on status of congenital heart disease. 2) Internal fixation with metallic bar is desirable for correction of funnel chest in children with Marfan syndrome, because of requirement of long stabilisation. 3) Typical Ravitch–Handelsman operation is proper operation for children with pectus carinatum.

One-day surgery in neonates with patent ductus arteriosus and extremely low body weight (≤1000 g)

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Aim: Patent ductus arteriosus (PDA) is a serious problem in preterm born infants with extremely low body weight. The pharmacological closure of PDA is often ineffective in these patients. We present 53 neonates with body weight below or equal to 1000g operated on PDA between April, 1998 and May, 2003.

Patients and methods: 53 neonates or infants (32 male and 21 female; median gestation time 26.14±2.12 weeks) with body weight ≤1000 g were operated on patent ductus arteriosus between April 1, 1998 and May 10, 2003. The patients' mean body weight was 817.79±133 g (range 600–1000 g). From January, 2000 a perioperative protocol for one-day surgery was introduced. After the procedure patients were transferred immediately to neonatal pathology departments.

Results: Ligation of PDA with one or two ligatures through left thoracotomy was applied in all cases. The macroscopic signs of respiratory distress syndrome grade III or IV were observed in 32 cases (60 %). Ligation of PDA resulted in short-term significant (>25 %) elevation of blood pressure in 32 patients (60 %). There was no postoperative mortality closely related to surgery. None of patients required re-intervention because of persisted PDA blood flow.

Conclusions: Surgical closure of patent ductus arteriosus is a safe method which minimises respiratory dysfunction syndrome and greatly improves pulmonary function. It can be well applied in one-day surgery but requires close co-operation between surgeons and neonatologists.

Surgical correction of complex high-grade thoracic dysplasia

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High-grade complex thoracic dysplasias may be accompanied by marked instability of the thorax, which greatly impairs the mechanics of respiration. The consequences are long-term respiration, followed by very poor life expectation. Surgical correction of these rare and previously inoperable dysplasias is performed with the goal of stabilizing the thorax and achieving complete weaning from the respirator.

We report surgical correction in several steps in a neonate (born in the 36th week of gestation, 2570 g) with high-grade unstable thoracic dysplasia. The infant also had a pelvic kidney on the right side, an ostium secundum defect (ASD II), a muscular congenital fibrous type I disproportion, and hexadactyly. For achieving stabilization of the ventral thorax we constructed special rib implants, which were then produced by a commercial manufacturer (Mathys Company). Primary fixation of the dysplastic sternum was achieved with 2 mini-apertured plates. In a second operation, the newly constructed implants were anchored within the spongiosa of bone at two selected secure rib rudiments in the lower circumference of the thorax. Both artificial rib implants were fixed with screws at the level of the sternum, crossing each other ventrally, and were mutually connected with a cross strut. Both the sternum and the lower aperture of the thorax (insertion of the diaphragm) were fixed to this construction. In addition, the wide intercostal spaces were stabilized with Gore patch plasty.

As numerous attempts to wean the patient from the respirator (even after placement of a tracheostoma at the age of 4 weeks) had failed, primary stabilization was achieved by fixing mini-apertured plates at the sternum along the missing ventral portion of the costal arch. Subsequently, in a separate operation performed via a lateral thoracotomy, the ASD II was corrected.

After dislocation of the mini-apertured plate that occurred 5 months later, a repeat thoracoplasty was performed and specially constructed metal ribs were implanted. The ribs were an-

chored in the bony portion of the lowest rib rudiments. As the infant's body grew, chest extension plasty was required after 8 months. In other words, the ventral screw fixation in front of the sternum had to be shifted to the appropriate holes. By this procedure, the patient could be fully weaned from the respirator. Since the age of 9 months the patient is being treated at home.

High-grade unstable thoracic dysplasia could be treated with specially constructed rib replacement implants, such that the patient could be weaned from the respirator and treated at home.

367 cases of esophagial atresia – a multicenter review for prognostic relevant factors

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Introduction: During the last twelf years the influence of factors, as prematurity and low birth weight, that affected the outcome have decreased. Survival and quality of outcome has remarkably improved due to developments in neonatal care with total parenteral nutrition and ventilatory support techniques, surgical technique and nursing. This paper looks at various aspects of esophagial atresia with reference to mortality in an attempt to define parameters influencing the outcome.

Methods: The registry for esophagial atresia was instituted in 1996 and supported financially by the Ludwig Bolzmann Institute, Vienna. Three hundred sixty seven charts of neonates presenting with esophagial atresia were reviewed between 1960 and 2002 and treated in the following eight Austrian clinics: All University clinics: Vienna, Innsbruck, and Graz; pediatric hospitals of Vienna (SMZ Ost- Danube Hospital, Mautner-Markhof, Preyer, and Glanzing), the general hospital of Linz. The patients data were reviewed with regard to antenatal diagnose, mode of delivery, maternal age, birth weight, gestational week, male/female ratio, coexisting malformation, method and number of surgical repair, surgical and medical complication, and mortality. All data were checked by an unpaired t-test and were also correlated to the mortality by single and multiple regression. Calculations were carried out by using a Stat View software (Abacus Concepts, Berkeley; CA, USA).

Results: Associated malformations in patients with esophagial atresia were present in 197 cases (54 %):

Ninety two cardiovascular malformations (48 %), seventy anointestinal malformations (36 %), sixty musculoskeletal malformations (30.5 %), sixty genitourinary malformations (30.5 %), thirty nine head and neck malformations (20 %), twenty seven mediastinal malforamtions (14 %), twenty three chromosomal malformations (12 %), ten pulmonal malformations (5 %) and six diaphragma hernias (3 %).

Ninety nine patients (50.3 %) presented only one associated anomaly, 27 % two and 23 % more than three associated malformations.

Esophagial atresia was treated with primary end-to-end anastomosis in 252 cases (69 %). A esophalgeal replacement was performed in 11 cases (3 %), 3 patients (0.8 %) with esophageal atresia died before correction of the defect. Significant postoperative complications in the esophageal atresia repair were cardiorespiratory insufficiency (n=16), pneumonia (n=99), stenosis (n=33), leak of the anastomosis(n=37).

Conclusion: Early gestational age and low birth weight significantly correlate with higher incidence of associated malformation, especially cardiac malformations.

In the last 12 years mortality of the patients with esophagial atresia decreased from 41 % to 30 % for patients with associated malformations and from 27 % to 9 % for patients without associated malformations.

An unusual cause of respiratory failure

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There are various etiologic factors of respiratory insufficiency in children. Malatic processes in the trachea belong to one of them.

Authors describe unusual course of respiratory failure in a child who underwent an operation for esophageal atresia Voght 3b as a newborn. The child also had congenital heart disease – VSD, PH, WPW sy, and verified GER on conservative therapy. The child suffered from recurrent respiratory infections during 1st year of age, with minimal weight gain. Respiratory infection with global respiratory failure in the age of 13 months required long term mechanical ventilation, with NO therapy due to severe

PH as well, without satisfactory effect. Recurrent attacks of inspiratory stridor ocurred after extubation with the need of nasal reintubation eventually. Direct tracheoscopy and lungs CT scan finds tracheal stenosis in the middle part of the trachea at Th 2–3 level. Trachel lumen reduced to one-half. Desaturation with intubation occured 10 hours after realization of tracheostomy was completed. During sternotomy and revision indicated for this condition malatic changes of the trachea in the very location of the previous tracheoesophageal fistula were found and reconstructive surgery performed. The child is wearing a permanent tracheal tube.

In the age of one and a half years fundoplication and reconstruction of pylorus due to massive GER was performed and the child has been prospering well since.

Bilateral congenital chylothorax

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Accumulation of chyle in pleural cavity is a common cause of fluidothorax in neonates. This congenital chylothorax is caused by malformation of the thoracic duct, tracheoesophageal atresia or lymphangiomatosis/lymphangiectasia – without history of birth trauma. The second category is traumatic chylothorax – its causes are nonoperative or operative injuries. Finally, in older children occurs nontraumatic chylothorax caused by predisposing disease (neoplasm, inflammatory disease) or when the cause is unknown we use the term spontaneous chylothorax.

Rapid accumulation of chyle leads to dyspnea and respiratory problems. Chronic loss of chylus causes malnutrition, fluid and elektrolyte imbalance and immunodeficiency.

Diagnosis is established if the triglyceride level is more than 110 mg/dl and there is a presence of chylomicrons in pleural fluid.

Therapy of chylothorax consists of pleural drainage with dietary restriction of fat. The drainage may be performed by thoracocentesis or tube. Essential are medium-chain triglycerides or fasting and TPN. Conservative therapy is successful in 75 to 90 % of patients. If there is no improvement in 2 weeks and the amount is more than 15 ml/kg/day surgical treatment is indicated. Surgery provides several options such a ligation of leaking lymphatics and thoracic duct, pleurodesis or pleuroperitoneal shunts. Some of these procedures can be done by thoracoscopy.

Authors present case report of bilateral congenital chylothorax.

Idiopathic chylothorax in a newborn

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Case report of a baby-girl who on 6 th day of life (DOL) developed sudden dyspnoe and cyanosis. Ultrasonography and chest X ray revealed right sided fluidothorax. Repeated thoracentesis in local hospital failed to solve pleural effusion. On 9 th DOL baby was transfered to our department. Tube thoracostomy was introduced and chylus was confirmed on analysis of plerual fluid. Secretion gradually ceased and tube was removed on 18 th DOL. Contrast oesophagogram and CT scan disclosed no underlying pathology. Baby was discharged on 23 rd DOL in good health and no problem was noticed on follow up.

Octreotide treatment of posttraumatic chylothorax

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Accumulation of chyle in the pleural space is in 25–28 % as posttraumatic complication. Conservative management consists of decompression by thoracocentesis, oral fat resctricted diet or total parenteral nutrition. Thoracic duct leak closes spontaneously in

near 50 %. Surgical intervention include thoracic duct ligation, pleuroperitoneal shunt, pleurodesis and at last pleurectomy. Octreotide seems to be a new option in conservative management of chylothorax. We reported our experience using octreotide in therapy of chylothorax in 4 year old girl. She was poisoned by kitchen gas. Thoracic duct was disrupted by compressions of the thorax during massive resuscitation. Total parenteral nutrition reduced chyle production to right hemithorax. Subsequent surgical ligation of thoracic duct was not successful due to anatomic variation – accessory tributary of thoracic duct (documented by lymphography). We continued in conservative treatment with use of octreotide. Initial dose 3 mcg/kg/h – intravenous application was changed to 3.75 mcg/kg/12 h subcutaneous app. (facial flush and tachycardia after i.v. app. wrere occurred). This therapy led to reduction and finally cessation of chyle production within 20 days. In conclusion it seems that octreotide has an effective action in the treatment of chylothorax although informations concerning its use in pediatric patient are limited.

Spontaneous pneumothorax in neonate with subvesical obstruction.

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Spontaneous pneumothorax occurs more frequently in the newborn period than at any other time in childhood. Term babies are affected more often (64 %); however, premature infants are more susceptible to the disease. Spontaneous pneumothorax occurs in 1 % of infants delivered vaginally and in 2 % of infants delivered by cesarean section. Virtually, in almost all cases, the pneumothorax has been resoluted without sequelae and in fact without the condition being diagnosed. Symptomatic pneumothorax occurs in 1>1500 live births. The highest incidence of pneumothorax (6–10 %) is in mechanically ventilated neonates. Infants requiring ventilatory assistance and those with meconium aspiration have a particularly high risk of tension pneumothorax. Many procedures performed in intensive care or emergency units can result in an iatrogenic pneumothorax and tension pneumothorax. Cannulation of central veins, cardiopulmonary resuscitation, hyperbaric oxygen therapy may serve as examples. Pneumothorax in the neonate may occur either in association with hyaline membrane disease, renal malformation, Potter's syndrome and cystic fibrosis or in the absence of any of these precursors.

Authors present a case of a female neonate with oesophageal atresia, anorectal and genital malformation and subvesical obstruction. Respiratory failure requiring arteficial ventilation developed soon after birth. Oesophageal reconstruction was performed succesfully. Subvesical obstruction required epicystostomic catheter insertion. In the early postoperative period bilateral spontaneous pneumothorax occured and chest tubes placement was necessary.

Infants with subvesical obstruction may seem to have diverse and unrelated symptoms when, in fact, the clinical findings are all related to the primary effect of urinary obstruction during various stages of early growth. In some, prenatal urinary obstruction leads to such severe oligohydramnios that the fetus is stillborn. Others, somewhat less affected, are born alive but have severe respiratory distress from hypoplastic (stiff) lungs and die of respiratory problems. Still others can be associated with massive ascites and urinomas, and be stillborn or die soon after birth. In less severe cases the neonates may have unexplained respiratory distress with pneumomediastinum or pneumothorax as the only indication of obstructive urologic disease with deficient urinary output.

We conclude that detailed urologic and nephrologic evaluation is indicated in newborns with unexplained spontaneous pneumothorax.

Congenital parenchymatous pulmonary lesions (PPL) – a plea for a clear concept of pathogenesis and treatment

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Objective: Congenital parenchymatous lung lesions (PPL) have been increasingly recognized with the improvement of antenatal ultrasound. PPL are detected in earlier stages of pregnancy, and sequential scanning to delivery provides an opportunity to observe the natural course and in utero evolution of the anomalies.

The objective of this study is to present longitudinal observations in antenatally detected parenchymatous pulmonary lesions (PPL), particularly pulmonary sequestration (PS) and cystic adenomatoid malformation (CAM).

A wide range of questions concerning nomenclature, classi-

fication, reliable features of ultrasonography, prognostic indicators, treatment options, likely reasons for surgical intervention, and the outcome of treatment will be covered.

Methods: Fetuses found to have a PPL on prenatal ultrasonography (US) were included in this study and followed-up until delivery. In all newborns radiographs and computerized tomography (CT) studies of the thorax were performed. Applied surgical procedures included sequesterectomy, lobectomy, segmentectomy, and non-anatomic resection. The prenatal sonograms, postpartum chest radiographs, and CT scans were correlated with clinical signs and surgical or pathological findings.

Results: Over a period of six years, routine prenatal US revealed suggestion of PPL in a series of 35 consecutive fetuses. Pregnancy was terminated or the fetuses suffered fetal demise in six cases. Another four fetuses became symptomatic in utero (e.g. hydrops, hydrothorax or polyhydramnios). Postpartum these infants required resuscitation and treatment in the intensive care unit.

In eleven patients, US findings were considered to demonstrate spontaneous resolution of the lesion, but disappearance without sequelae could be confirmed only in six infants. Five infants were shown to have persistent PPL, which were well depicted on postpartum CT scans. These infants underwent resection of the lesion within the first year of life.

In eleven fetuses PPL were continuously demonstrated during pregnancy with only slight changes in size and structure. Postpartum the infants were asymptomatic and were subjected to a systematic plan of diagnostic work-up and treatment. In nine of these infants surgical procedures were performed uneventfully and revealed a large number of hybrid type lesions (n=5).

In three infants, the primary diagnosis of PS or CAM had to be corrected during the diagnostic and therapeutic work-up.

Conclusion: Advancements in prenatal US have shed a new light on the natural history of congenital parenchymatous pulmonary lesions. The natural history has been shown to be dynamic and variable. Infants with PPL present a wide range of clinical severity as well as sonographic and radiological features. Previously applied concepts regarding the pathogenesis, diagnosis and treatment of PPL will be modified in the future. To overcome the uncertainty as to how these malformations should be described, we propose a reappraisal of the nomenclature.

Multidetector computed tomography (MD-CT) in the evaluation of antenatal diagnosed parenchymatous pulmonary lesions (PPL)

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Introduction: With improvement of fetal ultrasound the number of PPLs diagnosed antenatal has increased, whereas the postnatal chest radiogram often is unremarkable. Aim of this study was to evaluate the value of low dose MD-CT in the assessment of antenatal diagnosed PPL.

Material and methods: 17 children (10 boys, 7 girls) with a mean age of 389 days in whom fetal ultrasound suspected a PPL underwent low dose MD-CT with a 4-row detector system (Siemens). Images were reconstructed in the axial and coronal plane. If necessary a reconstruction of the aorta was performed.

Results: In 1 (6 %) child chest radiogram revealed a mass in the left paramediastinal space, the remaining chest radiograms were normal. In 11 (65 %) a PPL was diagnosed with MD-CT: in 8 (47 %) a cystic adenoid malformation and in 5 (29 %) a pulmonary sequestration was found. A combination of cystic adenoid malformation and pulmonary sequestration was seen in 2 (12 %). In 5 (29 %) cases a feeding artery from the aorta was depicted.

Discussion: Low dose MD-CT is of great value in exclusion and depiction of PPL, diagnosed with fetal ultrasound, before a clinical manifestation occurs, and can help to determine further therapy.

Fetal magnetic resonance imaging (MRI) in the diagnosis of congenital chest malformations

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Purpose: To evaluate the role of fetal magnetic resonance (MR) imaging for diagnosis of fetal chest lesions and to determine if MRI provides information for planning perinatal diagnosis and treatment.

Methods: Nineteen fetuses with ultrasound diagnosis of suspected thoracic malformation underwent MRI 1–2 times between the 19th and 38th gestational week (GW). Using a 1.5 Tesla Philips machine equipped with a phase array syncardiac coil, T2 and T1 weighted, fluid attenuated inversion recovery (FLAIR) and equilibrium angiography sequences were acquired in three planes (slice thickness 3–5 mm). Using these ultrafast sequences sedation of mother or fetus was not necessary.

Results: Ten fetuses presented with congenital diaphragmatic hernia (CDH), 9 left-sided.

They showed a mediastinal shift to the contralateral side, the topography of the heart and great vessels could be visualized. The herniated viscera (intestines, stomach, and liver) could be distinguished by their "configuiration" and their characteristic signals on the respective sequences. In particular, the presence or absence of liver herniation could be ascertained and its extent determined. The compressed ipsilateral lung could be assessed with regard to its size and signal intensity.

In 4 cases the ultrasound diagnosis of cystic adenomatoid malformations (CAM) could be confirmed. Based on the different structure and signal intensities the type of CAM could be determined and demarcated from normal lung tissue. Associated hydrothorax was found in two instances.

Other malformations encountered were subdiaphragmatic lung sequestration, lung cyst and neuroblastoma.

Discussion: In all cases MRI information was more detailed than ultrasound. The large field of view allows imaging the whole fetus. In addition, the combination of sequences allows accurate delineation of organs and demonstrates their topographical relationships clearly. Thus, fetal MRI might provide the pediatric surgeon with information necessary for planning postnatal surgery. Since fetal survival after birth is greatly dependent on the development of the lungs, information on pulmonary growth is important. Beside the size of the fetal lungs and their signal intensities, MRI also supplies information on lung maturation as evidenced by the signal changes seen on different sequences.

Unusual neck and periauricular masses: the first branchial cleft anomaly

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Background: Malformations of the first branchial cleft are uncommon and only sporadic reported in the literature. They may be present as a swelling or inflammatory opening on the neck, bland cysts or fistula associated with the external auditory canal. In this retrospective study, clinical features, diagnostic and therapeutic pitfalls are described in 7 pediatric cases.

Patients and results: Between 1999 and 2002, duplication of the external auditory canal were diagnosed in seven patients aged from 7 months to 10 years. Two infants had mass in external canal, one had fistula. One girl had two skin canal, both were blind ended. Three children had clinically swelling or abscess formation with persistent drainage after incision. All patient were treated surgically.

Conclusion: First branchial cleft malformation may be unrecognized or may be mistaken for tumors or other inflammatory lesions in the periauricular region. Surgical treatment might then be inadequate leading to recurrence or secondary infection. The distinct clinical feature, which can be derived from embryologic development, usually lead to the correct diagnosis and favorable surgical treatment.

Thymic cyst – an unusual childs neck swelling

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Background: Thymic cyst — clinical symptomatology could by described as unrecognisable painless swelling of children's neck, witch is not able to diagnose before surgical exstirpation. Up to 2002 there were about 100 publicated cases with asymtomatic course. The cyst occurs along the thymofaryngeal duct — from the angle of mandible down to upper mediastinum.

Child's neck swelling may be caused by lateral cyst originated from branchial arch, lymphonodopathy, lymphangioma or hemangioma, cystis colli mediana, thyroid gland cyst or parathyroid corpuscles, aberant or ectopic thyroid gland, struma, laryn-

gocele, patollogicaly changed salivary gland, parapharyngeal abscess or phlegmona, neck teratoma. Other reasons for neck swelling are benign tumours as dermoid, epidermoid, neurofibroma, lipoma and lymphoma and malignant tumours as sarcoma or lymph node metastasis.

We couldn't find any information about preoperatively diagnosed thymic cyst, but we have to take this possibility into account in each child with neck swelling of unclear origin.

Patients and results: The authors present two cases of this type of child's neck swelling. The first patient was admited to the hospital as possible lymphoma and the second child had swelling very similar to that one known by lymphangioma. Radiology reveal cystic formation suspicious of abscedenslymph node. Polycystic formation filled with pellucid, brownish liquid was found by the authors peroperatively. Thymic cyst was diagnosed by histological examination.

Conclusion: Definitive diagnosis is based only on histology. The possible therapy is surgical removing of the cyst.

Pulmonary hydatid cysts in children – our experience

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The paper presents an experience of 20 years. We review 210 cases of pulmonary hydatid cysts, operated in the Department of Pediatric Surgery — „M.S. Curie" Children Hospital, Bucharest, representing 67 % of all surgical pulmonary refered pathology. The patient's age ranged from 1 year, 7 months to 16 years old.

In 46 % of the cases the lung cyst was solitary and in 31 patients both lungs were affected. Other associated localizations are mentioned: liver, splenic, renal, cerebral and peritoneal.

In 24 cases we performed cystectomy; the rest of patients underwent cystotomy associated with removal of the membranes and drainage of the restant cavity as well as of the pleural cavity. Only one patient died on the operating table, from a cardiac arrest, having multiple hydatid cysts localizations: 7 in the right lung, 4 in the left lung.

Conclusions: In the majority of the cases the diagnostic was made by plain x-ray examination indicated for respiratory tract infections.

We performed surgical treatment in all cases through thoracotomy without rib resection.

In all cases of associated liver and right pulmonary cysts we used thoraco-freno-laparotomy approach.

The well known pathology due to the remaining cavity met in adult cases represents an exception in children.

Spontaneous regression of a posterior mediastinal tumor

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This is the report of a patient with a large cervico-mediastinal tumor that regressed spontaneously 4 weeks after its discovery. The 7-year-old boy was admitted with cough and fever. Chest x-ray showed a large mediastinal mass which displaced the trachea to the right. The following investigations: esophagogram, computed tomography (CT) and magnetic resonance imaging (MRI) revealed the large, longitudinal mass to be in the posterior mediastinum. The mass was well delineated and consisted of solid and cystic components, extending from the hypopharynx, para- and retroesophageal, until below the bifurcation of the trachea. The esophagus and the trachea, were pushed to the right and ventrally, but no esophageal obstruction was seen. A more precise diagnosis was not possible and surgical resection was intended. The CT 24 h prior to the operation showed a marked decrease of the tumor. The operation was canceled and an esophagoscopy performed: the suspected enteric duplication was not found, but a white-yellow polyp-like lesion 2.5/1 cm in the middle of the esophagus. Biopsy of the tumor showed a lesion with similar histologic appearance as a non Langerhans cell-histiocytosis. Eight months later the mass had disappeared on MRI. The patient was controlled 5 6/12 years after hospital discharge: he had no complains, chest x-ray was normal.To wait and simply closely follow the non malignant and otherwise not precisely defined tumor may be sometimes the correct "therapy".

Mediastinal teratomas

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Background: Mediastinal germ cell tumours account for approximately 20 % of all mediastinal neoplasms in pediatric patients. Thoracic teratomas are almost always located in the anterior-superior mediastinum and occur in all age groups from newborns to adolescents. Symptoms range from acute respiratory distress to a chronic cough, chest pain or wheezing.

Methods: A retrospective review of all pediatric tumours registered on the Salzburg Land Tumour Registry over the last 5 years revealed two girls with respiratory distress and a jugular mass who were admitted to the Pediatric Center in Salzburg. The younger girl (12 y) had to be acutely intubated, the older one (15 y) complained of respiratory distress in the supine position. Chest radiography demonstrated a well-demarcated mass in the upper mediastinum and unfortunately even CT of the chest could not differentiate the definitive diagnosis.

Results: Intraoperative frozen-section histology showed inflammatory changes of the tumour capsule with no signs of malignancy. Immediate operative removal of the tumour was indicated in both cases. Total resection was performed through a collar incisional approach coupled with a partial sternotomy. In both cases, histology revealed a mature teratoma requiring no further treatment.

Conclusion: The diagnosis mediastinal teratoma should be considered with tumours arising in the upper anterior mediastinum/lower neck. Imaging studies may show the tumour to be inhomogenous or even cystic. The differential diagnosis includes: lymphoma, lymphangioma, other germ cell tumours, thyroid tumours or neuroblastoma. In the case of acute upper airways obstruction, immediate surgical intervention is mandatory.

A rare complication of perforated appendicitis – appendico-bronchial fistula

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A case of a 10 year old girl with an appendico- bronchial fistula as a never described complication of appendicitis is presented.

A 10-year-old girl presented with a 14 days history of fever, vomiting, abdominal pain and diarrhoea. Two days after onset of a cough with purulent expectoration and severe dyspnea the child was taken to the pediatric intensive care unit. She was found to be in septic shock and multiple-organ failure. Profound intensive care treatment was started (aggressive fluid resuscitation, catecholamines, high frequency ventilation, continuos veno-venous haemodiafiltration, antibiotic therapy with tazobactam/piperacillin). Ultrasound examination and CT scan revealed a subphrenic cyst 8 cm in diameter and an appendiceal mass in the right abdomen. At laparotomy the inflamed appendix showed a perforation into the right colon and a subphrenic abscess. An ileocecal resection with end to end anastomosis, lavage and drainage were performed. Immediately after the closure of the abdomen the respiratory support had to be increased and a lot of air leaked from the abdominal drains. The girl underwent a right sided thoracotomy, where a 6 cm large diaphragmatic defect and a lung abscess in the basilar segments of the right lower lung lobe were found. In spite of the acute inflammation of the diaphragma, the diaphragmatic defect had to be closed due to its size with a titan-coated-prolene mesh. A segmental resection of the lower lobe with preservation of the apical segment was performed. Two days later persistent air leak required a re-thoracotomy during which the apical segment of the right lower lobe had to be resected. Bacteriological findings of abdominal and thoracical secretion showed the following spieces: E. coli, Bacteroides. Two weeks postoperatively markers of sepsis increased and antibiotic therapy was changed to imipenem, fosfomycin and fluconazole. This treatment led to the resolution of the sepsis syndrome and the child was discharged in good condition 5 weeks later.

Internal jugular venous aneurysms: presentation and therapy

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Purpose: The differential diagnosis of the anterior neck mass includes pharyngocele, laryngocele, superior mediastinal cyst or tumour and the venous aneurysm. Internal jugular vein aneurysms usually congenital present particular problems in management. The surgical therapy is controversial. Cosmetic appearance and prevention of possible complications (thrombosis, pulmonary embolism) are the reasons to operate on these patients.

Material and method: 4 patients all boys with unilateral jugular venous aneurysms have been surgically treated. The age ranged from 10 months to 8 years. The lesions involved the right side in 3 cases and left side in 1 case. Patients' symptoms were an anterior neck mass in all associated with pain in 1 patient. The swelling appeared mainly during straining especially in crying or on Valsava manoeuvre. The first case required angiographic studies for final diagnosis. Ultrasonography confirmed the diagnosis in the last 3 patients. The aneurysm was fusiform (up to 4 cm in diameter) in 3 cases and saccular (5 cm in diameter) in 1 case. Various operative techniques were used: tangential venorraphy with (1 pt) and without (1 pt) aneurysm resection, venous ligation with aneurysm resection (1 pt) and banding with marlex net (1 pt). Histology showed vascular dysplasia rather of congenital origin.

Results: No postoperative complications were seen in these patients. The shortest follow-up period accomplished 3 years.

Conclusions: According to the literature as to our cases the aneurysm mostly involves the right jugular vein. Ultrasonography seem to be the standard imaging for diagnosis of jugular venous aneurysm. Some patients may need a dynamic magnetic resonance imaging. Cosmetic and psychological considerations, and potential complications like aneurysmal expansion and thrombosis are the arguments for surgery.

Morbidity in misdiagnosed patients with congenital vascular lesions in childhood

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Abstract: Confusing nomenclature of congenital vascular lesions is responsible for improper diagnosis and inappropriate treatment. The retrospective analyze of 139 patients shows high incidence of recurenses in misdiagnosed patients with congenital vascular lesions.

Confusing nomenclature is, in large part, responsible for misunderstanding, improper diagnosis, and inappropriate treatment of vascular anomalies. Virchow, father of cellular (and surgical) pathology, designated all vascular anomalies „angioma" and categorized them, on the bases of microscopic channel architecture, as angioma simplex, cavernosus, or racemosum. Wegener, student of Virchow, proposed a similar histomorphic division for lymhangioma (7).

A biologic classification system, proposed in 1982, defines the cellular features of vascular anomalies as correlated with clinical characteristic and natural history (6). These two biological categories can be destinguished by clinical, radiologic, histopathologic, and hemodynamic evaluations (3, 4). Precise terminology is essential because prognosis and appropriate therapy for the various lesions are quite different (7).

Hemangiomas are the most common tumors of infancy and early childhood. They are found in 10–12 % of infants (2). They are usually not present at birth but appear in the neonatal period, usually in the first two weeks of life (7). Haemangioma exhibits cellular proliferation. These benign tumors grow during infancy, involute in childhood, and never appear in an adolescent or an adult.

In contrast, vascular malformations are developmental errors, composed of dysplastic vessels, and lined by quiescent endothelium. They almost never regress, and some even expanded. Unlike vascular malformations, haemangiomas rarely produce bony distortion or hypertrophy (7). Vascular malformations can be subcategorized according to channel structure and rheology. Slow-flow lesions are either capillary, lymphatic or venous. Fast-flow lesions include arterial and arteriovenous anomalies (5). There also are complex-combined vascular malformations, which are often associated with soft tissue and skeletal owergrowth. Many of these disorders are known by eponyms (Tab. 1).

Venous malformations can be mistaken for hemangioma. Lymphatic malformation or lymphaticovenous malformation, especially with intralesional hemorrhage at birth or appearance in infancy, can also be misdiagnosed as hemangioma. In more than 90 % of patients, the type of vascular anomaly can be correctly diagnosed by correlating history and findings on physical examination (1).

The authors analyze the complications of inappropriate treatment based on group of 139 patients with congenital vascular

Tab. 1. Vascular malformations (Mulliken, 1998).

Pure vascular malformations
Slow-flow
capillary
teleangiectases
lymphatic
venous
Fast-flow
arterial: aneurysm, coartacion, ectasia, stenosis
arteriovenous fistula
arteriovenous
Complex-combined vascular malformations
Slow-flow
Klippel-Trenaunay syndrome: capillary venous malformation, capillary-lymphatico-venous malformation of limb or trunk with hypertrophy
Proteus syndrome: capillary, lymphatic, capillary venous malformation, capillary-lymphatico-venous malformation, macrodactyly, lipomas, epidermal nevi, scoliosis
Solomon syndrome: capillary, venous, arteriovenous (intracranial), epidermal Nevi
Fast-flow
Parkes-Weber syndrome: capillary arteriovenous fistula, capillary arteriovenous malformation, capillary lymphaticoarteriovenous malformation limb

disorders. The complications result from improper diagnosis. In the group of 68 patients with hemangiomas 91 % of patients undergone surgical treatment. 21 % of patients was misdiagnosed. In this grop the incidence of recurences was 63 %. Unlike patients with correct diagnosis with 11 % recurrence.

71 patients suffer from vascular malformations. In 13 % was poor diagnosis. But 38 % of patients were misdiagnosed in the group of high-flow arteriovenous malformations. In this group the incidence of recurences was 60 % after surgical treatment. Precise biologic classification system is essential because prognoses and appropriate therapy for the various lesions are quite different.

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Management of acute scrotum in children – the impact of doppler ultrasound

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Aim: Investigation of the value of scrotal doppler ultrasound (DUS) in the diagnosis of acute scrotum and the impact on the treatment strategy.

Methods: In a prospective study from January 2002 to March 2003, 79 consecutive patients (mean age 9.2 yrs, range 3 months–17 yrs) with symptoms of acute scrotum were included. The protocol included: History, clinical examination, scrotal DUS, standard lab, urine analysis and a follow up investigation including a scrotal DUS 6 weeks after discharge. According to the results the children were treated either non-operatively or by scrotal exploration.

Results: In 66 children (84 %) the result of DUS determined the management: 26 children with hyperperfusion (epididymitis, orchitis), 18 children with appendix testis torsion (ATT) and 9 children with normal perfusion (edema, hematoma) were successfully treated non-operatively (mean hospital stay 2.9 days). The follow up examination confirmed the primary diagnosis. 10 children without testicular perfusion and suspected torsion and 3 children with abscess-formation were surgically explored and the initial DUS diagnosis was verified. In the remaining 13 patients (16 %) the result of the ultrasound examination was unclear. 10 younger children (3 months–3 yrs) were noncompliant, in another 3 children (8.9 and 12 yrs) a testicular tumor was suspected. Exploration revealed inflammation (epididymitis, orchitis) in 10 children. The suspected tumor emerged as post-acute ATT in 3 boys.

Conclusion: In 84 % of children with acute scrotal pain the DUS was able to differentiate between surgical emergencies and other etiologies. In 16 % of our pediatric patients the DUS remained unclear thereby necessitating surgical exploration.

The influence of surgical treatment and endoscopic sclerotherapy on esophagogastric varices caused by extrahepatal portal hyperthension in children

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The formation of varices in the esophagus and stomach is conditioned by the evolution of colateral circulation by portal hypertension (PH). The bleeding of varices is the most dangerous manifestation of PH that endangers the life of the patient. Before the period of using the endoscopic methods, the only possibility to handle the situation was the surgical intervention. Despite the performed operation most of the patients required endoscopic sclerotherapy later on.

In our study we evaluated the length of the period of the unchanged endoscopic finding in the group of patients that had been operated on surgically and endoscopically and in the group of patients in which only the endoscopic sclerotherapy was applied. The group of patients with extrahepatal (prehepatal) PH had 27 patients. Before sclerotherapy 10 children had been operated on: azygo-portal deconnection had three of them, deconnection and splenectomy had four of them, mezenterico-caval shunt had two of them and mezenterico-caval shunt with splenectomy had one of them. By statistical processing of data (Mann–Whitney test) we found out a significant difference ($p=0.000105$).

The patients being operated before sclerotheraphy had had statistically much longer period of the unchanged endoscopic finding after sclerotherapy. By evaluation of influence of the operation on endoscopic finding after sclerotherapy (method of variational analysis $p=0.1574$) we didn't confirm statistically significant difference. We didn't confirm the influence of operation before sclerotherapy on the lenghth of sclerotherapy (bilateral t-test, $p=0.1645$). The length of the unchanged endoscopic finding after sclerotherapy was commensurable to the endoscopic finding before sclerotherapy (method of variational analysis, $p<0.0001$). The length of the sclerotherapy didn't have influence on time period of unchanged endoscopic finding after sclerotherapy (method of variational analysis, $p=0.3115$). The broader endoscopic finding before sclerotherapy required more sclerotisations during the sclerotheraphy (method of variational analysis, $p=0.0458$, $r=0.39496$). The broader range of endoscopic finding before sclerotherapy required longer period of sclerotherapy (method of variational analysis, $p=0.0155$, $r=0.46944$).

Management of a complications of ventriculoperitoneal shunts in children using laparoscopic techniques

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Background: After pplacement of ventriculoperitoneal shunts in children with hydrocephalus, revisions are often necessary. We investigated the efficacy of video-assisted laparoscopic technique for abdominal shunt revisions.

Methods: Management options include various types of shunt revisions with or without aspiration or excission of the pseudocyst, which recently have been conducted laparoscopically. *Results*: The present paper is a retrospective analysis of 42 consecutive cases, treated for complications of ventriculoperitoneal shunt at the University Hospital in Brno in the years 1997—2002.

Conclusions: The laparoscopic method provides simple handling, excelent intra-abdominal views, short operation time and good cosmetic results.

Laparoscopy in children (view of anaesthesiologists)

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Introduction: Laparoscopic surgery started with Gans and Bersi and their first peritoneoscopy in the year 1971. Nowadays there are about 25 diagnostic and therapeutic procedures routinly performed. Laparoscopy has many advantages comparing to

classical abdominal surgery. A quicklier reconvalencence with less postoperative pain and complications and better cosmetic effect are for the patient of a big importance. Pediatric surgeon must be careful with inroducing of the Veress-needle, because of some differences typical for this age. Also the insuflation of the peritoneal cavity with CO_2 is performed in an adapted way.

Approach of an anaesthesiologist to child sheduled for a laparoscopic surgery starts with preoperative evaluation, premedication and induction of general anaesthedia either with venous or inhalation agent. The pacient is intubated, artefitially ventilated and so as to achieve a comfort of the surgeon put under a deep muscle relaxation. A nasogastric tube and urine catheter are inserted.During general anaesthesia a monitorig of EKG, BP, SpO_2, body temperature and diuresis are a standard. A laparoscopy need also a good monitoring of $EtCO_2$, minute ventilation and other ventilation parameters such as airway pressures, lung compliance, composition of inhalated gas mixture. A resorption of CO_2 from the peritoneal cavity into bloodstream causes respiratory acidosis if ventilation parameters are not adapted to the need of greater minute ventilation. With increased intraabdominal pressure the diaphragma is in higher position. This leads to the decrease of funcional residual capacity of yhe lung and to formation of atelectasis. The increase of intraabdominal pressure above a certain level causes decrease of cardiac output by infuencing the systemic and pulmonary vascular resistance. A normal mean arterial pressure preserves the adequate perfusion of peripheral tissues. Laparoscopic surgery is relatively contraindicated in patients with altered cerebral perfusion pressure, becuase it has a significant influence on their intracranial pressure. An aneasthesiologist must be careful with replacement of fluid losses. An overload of a patient with transient decrease of glomerular filtration rate and diuresis is not rare.

Methods: The authors would like to introduce a group of 56 patient who undewent a laparoscopic surgery in our hospital. The spectrum of surgeries corresponds with the most performed laparoscopic surgeries elsewhere, including appendectomy, cholecystectomy, splenectomy, extirpation of an ovarial cyst and diagnostic procedures i.e. biopsy of the liver. 41 girl and 15 boys aged from 6 days to 17 years underwent a general anaesthesie of an average duration of 122 min. During operation, especially during insuflated capnoperitoneum, following parameters according to a protocol were recorded and inform of a prospective study evaluated: Changes in airway pressure, in minute ventilation, in lung compliance, in monitored $EtCO_2$, so as haemodynamical parameters including blood pressure and frequency of the heart and body temperature were recorded. Analyses of blood gasses were performed more often then routinely.

Results: In our prospective study we recorded changes in pulmonaty mechanics and ventilation paramters. For maintenance of normocarbia was a change of ventilation strategy always necessary, but despite of increasing the minute ventilation monitored $EtCO_2$ and pCO_2 always increased above norm. Cardiovascular changes manifested by an increase of systemic blood pressure, without any significant change in frequency. A short period of time after exsuflation of the capnoperitoneum most of the changed parameter returned spontaneously. After prolonged surgeries the level of pCO_2 returned to the normal value only within 12 hours. There was only slight difference in the need of postoperative analgesia in our group. In this group no severe anaesthesiological complications related to the kind of the surgery occurred.

Complete recovery after severe necrotizing pancreatitis in childhood – a case report

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Aim: Pancreatitis is very rare in childhood compared to adults. even more less frequent is the necrotizing form which is a real challenge to the paediatric and surgical team due to its rather high mortality. As there is little paediatric experience, the lesson of every case is worth sharing. We present a case of a successfully treated necrotizing pancreatitis.

Methods: A 5 y girl treated by the Haematological Department with acute lymphoblastic leukemia was referred to the ICU because of a dramatic onset of pancreatitis induced very probably by cytostatic drugs. We started with conservative treatment (analgetics, NG suction, TPN or rather jejunal feeding, somatostatin, antibiotics) but as the process proved to be necrotic we had to complete the therapy several times by surgical intervention first because of bleeding and later because of septic symptoms.

Results: 90 days after the onset the child has become complaintless but needs a diet.

Conclusion: The therapy of pancreatitis should be conservative until there are no surgical complications such as bleeding, perforation, persistent fluid collection, infection or abscesses. From surgical viewpoint it is critical to decide if and when to operate. To decide this the clinical picture, the laboratory and the imaging (USG and CT) results have to be considered. According to others' experience we had to repeat the necrectomy (completed with peritoneal lavage) and the paracolic fluid collection drainage several times. If surgery is indicated we vote for aggressive and repeated treatment.

In patient with gastroschisis the therapy starts prenatally

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In gastroschisis the protruding bowel is usually shortened, thickened and covered with a fibrous peel. The postoperative course is poor. There are some encouraging papers in the last years, that the prenatal management with amnioinfusion reduces the bowel damage and has a positive effect on bowel motility in postoperative period. We present our experiences in the first 3 patients.

Method: We use routine methods in prenatal screening for detection of congenital anomalies. After the detection of gastroschisis we suggest to the pregnant women amnioinfusion. In 32nd and 36st gestational week we perform exchange amnioinfusion of nearly 200 ml of warm (37.0 °C) saline solution. We use transabdominal approach under the ultrasound guidance. After the delivery, the baby is under control of paediatric intensivist and paediatric surgeon and the operation is performed within first hours of life, after stabilasation of the neonate.

Results: We have first clinical experiences in 3 patients (A, B, C) with gastroschisis. In all of them the delivery was by cesarean section in 36 (B) and 37 (A, C) gestational week. We perform surgery within the first hours of life. The excluded bowel was like normal – without fibrous peel and not so thick, as usually. The primary closure was possible in every patient. In one patient (A) because of meconium obstruction in terminal ileum and microcolon we performed Bishop–Koop ileostomy. In this patient, we started oral feeding on day 8 and rectal stools appeared on day 9. The patient was discharged on day 22. In 3 months of age the ileostomy was closed without any complications. In the second patient (B) we started oral feeding on day 5, without parenteral nutrition was on day 19 and discharged was on day 23. In the third (C) patient we started oral feeding on day 9, without parenteral nutrition was on day 21 and discharged on day 25. In all 3 patients we detected postoperatively dilatation of renal pelvis (A – bilaterally, B – right, C – left side). In all 3 patients we used diuretics for 3–4 days. Now, there are no failures in renal function. No other malformations were detected.

Conclusion: Our experiences are limited, but it seems, that we should say two followed hypothesis: After amnioinfusion we have to be prepared for preterm delivery by Cesarean section. In patient with gastroschisis after amnioinfusion, primary closure of the defect is possible and amnioinfusion is beneficial for postoperative bowel function.

Clinical evaluation of the neuronal intestinal dysplasia

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Abstract

Introduction: Hirschsprung's disease has been known since its first description by Harald Hirschsprung in 1887 and aganglionosis was accepted as the sole cause of bowel motility disorders in children. In early nineteen seventies, based on histochemical examination, Maier-Ruge described for the first time a disease with clinical symptomatology similar to Hirschsprung's disease, but with a significantly different morphology. The disease was named Neuronal Intestinal Dysplasia.

Despite persistent skepticism on the part of some surgeons, there is international consensus on existence of neuronal intestinal dysplasia (NID) and other types of neuronal intestinal malformations.

Material and methods: Between 1997 and 2001, 144 children suffering from constipation due to failure to pass stool were investigated and treated at the Department of Pediatric Surgery, University Children's Hospital in Bratislava.

Results: Fifty seven (40 %) of them suffered from classical Hirschsprung's disease. In thirty nine patients normal biopsy was found. Out of remaining forty-eight patients, eighteen (38 %) had NID type B, ten (21 %) had Hirschsprung's disease combined with NID type B, eight (17 %) were diagnosed with hypoganglionosis, five (10 %) with heterotopy, five (10 %) with hypoganglionosis of the submucosus plexus and in two (4 %) immaturity of ganglion cells were found. All these children were investigated preoperatively by barium enema and full thickness biopsy of the rectum was also performed.

Key words: megacolon congenitum, neuronal intestinal malformations, aganglionic colon, hypoganglionosis.

Tab. 1. Classification of neuronal intestinal malformation according to the consensus conference in 1990 (Borchard et al, 1991).

1 Aganglionosis
2 Hypoganglionosis
3 Neuronal intestinal dysplasia
4 Immaturity of ganglion cells
5 Combinations
6 Non classifiable dysganglionosis

Tab. 2. Types of neuronal intestinal malformation in our series (1997—2001).

Type	Number	%	Male	Female
aganglionosis	57	40		
dysganglionosis	48	33	102	42
normal biopsy	39	27	71 %	29%
Total	144	100		

Tab. 3. Types of 48 dysganglionoses in our series (1997—2001).

Type	Number	%	Male	Female
MH+NID B	10	21		
NID B	18	38		
Hypoganglionosis	8	17		
Heterotopy	5	10	39	9
Hypogaglionosis in plexus submucosus	5	10	81%	19%
Immaturity	2	4		
Total	48	100		

Hirschsprung's disease has been known since its first description by Harald Hirschsprung in 1887 and aganglionosis was accepted as the sole cause of bowel motility disorders in children (3).

In early nineteen seventies, based on histochemical examination, Maier-Ruge described for the first time a disease with clinical symptomatology similar to Hirschsprung's disease, but with a significantly different morphology. The disease was named Neuronal Intestinal Dysplasia (5, 6, 7).

The main clinical symptom of both of these diseases is chronic constipation caused by the absence of normal bowel innervation. During further investigations other subforms of this malformation such as hypoganglionosis, NID type A, NID type B, immaturity of ganglion cells, and a heterogeneous group of innervation defects, were found. Each of the above-mentioned diseases may occur as a solitary condition or in combination with another.

Detailed classification of neuronal intestinal malformation (NIM) was accepted by the Association of Enteropathology in Frankfurt on Main in December 1990 and was published by Borchard and Meier-Ruge in 1991 (1).

The classification (Tab. 1) clearly describes this very complicated pathology requiring very precise diagnosis established by an experienced pathologist by means of relatively difficult histological and immunohistochemical staining methods.

Materials and methods

Between 1997 and 2001 at the Clinic of Pediatric Surgery of University Children's Hospital in Bratislava, we treated 144 children suffering from constipation and failure to pass stool.

Out of 144 patients, 57 suffered from typical aganglionosis, 48 had another type of dysganglionosis, and the remaining 39 patients had normal biopsy results (Tab. 2).

In the group of 48 dysganglionoses, a combination of Hirschsprung's disease and neuronal intestinal dysplasia type B was found in ten patients, isolated IND B in eighteen, hypoganglionosis in eight, and heterotopy in five. Heterotopical ganglia in the submucosal plexus with mesentery plexus were found in five children and immaturity of ganglion cells in two (Tab. 3).

All patients of this group were investigated preoperatively by barium enema and full thickness biopsy was performed simultaneously with suction biopsy by means of Noblett probes. Routine acetylcholinesterase, lactate dehydrogenase, succinyl dehydrogenase and hematoxylin-eosin staining methods were used.

Samples for full thickness biopsy of the rectum were excised at a distance of 2, 5 and 7 cm from the dentate line. Although positively reported by other authors, we were not able to obtain

Tab. 4. Therapeutic approach in patients with combined aganglionosis and NID type B.

Patient	1	2	3	4	5	6	7	8	9	10
Extent of aganglionic segment	D	S	R	R	S	R	SF	R	S	S
Extent of NID B segment	C	SF	SF	SF	HF	SF	C	HF	C	HF
Colostomy	+	+	+	+	+	+	+	+	+	+
Pull-through	+	+	+	+	+	+	+	+	+	+
Resection up to	SF	SF	SF	SF	HF	SF	HF	HF	HF	HF
Myectomy	+	-	-	-	-	-	-	-	-	-
Result	E	E	E	E	E	E	E	E	E	E

E — excellent, C — coecum, A — colon ascendens, HF — hepatic flexure, SF — splenic flexure, D — colon descendens, S — sigma, R — rectum

Tab. 5. Therapeutic approach in patients with NID type B.

Patient	Extent of NID B	Laxat's diet	Rectal myectomy	Previous colostomy	Resection up to	Result
1	C	+	-	-	-	excellent
2	?	+	-	-	-	excellent
3	?	-	+	-	-	excellent
4	?	-	+	-	-	excellent
5	D	-	+	+	SF	excellent
6	D	-	-	+	SF	excellent
7	SF	-	-	+	SF	poor
8	HF	-	-	+	HF	excellent
9	C	-	-	+	HF	excellent
10	SF	-	-	+	SF	excellent
11	HF	-	-	+	HF	excellent
12	HF	-	-	+	HF	excellent
13	HF	-	-	+	HF	excellent
14	C	-	-	+	HF	excellent
15	C	-	-	+	HF	excellent
16	C	-	-	+	HF	excellent
17	D	-	-	+	SF	excellent
18	D	-	-	+	SF	excellent

C — coecum, A — colon ascendens, HF — hepatic flexure, SF — splenic flexure, D — colon descendens, S — sigma, R — rectum

satisfying samples using Noblett probes and we could not reliably identify neuronal intestinal malformation by this method.

Results

In all fifty-seven patients with aganglionosis, retrorectal pull-through by the Duhamel method in the Ikeda-Soper modification was performed.

In ten patients with combined Hirschsprung's disease and neuronal intestinal dysplasia type B diagnosed preoperatively, retro-rectal pull-through was also performed. However, in five of these patients, their left colons up to the splenic flexure and in five patients colons up to the hepatic flexure were resected in order to remove most of the malformed colon. One of these patients who underwent resection only to the left colon, had to have a repeated laparotomy on the fourteenth day after surgery due to intestinal obstruction. The obstruction was functional and caused by motility disturbances. An ileostomy was performed as a temporary solution. Two months later ileo-colic side-to-side anastomosis over a lenght of 10 cm was performed and myectomy of the neorectum was carried out at the same time. Folowing the operation the child's problems resolved. The extent and type of pathological innervation, the type of surgical intervention, and the results of treatment in the group of these ten children are shown in Table 4.

Two of the patients from the group of eighteen children with NID B were treated on laxatives and high fiber diet. Improvement in their defecation pattern was obvious at the age of three and four. Lately, they have been passing stool every other day.

Rectal myectomy was performed in three children. In two of them the surgery led to improvement. In the third, serious colitis and obstruction required colostomy. Resection of the left colon and retro-rectal pull-through were performed later. Child is not experiencing any problems now.

The left colon up to the splenic flexure was resected in two children and the Duhamel procedure was performed. In four patient with extent of NID up to the coecum which underwent Duhamel procedure, the resection of the colon was only up to the hepatic flexure. These patients are free of problems (Tab. 5).

Four out of eight children suffering from hypoganglionosis underwent rectal myectomy that led to an improvement. The four of them underwent colostomy and the Duhamel procedure later and they are also doing well.

The condition of patients with heterotopy in the submucosal plexus improved with age on a high fiber diet.

Two brothers out of five patients with hypoganglionosis in the submucosal plexus underwent rectal myectomy that led to an improvement.

The third, suffering from cerebral palsy with spastic quadruparesis, was admitted with an obstruction to our hospital at the age of ten. Barium enema showed a significantly dilated left colon. A colostomy and successive Duhamel procedure six months later were performed. Histology showed hypoganglionosis in the submucosal plexus and normal innervation of the myenteric plexus. Last two patients with hypoganglionosis of submucosal plexus underwent resection of the disturbed bowel followed by Duhamel procedure (Tab. 6).

Tab. 6. Treatment of patients with hypoganglionosis and heterotopy.

Type	N	Rectal myectomy	Pull-through	Diet
Hypoganglionosis	8	4	4	-
Heterotopy	5	-	-	5
Hypoganglionosis in plexus submucosus	5	2	3	-

Discussion

Hirschsprung's disease (HD) is a functional disorder caused by congenital absence of ganglion cells of the mesenteric and submucosal enteral plexuses in the gastrointestinal tract. Possible cause of failure to pass stool following successful pull-through procedure is combination of HD with other type of neuronal intestinal malformation.

The frequency of association of neuronal intestinal dysplasia type B (NID type B) with aganglionosis reported in literature varies between 4 and 75 % (2, 4, 8, 9, 10, 11).

A large study by Meier-Ruge shows that the real incidence varies between 20 and 27 %. Our study showed that out of 48 children suffering from various types of dysganglionosis ten (21 %) were suffering from a combination of HD and NID type B, eighteen (38 %) had typical NID type B, eight (17 %) had hypoganglionosis, and five (10 %) hypoganglionosis in the submucosal layer.

A correct diagnosis of the combination of HD and NIM may help avoid several operations and discomfort of the patient. If neuronal intestinal dysplasia is not diagnosed and a transposition of the poorly innervated intestine is performed, the problems will persist even though the surgery have been technically perfect.

According to our experience, suction biopsy does not provide sufficient information about the presence of NIM and can be used only for diagnosis of pure aganglionosis.

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Tumor-like inflammatory intra-abdominal masses in children

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Abstract: The report describes 4 cases of rare tumor-like inflammatory intra-abdominal masses in children aged from 2.5 to 16 years, treated with favorable outcome at department of Surgical Pediatrics and Oncology, PAM, Szczecin, between 1997 and 2002.

Case 1: A 12-year-old cachectic girl with diagnosis of malignancy with necrotic foci – an extensive retroperitoneal invasive lesion located behind the left kidney, infiltrating the posterior abdominal wall, ribs XI–XII and lymph nodes at the level of renal hilus (CT) proved to be an actinomycosis. Nine-week antibiotic therapy that allowed limitation of the lesion was followed by surgical evacuation of white tissues of the mass; the latter resulted in creation of an huge cavity that required drainage. Complete recovery was obtained after 6 consecutive weeks of antibiotic therapy.

Case 2: A 2.5-year-old girl transferred to our institution with diagnosis of cystic mass located in small pelvis, most likely originating from mesenteric lymph nodes or left ovary. AFP and ß-hCG levels were normal. A non-resectable tumor of the root of the mesentery proved to be a "cystic lesion with connective tissue walls with productive inflammatory reaction" in the course of Salmonella enteritidis infection. Excision of the remaining cystic lesion followed the subsidence of the inflammation. Ten days later the girl was discharged home as completely cured.

Case 3: A 5.5-year-old boy with predisposition to upper and lower respiratory tract infections and neck lymphadenopathy, with previous history of conservative (due to inflammation) and subsequent surgical treatment of the lateral cervical cyst, was admitted to our institution with the diagnosis of the tumor of the right lobe of the liver. Fine needle biopsy suggested only inflammato-

ry, granulomatous character of the lesion. Open biopsy confirmed the diagnosis. Lambliasis was the most likely cause of the inflammation; complete recovery was obtained after introduction of antibiotic therapy. Six months later the boy was admitted again due to extensive right-sided pleural and pulmonary inflammatory changes. After 3 months of treatment the child was transferred to the Children's Memorial Health Institute with suspicion of immunodeficiency syndrome.

Case 4: A 16-year-old boy, with previous history of suppuration of wound located in the left subpatellar area a few weeks ago, and a history of left hip pain lasting approximately one month without fever, was transferred to our institution with diagnosis of polycystic tumor of the left iliac fossa and left inguinal area. The lesion proved to be the abscess of the left iliopsoas muscle. The patient was discharged home after 4 weeks of treatment (drainage, antibiotics) with residual lesion which required excision of the fistula and evacuation of granulomatous masses from the inguinal fossa 2 weeks later. Eventually the patient was discharged home two weeks later as completely cured.

Intussusception – abdominal emergency in childhood

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Abstract: The authors present the results of intussusception diagnostics and treatment in a group of 39 patients. Hydrostatic desinvagination was applied in 16 patients (41 %). It was repeatedly performed in 42 %, and in 8 % of children treated with this method a relapse was noted. Surgery was applied in 23 patients (59 %), in 63 % of them manual desinvagination was performed, and in 21 % intestinal resection. The importance of early diagnosis and repeated attempts with hydrostatic desinvagination are stressed. Two patients with chronic intussusception were treated surgically.

Intussusception is a term used to describe telescopic enfolding of one segment of the intestine with surrounding mesenterium whithin another. In the majority of cases the cause is primary, only rarely it is secondary. It is a common cause of occlusive ileus in breast-feeding age. Early diagnosis and treatment are required. If early diagnosed, the therapy is predominantly conservative. Screening examination is represented by ultrasound. Sensitivity of this examination is high, see Table 1. The major advantages are availability and possibility of repeated examinations. Diagnosis of other causes of abdominal colic, diagnosis of ascites and further examinations could be realized also after the hydrostatic desinvagination is performed. See Table 2 for the algorithm of the treatment.

Patients and methods

39 patients treated between 1996 and 2001 at the Department of Pediatric Surgery of the Childrens Faculty Hospital in Bratislava were evaluated. The incidence of the particular forms of intussusception is listed in Table 3. The average age of the patients was 25.6 months (6 weeks to 42 months) (Tab. 4). Males outweighed females (63 % to 37 %). At the time of the start of treatment in 45 % of patients the disease lasted less than 12 hours (18 patients) and more than 12 hours in 15.4 % (6 patients) (Tab. 5).

The most common symptoms included abdominal colic — 100 %, vomiting in 73 %, haemorrhagic mucous stools in 46 %, abdominal resistance in 41 %, other symptoms were less common (Tab. 6).

Methods of hydrostatic desinvagination

It is performed at the department of radiology, on a special table for examinations, under radiographic control. An elastic catheter terminated with a ball is introduced into the rectum. Gluteal muscles are attached with adhesive plaster to prevent the catheter from sliding. Thin barium paste warmed to body temperature is used. The reservoir fixed on a stand with adjustable level of the water column is filled up with this barium paste. The instilation is performed without interruption, never exceeding 90 cm of the water column. Reflux of the contrast media into the terminal illeum is an evidence of completeness of the desinvagination. Never apply pressure on the abdominal wall in the sense of taxis. The time of intestine desinvagination is varying, ranging from 45—60 minutes, or untill the progression of the invagination is stopped for more than 10 minutes. Than the instilation can be terminated.

Tab. 1. Sensitivity of ultrasound in patients with intussusception in the Department of Radiology of the Children's University Hospital in Bratislava.

Year	Sensitivity in %
1995	86.7
1996	88.9
1997	75
1998	100
1999	100
2000	100

Tab. 2. Algorithm for diagnosis and treatment of intussusception in the Department of Pediatric Surgery of the Children's University Hospital in Bratislava.

Algorithm of the treatment of intussusception
1. Ultrasound
2. Native radiographic scan
3. Irrigography
4. If unsuccessful: surgery- manual desinvagination, intestinal resection

Tab. 3. Types of intussusception, n=39.

Type of invagination	Number of patients
Ileal-ileal	2
Ileal-colonal	7
Ileal ascending	17
ileal transversal	8
Ileal-descending	1
Ileal sigmoideal-rectal	4

Tab. 4. The age of the patients, n=39.

Age	Number of patients
0-1 year	19
1-2 years	9
2-3 years	6
3-4 years	5

Methods for evaluation of the results

Retrospectivelly 39 patients were evaluated. They were divided into two groups according to wheter they were treated conservatively or surgically.

Results

In the group of conservatively treated patients was 41 % of the patients (16 patients) (Tab. 7). From the total number of conservatively treated patients, repeated hydrostatic desinvagination was performed in 42 % (7 patients), the time interval between the examinations ranged from 1 to 12 hours. Desinvagination was repeated 2 to 4 times. Relapses of intussusception after successful desinvagination were detected in 7 % (2 patients).

Second group consisted of patients after surgery (Tab. 8). It consisted of 59 % (23 patients) from the whole group. Spontaneous desinvagination developed in 17 % (4 patients), manual repositioning was performed in 60 % (14 patients), intestinal resection in 23 % (5 patients). Mortality in connection with invagination was zero.

Discussion

Ultrasound examination is an important screening examination. It should not be missed in any infant with typical patient's history. In case of ambiguous results of ultrasound it is appropriate to perform repeated ultrasound examinations (1). According

Tab. 5. Duration of symptoms, n=39.

Symptoms duration	Number of patients
Up to 12 hours	18
12–24 hours	6
24 hours and more	15

Tab. 6. Symptoms of patients with intussusception, n=100 %.

Symptom	Patients in %
Colic pains	100
Vomiting	75
Hemorrhagic stools	46
Resistance	41
Resistance and diarrhoea	2
Diarrhoea	39
Respiratory infection	27

Tab. 7. Results in the group of patients treated with hydrostatic desinvagination, a=16 (41 %).

Symptoms duration in average	15.4 h (4-20 h)
Guiding point (messenterial lymphatics)	10 % after USG
Average age	26.6 months (6-42 m)
Relapse	8 %
Repeated desinvagination	42 %
Number of repeated desinvaginations	2-4x

to the experience of the Radiology Department of the Childrens Faculty Hospital in Bratislava is the sensitivity of the examination in the hands of an experienced physician close to 100 %.

Irrigography has a major importance in the diagnosis a theraphy of intussusception. Accurately adjusted pressure of the contrast medium can desinvaginate the intestine whithout the necessisity of surgery. Very important are repeated or delayed hydrostatic desinvaginations that increase the success of the method (2, 3, 4, 5). Native abdominal scans are of no importance for the detection of the early stages of intussusception because in the beginning is the clinical picture physiological. Contraindication of hydrostatic desinvagination is long history of symptoms and advanced intussusception. Clinical symptoms of advanced intussusception are: free air or high volume of free fluid in the abdominal cavity, worse clinical state of the patient, absence of Doppler's signal from the wall of the intussuscipiens.

Surgical treatment is rare in invagination (6). Indications for surgery are:

1) Unsuccessful hydrostatic desinvagination: missing reflux of the contrast medium in to the terminal illeum.

2) Symptoms of intestine perforation: free air in the abdominal cavity or peritoneal symptoms.

Surgical procedure is mainly manual desinvagination, only in rare case resection is necessary. After the intestine perforation very often its resection at the site of dammage and end to end anastomosis are performed. Spontaneous desinvagination is rela-

Tab. 8. Results in the group of patients treated surgically, b=23 (59 %).

Procedure: none		15 %
manual desinvagination		63 %
intestinal resection		21 %
Symptoms duration in average		33 h (6-120 h)
Guiding point:	mesenterial lymphatics	11 (48 %)
	Meckel's diverticulum	1 (4 %)
	enteral cyst	1 (4 %)
	appendix	1 (4 %)
	none	9 (40 %)
Average age		18.5 months (2-56 m)

tively often found during the surgery (7). Of great importance is a good postoperative care in both, resection and manual reposition of invagination. The patient could be markedly dehydrated, anemic or septic (8).

Chronic intussusception is marked by different clinical pattern and different treatment strategy. It is a rare disease Tosovsky (9, 10) indicates an incidence of 3 %, but an important one, because it often causes diagnostic problems. It is based on incomplete intussusception whithout strangulation and whithout passage disturbances. In this study chronic intussusception was observed in two patients. Both were operated on with proved ileal-ileal intussusception. In one of them based on Puetz-Jeghers syndrome. The history of the diseases ranged from 4 to 6 days. The symptoms were nonspecific and in both the irrigography has not detected intussusception. In chronic intussusception the typical symptoms use to be masked. In the clinical pattern prevail intermittent abdominal pains, intermittently symptoms of disturbed passage can join in. Detailed medical history, repeated clinical, ultrasound and radiograph examinations are important for the diagnosis. The treatment is surgical (9, 10). The surgery is based on manual desinvagination, which is sufficient, because the intestine nutrition is generally not affected (9, 10). Surgical treatment is more appropriate than hydrostatic desinvagination, because in half of the patients is the cause of intussusception secondary Meckel's diverticulum, polyp (9, 10). The disease prognosis is good (9, 10) despite the generally late diagnosis and late start of treatment.

In the last decade in nonsurgical treatment, barium is replaced with other contrast media physiological saline solution, air, desinvagination is performed under ultrasound control (11, 12).

Conclusion

1) Hydrostatic desnvagination is a safe and efficient treatment of intussusception in childhood.

2) In many patients is the connection of intussusception with hyperperistalsis in gastroenteritis very likely.

3)If there are no contraindications, it is appropriate to repeat the hydrostatic desinvagination before the decision for surgery.

4) If surgery is needed, mostly manual desinvagination is sufficient, only rarely intestine resection is necessary.

5) Chronic intussusception is treated surgically.

6) The radiation burden can be reduced if the desinvagination under radiographic control is replaced by desinvagination with physiological saline solution under ultrasound control.

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Reconstructive burn surgery in childhood using Integra™ dermal regeneration template

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Introduction: Burns and scalds are frequent injuries in childhood and adolescence. In literature review about 3000 children suffer scarring thermic lesions per year. For best treatment of this sequelae fast and easy skin replacement with handsome cosmetic results are mandatory.

Patient and methods: After necrosectomy and preparation of their burns 15 children (range 10 months to 9 years) have been treated with Integra™, a commercialised two-layer matrix providing neodermis formation during skin replacement. Integra™ is fixed with sutures, dressed two-days with antiseptics and grafted within two to three weeks with meshed or unmeshed split thickness skin grafts (Tab. 1).

Results: 13 patients showed uneventful healing after Integra™ application during follow-up (range 3 weeks to 1.5 year) with very good functional and cosmetic result after final grafting. Caused by pseudomonas infection respectively sepsis Integra™ was lost completely respectively partly a few days after application in one patient each.

Conclusion: In our experience Integra™ seems to be a handsome device in reconstructive pediatric burn surgery leading to excellent functional and cosmetic results.

Table 1.

1) boy	10 months	right palm	appr. 1% TBSAIIb-III•
2) boy	15 months	both palms	appr. 2% TBSAIII•
3) boy	3 years	both thighs	appr. 10% TBSA IIb-III•
4) boy	4.5 years	prox. and distal thigh left	appr. 5% TBSAIII•
5) girl	4.5 years	right foot	appr. 2% TBSAburn ulcer
6) boy	6 years	back right	appr. 6% TBSAIIb-III•
7) boy	9 years	chest/upper arm right	appr. 6% TBSAcontracture
8) girl	12 months	right palm	appr. 0.5% TBSAIIb-III•
9) boy	11 months	belly/both thighs proximal	appr. 10% TBSAIIb-III•
10) gir	l 4 years	trunk/right thigh	appr. 15% TBSAIII•
11) girl	4 years	back, nates, thighs	appr. 17% TBSAIIb-III•
12) girl	1 year	both palm	appr. 1% TBSAIIb-III•
13) girl	4.5 years	left knee	appr. 5% TBSAIII•
14) boy	8.5 years	left chest/axillar fold	appr. 9% TBSAIIb-III•
15) boy	6.5 years	right shank/foot	appr. 9% TBSAIII•

Management of complicated wounds using VAC™ and Integra™

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Introduction: Due to their excellent self-recreation tissue capacity seriously infected, non-healing or chronic wounds are rare in childhood, nevertheless they force the treating paediatric surgeon to achieve a durable, functional and esthetic wound closure rapidly. Therefor we would like to report about our expierence with vacuum assisted closure (VAC™) and dermal regeneration template (Integra™) in this kind of wounds.

Method: After necrosectomy and preperation of their beds they were sealed with a VAC™ device, manufactured by KCI-company. Later on application of Integra™ for replacement of dermis, manufactured by Ethicon, Johnson & Johnson company, followed by split-thickness-skin grafts harvested from the skull for epidermal closure.

Patients: 1) 4 months, male, premature infant, necrotizing enterocolitis, St. p. artificial anus replacement, generalised sepsis, necrotising fasciitis right lateral flank; 2) 5 years, female, polyneuropathia, neglected, older contact burn right foot, Pseudomonas-infection; 3) 8 years, male, antiquated open forearm fracture with osteomyelitis, vessel-/tendon- and nerve injuries, sepsis, Sudeck reflexe dystrophia; 4) 12 years, female, multiple limb fractures and soft tissue injuries, Pseudomonas- und MRSA-infection.

Conclusion: Due to our experience complicated wounds can be treated safely by a two step technique using VAC™ and Integra™. Simultaneous techniques are still in progress expecting good results as well.

Blunt abdominal truma in childhood — indications for laparotomy

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Purpose: The blunt abdominal trauma is one of the most dangerous injury in childhood and it is necessary to give it concentration and talk about it between the doctors, which cames to contact with this problem. The cause is simple, treacherous and dangerous of death out of spite simple appear injury. There were a lot of publications on theme. Treatment of blunt abdominal injuries in childhood, and we know, the modern way is conservative procedure. But where is the limit to use nonoperative management and on the other side to do a laparotomy? When is the moment, thet the surgeon have to indicate operation? Which patient is stable and which instable? To find an answers was the aim of this theme.

Patients and methods: We report study of patients with blunt abdominal trauma treated at pediatric surgery department between years 1991–2002. During 11 years period 116 patients with demonstrated injury of abdominal organs were analyzed. 106 patients (92 %) were treated conservatively. 10 needed urgent laparotomy – 7 after spleen injury, 1 after liver, 1 after kidney, 1 after pankreas and 1 after small intestine. 15 patients treated conservatively have had complications which 7 of them we solved operatively (delayed splenic rupture, splenic arteriovenous fistula, splenic or pancreatic cyst). Period of hospitalization in average lasted 12.4 days by conservativelly trated children, 15 days by children after laparotomy. We demonstrated those patients, which needed operation and compare them with non operative management which was successful, or with late complications (rebleeding, arterio-venous fistula, pseudocyst).

Conclusions: Many authors prefer conservative treatment after blunt abdominal trauma in childhood and success confirm our study. 85.3 % children were definitly treated conservativelly.

Alternatives of the perioperative blood losses substitution in children

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The advances in modern medical care displace marches of therapeutics possibilities in the children surgical procedures and intensive care. The volume of surgery is large and growing and these patients are at particularly high risk of requiring a blood transfusion. The problems of allergenic transfusion are already well documented both in the reduced availability of blood and the multitude of potencional risks with its use. There are the possibilities of administrative mistake during obtain, handle and expedition of allogenic transfusion, adverse post transfusion reactions, parenteral transmit of infectious agent, the immumomodulation till immunosupresion of recipient. The most of these risks depend on limited chances of screening of voluntary donors, not lonely with processing of donate blood which strategy is designed by WHO.

In depend of these risks in the present time rising a wide range of new strategies of alternative blood losses substitutions is available. Even small changes to routine procedures can lead to enormous benefits for patients, physicians, hospital and society in general. The using strategies must be simply, safe and effective. Exploitation of these techniques depends on inevitable collaboration among surgeon, anesthesiologist an intensivist, optimalization of the operation procedure and status of patient. Application of some techniques are individual limited of patient status and the fact that „some techniques are particularly suited for definite operation and definite surgeon but not for the others".

Alternative strategies are based on three pylons. The first is *the determination of individual limits to the tolerance of anemia.* We must determinate if the patient have for an elective operation procedure, which is coupled with expected blood losses, enough quantity of self erythrocytes and the others blood elements and plasmatic components for achieving adequate tissue oxygenation and hemodynamic stability of patient with adequate intravascular volume not only during the operation but for all post operative period. By the way, in this aspect we must to say, that historical axiom for the value of normal level of hemoglobin

10 g/dl described by Adams and Lendy in the year 1942, have today no clinical justification.

The preoperative *enhancement of hemoglobin level* is the second pylon. Preoperative assessment of the patient's hematological status to identify any coagulation abnormalities or preexistent anemia can be readily accomplished. Any such abnormalities should be evaluated ant treated. Very simply method for the rising a low level of erythrocytes can be supplementation of these patient with exogenous iron, folic acid and vitamin B12. The use of recombinant human erythropoetin (EPO) has been safe and effective in complicated patients from 10 to 21 days before elective operation. Individually could be erythropoetin used like an „acute therapy" directly in time of hemorrhagia. This can be very useful for traumatic patients.

And the last but not least pylon is *minimalization of preoperative blood loses* by the using of suitable surgery and anesthesiology techniques. This includes optimalization of surgery techniques and postoperative management individually for each patient and type of intervention. From the surgeon point of view we talk about appropriate positioning of patient during surgery, which do not lead to the stasis of blood and increasing of blood losses, using the intraoperative and postoperative cell salvage systems and consistent hemostasis. From the anesthesiologist procedures is necessary to maintain of normothermia (for optimal coagulation status), using some of techniques of regional anesthesia, controlled hypotension, application of haemostatic drugs (topical and systemic), using of micromethodes in taking of samples of blood for laboratory examination and using of acute normovolemic hemodilution (ANH) preoperative simultaneously intravenous replacing with crystalloid and colloid to maintain of normovolemia.

In presentation the authors discuss about possibilities of exploitation these techniques in children during spondylosurgical operations coupled with high blood loses or other surgical procedures and intensive care about polytraumatic patients.

Preanesthesia evaluation in children

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The literature does not provide a standard definition of preanesthesia evaluation. As there is limited scientific evidence regarding this matter, neither guidelines, nor standards, but practice advisories can be formulated. They include preanesthesia evaluation for both, surgical and nonsurgical (diagnostic) procedures in children.

Authors analyse the evaluation of a child before general anesthesia with emphasis on the patient's medical record, interview and history assessment and physical examination, as they provide the most important information, on the basis of which an anesthesioloigist then indicates laboratory or other medical tests needed, consultations with other medical specialists included. They look closer at basic laboratory tests routinely performed, as well as present some most frequent patological findings (e.g. upper respiratory tract infection, asthma bronchiale) from the point of view of an anesthesiologist with their implications for and risks in relation to anesthesia.

They also discuss concurrent medication with its possible implication for anesthesia. The list includes drugs used frequently in pediatric medical practice, as nonsteroid antiinflammatory drugs, corticosteroids, antibiotics, antiasthmatic agents, anticancer drugs, anticonvulsants and others.

The matter of preoperative fasting is also discussed, where a recent understanding is presented with practical recommendations for its appropriate and adequate management for all age groups and different types of food.

As the preoperative fasting is the source of stress and questions of both, parents and surgeons, it is one of the most important part of the preoperative anesthetic management, so the authors pay attention to the problem.

Regional techniques in pediatric anesthesia – fascia iliaca compartment block

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O*bjective:* To evaluate the quality and the efficacity of the fascia iliaca compartment block in children and occurrence of adverse reactions. A new single injection procedure, the fascia iliaca compartment block, is described for blocking the three branches of the lumbar plexus – femoral, lateral cutaneous, and obturator nerves. This block is particularly useful in children to provide unilateral anaesthesia of the lower extremity. An alternative approach is 3-in-1 block. It produces blockade of the three

branches of the lumbar plexus but the point of injection of local anesthetic and the result of quality of the blockade is different in comparison with the fascia iliaca compartment block.

Design: Prospective clinical study.

Setting: Department of paediatric anaesthesia and intensive care children's University Hospital, Bratislava, Slovakia.

Material and methods: The authors enrolled 22 patients (ASA I—II, age 11—18, weight 35—70 kg), scheduled for elective orthopaedic and trauma surgery of the lower extremities with estimated duration 0.5—2 hrs — knee surgeries (knee arthroscopy, ...), operations of the thigh (femoral shaft fractures, ...). They were also suitable for anesthetizing the lateral aspect of the thigh as a donor site for small skin grafts, fascia iliaca grafts, or muscle biopsy for muscular disorders.

Fascia iliaca compartment block is not painful. We excluded the patients with genetic disorders, with stable central nervous system disorders (with cerebral palsy), children with severe deformities of the lower extremities, infections (e.g. osteomyelitis) or malignant diseases in inguinal region. The contraindications are allergic reactions to bupivacain, local haematoma, anticoagulant treatment, infections (e.g. osteomyelitis, pyoderma) or malignant diseases in the inguinal region, distorted anatomy (due to prior surgical interventions or trauma to the inguinal and thigh region).

Patients were premedicated orally 60 min prior surgery (*midazolam*). We combined general anaesthesia with regional anaesthesia in all patients in the following conditions: desire of patient, disagreeable position of patient during intervention, longlasting surgery, reposition of dislocated fracture necessiting muscle relaxation (at request of surgeon). In case of supposed duration of intervention over 60 minutes (10 cases), we realized a peripheral bloc after intubation (diagnostic and therapeutic arthroscopies, osteotomies of femur, fractures of femur). Patients with dislocated fractures of femur were intubated by reason of necessity of muscle relaxation. We administrated peripheral bloc in 7 cases by reason of anxiety in intravenous sedation by *propofol* or with transition to inhalation anaesthesia — *sevoflurane, isoflurane* by mask (arthroscopies, plastic reconstructions of devastation injury of the soft tissues in femoral region in the same patient).

The needle 22-gauge was used. The patient was in dorsal recumbent position, lower extremity was in slight abduction and axtrarotation. A projection of the inguinal ligament was drawn on the skin from the pubic tubercle to the anterior superior iliac spine and divided in three equal parts. The site of puncture of the fascia iliaca compartment bloc is 2—3 cm caudal to the point where the lateral joined the two medial thirds of this line (without use of neurostimulator). The needle was inserted at a right angle to the skin while gentle pressure was exerted on the barrel of a syringe filled with the local anesthetic and connected to the block needle. Depth of puncture is about 2 cm: piercing of the fascia lata and then fascia iliaca. Repetitional aspirations are necessary to avoid the arteficial puncture of the femoral artery. Local anaesthetic is then administered slowly and easily. after the needle had been withdrawn, the swelling in the groin was firmly massaged to improve rostral diffusion of the local anesthetic within the fascia iliaca compartment. We have used long-acting local anaesthetic *0.5 bupivacaine in the maximal dose of 2 mg/kg* (in children with higher weight we used a maximal volume 20 ml of 0.5 bupivacaine).

Results: We monitored vital functions during intervention and postoperatively, the duration and efficacity of analgesia of the fascia iliaca bloc. Postoperative analgesia endured on average 6 hours after the administration of local anaesthetic. We have not observed any undesirable effects of local anaesthetic. In one case (arthroscopy in a 13 years old girl) a transient motoric blockage of femoral nerve was observed that was resoluted spontaneously after 4 hours. In view of efficacity and encouraging results of fascia iliaca. Bloc in the control of postoperative pain, we would like to enlarge indications in the group of younger pediatric patients.

Skull fractures in sucklings. X-ray versus ultrasound scan for diagnostic approach

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Introduction: After accidental fall-downs out of their carrier bags or from their swaddle table during nappy changing sucklings might suffer typical skull fractures becoming most striking by a big parietal swelling. Next steps are usually to order plan x-rays of the skull and sometimes transfontanellar ultrasound scans to exclude intracerebral bleeding. Due to the widely increasing acceptance of ultrasound scanning for fracture diagnostics we asked ourselves the question to what extent the radiation-loaded x-ray investigation could be replaced by our ultrasound technique.

Patients and methods: During a period of 9 months we examined 12 injured sucklings (average age 4.8 months) with skull fractures. A linear ultrasound probe (10 MHz) was used to scan the fracture side in comparison to the regular plane x-ray. The sector probe (7.5 MHz) was used transfontanellar to exclude an intracerebral lesion as usual. Our findings have been put in a survey chart. Ultrasound machine used Accuson 128 XP^R.

Results: The fracture lines could be visualized in all patients by ultrasound, only in 2/3 by x-ray. No concommitant intracere-

bral lesions were detected. All additional examinations were performed easily and safely in all patients.

Conclusion: Ultrasound scanning of skull fractures is easy to perform, provides highly reliable results and additional informations for the paeditric surgeon as well as being cheap and last but not least do without radiation.

Acetabulum fractures in childhood and youth

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Acetabulum fractures (AF) are rare injuries based on heavy direct impact forces to the pelvis. Due to their seriousness they could lead to lifethreatening conditions and result in lifelong disability.

After roll over injury a toddler suffered crush injury of y-physis and comminuted fracture dislocation of iliosacral joint area. Course: premature growth arrest of physis, flattening of acetabulum and femoral head subluxation with consecutive spine scoliosis. Later acetabuloplasty was performed. In adolescence x-ray showed correct hip joint alignment, however, hip adduction was slightly restricted. A 7 year old suffered AF, ossis pubis fracture after being dragged along by car. Treatment by bed traction was applied. Three weeks later callus formation was seen, later the child was free of pain. A scater was rolled-over by a truck. He sustained fractures of acetabulum, symphisis, femoral epiphysiolysis, hemorrhagic shock, neurological, abdominal and thoracic trauma. Reduction and external fixation of dislocated pelvic fracture was done, later ORIF had to be performed. Hartmann procedure was done after emergency laparotomy stopped pelvic hemorrhage. Course: paresis of gluteal muscles and sciatic nerve, leg length discrepancy 1 cm, restricted ROM, painless walking distance 50 m. Radiographs demonstrated avascular femoral head necrosis with subluxation and premature fusion of femoral physis. Fractures of acetabulum rim, pubic bone, femoral shaft, fibula and os naviculare were notified after another boy's roll-over injury. Femur fracture was treated operatively, remaining ones non-operatively. Later, ROM of both hips was unrestricted. Non-weight bearing of an all columns affecting fracture was done in a teenager until healing in alignment. Another teenager sustained an undisplaced AF. Treated by bone traction and evacuation of hip joint effusion. Unrestricted ROM. A pelvic roll-over injury resulted in an open-book and acetabulum fracture, abdominal contusion resulting in a pancreatic pseudo cyst. So far conservative treatment is taking place.

AF are serious injuries. Remaining deformities will not remodel till growth arrest and carry doubtful prognosis. Careful reduction and stable fixation is mandatory to minimize risk of lifelong disability.

Posttraumatic reconstructions of the children's elbow

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The elbow in pediatric patients does not usually have the tendency for stiffness like that one in adults. But there are several posttraumatic conditions of the elbow in the paediatric patients that do require reconstruction. The aim of this study was to make an outcome analyse and establish indication criteria's for successful reconstruction.

We have treated 336 fractures of distal humerus (incl. 213 supracondylar fractures).

There were 13 reconstructions performed in all. The reconstructions following intercondylar fracture – were performed in 2 cases, following supracondylar fracture – in 4 cases, abruption of radial condylar mass – 3 cases, capitulum humeri fracture – 2 cases, abruption of ulnar condylar mass – 1 case. There were 6 patients treated at our department primarily.

The interval between the first fracture's attendance and reconstruction ranged from some months to some years.

The indication criteria's were established as follows:

Parents or patient have asked for corrective operation because of visible deformity or diminished of elbow movement. Precise examination of elbow skeleton including comparative

X-ray scans and 3D CT scan gives a high probability for improvement of pre-operative status.

Our attitude to each intervention was never to impair of attempted status. There were performed correction osteotomies with osteosynthesis, bone resections, resection of paraarticular ossifications, depending on deformity type. There was a two-step correction (distal humerus comminutive fracture) in one case. We have achieved an improvement of motion or better cosmetic effect in all cases, the patients were usually satisfied with final outcome.

Instability of chest wall

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Chest trauma in children is an indicator of significant trauma and is associated with a high mortality rate. The most commonly reported chest injuries are rib fractures and pulmonary contusions or dilacerations. Rib fractures occur in a many as 50 % of chest injuries (5) and are associated with extrathoracic injuries in up to 70 % of patients (4). The increast mortality associated with chest trauma is as high as 6.7 to 26 % (2). Black (3) reported mortality in patients with three or more rib fractures in 22.2 %.

Although specific types of chest trauma have been exhaustively reviewed in the literature, flail chest is a rare. Radiological signs of instabil chest are fractures of series minimally five ribs or a segmental fractures at least three ribs (3).

There are some protocols for surgical stabilisation of instabil rib fractures. For instance: instabilisation chest wall with paradoxical respiration or multiple impacted rib fractures associated with injury of pleura and lung or succesive development of pneumothorax or fluidothorax. In children is commonly recomanded conservative treatment — internal pneumatic stabilisation. Extrathoracic pressure or external traction are obsolete. The aim of our lecture is a presentation our three patients witch underwent surgery for flail chest with analysis of stabilisation effect.

Case report 1

A 9-years-old boy was admitted after car accident with an open segmental fractures of clavicle and 1st, 2nd and 3rd rib with cerebral contusion. A proximal and a part of medial lung lobe were prolapsed through opening of chest wall. We immediatly performed intrameddulary osteosynthesis with K wires of fractured clavicle and ribs with reconstruction of chest wall. Six days after injury the patient has been extubated and atelectasis as a complication occurs. After tracheostomy with two-weeks last mechanical ventilation clinical and radiological finding were regulated, the patient was discharged 34 days posttrauma.

Case report 2

A 3.5-years-old boy was admitted after motor vehicle accident as a polytrauma. Dominant was thoracic injury with segmental fractures of ribs III–VIII. Subcutaneous emphysema of the thorax rapidly extending to the whole abdomen and scrotum. Radiologicaly fractures of ribs were covered by subcutaneous emphysema, massive hemothorax and pneumothorax. The innitial treatment of thoracal trauma was double chest drainage. The radiological findings after three days improved, but pneumothorax and blood secretion about 100 ml per day persist. Therefor six days after injury we performed thoracotomy. Two fragments of segmental fracture continually lacerated lungs and this was reason of prolongated hemo-pneumothorax. After suture of lung lacerations and osteosuture of fractures with Prolen the postoperative recovery was without complications. Five days later thoracal and endotracheal tube were removed.

Case report 3

A 15-years-old boy felled out from train. He was addmited as a polytrauma with impressive cranial fracture and a segmental fractures of ribs II–VIII. Initially was performed elevation of the impessive fracture and intercostal drainage. Conservative treatment of thoracal trauma was looking to be succesfull up to the sixth posttraumatic days, when the waste from thoracic tube was minimal, but later gradually progressed. In consequence of our experience with the previous boy 14 days after injury we performed thoracotomy with the similar finding. After osteosynthesis of the ribs was again non complicated postoperative phase, thoracal and endotracheal tubes were removed one week after surgery.

Conclusion: Chest trauma in children is rarely isolated injury. Associated extrathoracal injuries are up to 70% patients (4). They are often assotiated with intraabdominal injuries, limb fractures and specially head injuries, which remains the most common cause of death. In children paradoxical respiration is not expressive, commonly recomanded treatment is conservatively. But our a few experiences show, that surgical intervention in some cases leads in rapid improvement and in our patients should be performed sooner. Ahmed reported, that the treatment of flail chest injury in his series by internal fixatiom resulted in speedy recovery, decreased complications, and better ultimate cosmetic and functional results and proved to be cost effective (1).

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Pleuropulmonary blastoma

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Pleuropulmonary blastoma (PPB) is rare and aggresive malignant tumor of the lung. It may develop from congenital pulmonary cysts. The brain is the most common metastatic site.

Although PPB is treated with a multimodality approach including surgery, chemotherapy and radiotherapy, the prognosis remains poor.

In our case report we described a 5-year-old girl with congenital pulmonary cysts, locally advanced PPB and metachronous brain metastases. After 4surgical procedures (operation for pulmonary cysts, 2 times operatin for PPB, operation for brain metastases), 2 lines of chemotherapy and radiotherapy she is alive with no evidence of disease (NED) 6 months after completion of treatment.

Conservative treatment of large haemangiomas in childhood

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Haemangiomas belong to the most frequent tumors in childhood. Theri prevalence in infants of Caucasian population is 10–12 %. Most of them involve spontaneusly, but about 20 % of them may extend to a large scale and never involve completely.

Aim of the study: Tha authors report their experience with conservative treatment of large haemangiomas with Prednisone and interferon alpha.

Patients and method: We followed-up 20 patients with haemangiomas in various parts of the body at our department. 12 of them were large haemangiomas in various part of the body. In 5 cases tha haemangiomas developed in the region of the head, in one case periorbitally, in two cases in the lumbosacral lesion, in one case in the region of the scapula, in two on the legs and in one case in mesenterium. The age of the children was ranging from 5 months to 2 years. According to the localization, surgical intervention was delayed and therapy with Prednisone in the doses of 2 mg/kg/day was initiated. When despite this regimen haemangiomas did not diminish, we decided to use interferon alpha 3 mil IU/m^2 in one daily subcutaneous dose until involution or at least for 7 months.

Results: The therapy with Prednisone alone diminished the haemangioma in 4 patients. In the remaining patients this therapy failed so we decided to use interferon alpha.

Conclusions: Recent data prefer conservative treatment of large haemangiomas. Therapy should start by Prednisone. Positive result may be expected by 1/3 of patients. In the remaining cases, the treatment should be continued by interferon alpha.

Agenesis of diaphragm

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The authors present a case study of left diaphragm agenesis, with severe hypoplasia of left lung and vitium cordis. The immediate replacement of diaphragm in newborn was done by goretex mesh. Stomach incarceration into pleural cavity indicated reoperation 3 weeks later with the replacement of diaphragm by musculus latissimus dorsi and anastomosis of nervus thoracodorsalis and nervus phrenicus.

Exchange amnioinfusion in fetuses with laparoschisis

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Introduction: Exchange amnioinfusion is an invasive procedure in which certain amount of amniotic fluid is repeatedly extracted and subsequently the same amount of physiologic saline solution instilled into the amnionic cavity of the fetus. The purpose of the procedure is to dilute the fetal fluid containing fetal urine and meconium, that freely baths the eviscerated organs in fetuses with laparoschisis, and in this way to prevent the development of fibrinous plaque on the surfaces of these organs.

Materials and methods: From June 2002 exchange amnioinfusion was performed in 5 female patients with fetuses suffering from laparoschisis in our Clinic. It was performed twice in two patients in 36nd and 36th weeks of gravidity, once in 32nd week in two patients and once in 36th week in one patient. Under ultrasound control with the help of a needle for amniocentesis was about 200 ml of thick, translucent fetal fluid extracted. Subsequently the same amount of saline solution warmed to body temperature was instilled into the amniotic cavity via an antibacterial filter or under antibiotic shield.The fetus was monitored prior to the procedure and after it with the help of cardiotokography and ultrasound flow measurements in umbilical vessels.

Results: Exchange amnioinfusions were successful and uncomplicated in all cases. All women delivered per sectionem caesaream. One female delivered 48 hours after the procedure due to threatening intrauterine hypoxia of the fetus detected with cardiotokography. The rest delivered with time passed after spontaneous start of labour or spontaneous premature outflow of fetal fluid.

Discussion and conclusion: Exchange amnioinfusion is an asset in the area of fetal medicine in fetuses with laparoschisis, that belongs into the category of inborn developmental disorders that are surgically well correctable and life compatible.

The importance of this method lies-lays above all in the reduction of the incidence of fibrinous plaques on the eviscerated organs. It enables postanataly surgically primary closure of the defect in the abdominal wall, earlier start of peristalsis, transition from parenteral to oral nutrition and shortening of hospitalisation.