



# Abstracts of Papers

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## Session I, Gastrointestinal I

### S I.1: LAPAROSCOPIC COLECTOMY IN CHILDREN: AN 8 YEAR NATIONAL REFERRAL CENTRE EXPERIENCE

Ancuta Muntean<sup>1</sup>, Ionica Stoica\*<sup>1</sup>, Suzanne Victoria McMahon<sup>1</sup>, Alan Mortell<sup>1</sup>, John Gillick<sup>1</sup> and Brian Sweeney<sup>1</sup>  
E-mail: Ancuta Muntean — [ancutza\\_muntean@yahoo.com](mailto:ancutza_muntean@yahoo.com)

<sup>1</sup>Department of Paediatric Surgery, Our Lady's children's Hospital, Crumlin, Dublin 12, Ireland

**Background** Few studies have reported the utility and efficacy of laparoscopic colectomies in the paediatric population. The aim of this study is to describe a single centre experience on laparoscopic treatment of children with inflammatory bowel diseases (IBDs) and familial adenomatous polyposis (FAP).

**Materials and methods** An institutional retrospective review of the charts of patients with IBDs and FAP who underwent a laparoscopic colectomy at a tertiary paediatric referral centre between 2009 and 2017 was performed. Data reviewed included demographics, indication for surgery, age at time of surgery, operative reports, histopathology results, American Society of Anaesthesiologists (ASA) classification, duration of surgery, length of hospitalization and perioperative complications.

**Results** From 2009 to 2017, a total of 65 patients underwent colectomies at our institution, of which 49 were laparoscopic. The laparoscopic cohort included 28 males and 21 females with a mean age at diagnosis of 11.4+/-3.12 years (range 2–15) and a mean age at surgery of 13.23+/-3.07 years (range 2–17). The surgical procedures included 47 total abdominal colectomies, one hemicolectomy and one ileocaecectomy. In 37 cases an end ileostomy was created at the time of colectomy, while in 12 cases a primary anastomosis was fashioned. Seven patients (14.2%) required conversion to open approach, mainly due to poorly defined anatomy and perceived unacceptable risk to proceed laparoscopically. The average operative time (from induction of anaesthesia to leaving theatre) was approximately 6 hours (mean 354.12 minutes, range 203–564 minutes). The mean postoperative hospitalization was 10.42 days (range 4–49). The pre-operative diagnosis was ulcerative colitis in n=29, Crohn's disease in n=2, indeterminate colitis in n=9 and familial adenomatous polyposis in n=9. There was a 81.6% concordance between the preoperative and the postoperative histological diagnosis. Major surgical complications that required return to theatre were encountered in 7 patients: 3 (6.1%) adhesive intestinal obstructions, 2 (4%) infectious complications and 2 (4%) complications related to technical issues.

**Conclusions** Laparoscopic approach is a feasible and safe option with a low conversion rate in most paediatric patients with IBD and FAP. At our centre, laparoscopy is the preferred approach for colectomy in appropriately selected patients.

**Keywords** children, laparoscopy, inflammatory bowel disease, familial adenomatous polyposis

### S I.2: LAPAROSCOPIC VERSUS OPEN SURGERY FOR

### THE REPAIR OF CONGENITAL DUODENAL OBSTRUCTIONS IN INFANTS AND CHILDREN

Stefan Gfroerer\*<sup>1</sup>, Till-Martin Theilen<sup>1</sup> and Udo Rolle<sup>1</sup>

<sup>1</sup>Department of Pediatric Surgery and Pediatric Urology, University Hospital Frankfurt, Theodor-Stern-Kai 7, 60590 Frankfurt am Main, Germany

**Background** Laparoscopic repair of congenital duodenal obstruction (LCDO) was first described more than 15 years ago. However, studies, comparing outcomes of LCDO with open repair (OCDO) are rare. Standardized assessments of complications following both procedures using the Clavien-Dindo classification (CDC) and the comprehensive complication index (CCI) are not available.

**Materials and methods** All patients who underwent OCDO or LCDO between 2004 and 2017 were identified from the institutional database of our tertiary referral center by retrospective analysis. Postoperative outcomes were assessed, including all complications using the CDC and the CCI.

**Results** 47 consecutive patients were identified; 27 patients underwent LCDO and 20 patients had OCDO. Both groups did not differ regarding demographics, associated congenital anomalies, intraoperative pathologic findings and operative procedures. LCDO was associated with a longer operative time (mean(s.d.), 202(89) versus 112(41) min,  $P < 0.0001$ ), shorter time to initiation of feeds (median (range), 1 (0–4) versus 3 (1–12) days,  $P = 0.0027$ ) and shorter time to full feeds (mean(s.d.), 8.2(4.1) versus 12.2(6.4) days,  $P = 0.0243$ ) compared to OCDO. Shorter length of postoperative hospital stay in LCDO group was achieved for patients without cardiac anomalies (mean(s.d.), 9.4(3.1) days in LCDO group versus 17.2(9.4) days in OCDO,  $P = 0.0396$ ) and patients without other anomalies (median (range), 12 (3–38) days in LCDO group versus 21 (7–31) days in OCDO,  $P = 0.0460$ ). Postoperative morbidity was similar according to Clavien-Dindo classification, however, LCDO was associated with a lower CCI (median (range) 0 (0–39.7) versus 4.3 (0–100),  $P = 0.0270$ ).

**Conclusions** LCDO in neonates and children in our series was associated with a lower CCI, earlier initiation of feeds and earlier achievement of enteral full feeds. It also appears that LCDO, in selected patients, has the potential to shorten hospital stay.

**Keywords** laparoscopy, congenital duodenal obstruction, laparoscopic, duodenoduodenostomy

### S I.3: LAPAROSCOPIC REPAIR OF TRAUMATIC DUODENAL PERFORATION IN A CHILD

Lucas Matthyssens\*<sup>1</sup>, Dirk van de Putte<sup>1</sup>, Katrien van Renterghem<sup>1</sup> and Piet Pattyn<sup>1</sup>

E-mail: Lucas Matthyssens — [lucas.matthyssens@uzgent.be](mailto:lucas.matthyssens@uzgent.be)

<sup>1</sup>Dept of Pediatric Surgery/GIHK, Ghent University Hospital, De Pintelaan 185, B-9000 Ghent, Belgium

**Background** Duodenal perforations are uncommon in children and mainly caused by blunt abdominal trauma. The diagnosis may be difficult and is mainly based on clinical infor-

mation and computed tomography (CT)-scan. In haemodynamically stable patients, laparoscopic exploration may confirm the diagnosis or prevent negative laparotomy. Laparoscopic duodenal perforation repair in children has so far been described only rarely.

**Materials and methods** Case report and review of the literature.

**Results** A 12-year-old previously healthy girl had fallen off a horse, receiving a kick of a hoof in her right abdomen. She was brought to our ER with abdominal pain and vomiting, remaining haemodynamically stable. A skin abrasion was seen in the right upper abdomen with tenderness and guarding. CT-scan showed a localized retroperitoneal fluid collection with some air bubbles, indicating duodenal perforation.

At laparoscopic exploration, a Kocher manoeuvre was performed and bile-stained fluid was aspirated. A longitudinal perforation in the second part of the duodenum was seen and closed laparoscopically in two layers with interrupted sutures. A methylene-blue dye test showed no leak. After irrigation and aspiration, two silicone drains were left. Somatostatin was started intravenously and continued postoperatively. The girl had an uneventful recovery. Upper GI contrast study on postoperative day (POD) 4 showed good passage without leak. The nasogastric tube was removed on POD6. The oral intake went well. The drains were removed on POD5 and 6. The patient went home on POD8 and remains in good health with 18 months' follow-up so far.

**Conclusions** This is the third report of a child with traumatic duodenal perforation treated successfully by laparoscopy. Two other boys of 10 and 12 years old were described and reported in 2012 by Tytgat and Huang. In case of (suspicion of) duodenal perforation in children, laparoscopy may confirm the diagnosis. In selected patients, laparoscopic suturing of the duodenal perforation is feasible and safe, offering a minimal invasive approach with good recovery and outcome.

**Keywords** laparoscopy, trauma, duodenum, perforation, minimal invasive, diagnosis, treatment

#### S I.4: ENDOSCOPIC MANAGEMENT OF PERIAMPULLARY DUODENAL DUPLICATION CYSTS: A REPORT OF THREE CASES FROM A SINGLE CENTRE

Anna Lavinia Bulotta<sup>1</sup>, Maria Vittoria Stern<sup>1</sup>, Guido Missale<sup>2</sup>, Dario Moneghini<sup>2</sup>, Filippo Parolini<sup>1</sup>, Giovanni Boroni<sup>1</sup>, Paolo Orizio<sup>1</sup> and Daniele Alberti\*<sup>1</sup>

E-mail: Anna Lavinia Bulotta — anna\_lav82@yahoo.it

<sup>1</sup>Department of Paediatric Surgery, Spedali Civili Children's Hospital, Piazzale Spedali Civili 1, Brescia, Italy; <sup>2</sup>Department of Digestive Endoscopy, Spedali Civili, Piazzale Spedali Civili 1, Brescia, Italy

**Background** Duodenal duplications (DD) are rare congenital anomalies, representing 5-7% of all gastrointestinal duplications. Generally observed in childhood, they present with highly variable and non-specific signs. Pancreatitis, bleeding, perforation are the most frequent complications that allow their

diagnosis. Among the DD, those periampullary are even rarer and due to their location concern arises about their treatment. Endoscopic management has been described in adulthood and recently also in paediatric patients, with only few published cases. The Authors describe 3 paediatric patients with Periampullary Duodenal Duplication Cyst (PDDC) successfully managed with endoscopic drainage.

**Materials and methods** We reviewed all patients admitted in our Department for PDDC and treated by endoscopic approach. Clinical presentation, laboratory tests, imaging, endoscopic features and follow-up are analysed.

**Results** Between January 2011 and April 2017, 3 patients were submitted to endoscopic drainage for PDDC (1 male and 2 females). Median age was 13,6 years (range 11-16 years). All patients were admitted for acute pancreatitis. Cholangiopancreatography Magnetic Resonance and Endoscopic Ultrasound were performed in all patients for diagnosis. All patients were submitted to Endoscopic Retrograde Cholangiopancreatography (ERCP) with marsupialization and resection of the common wall cyst. The postoperative course was uneventful with exception of 1 patient submitted to endoscopic clip placement for persistent bleeding at section site. At follow-up ranging from 6 years, all patients are doing well with no pancreatitis and/or duplication recurrence at US.

**Conclusions** PDDC in children are very rare. Endoscopic management plays an important role for diagnosis and treatment. Our experience suggests that accurate preoperative assessment is essential for a safe, mini-invasive and effective endoscopic treatment. Anyway, longer follow-up is necessary to exclude their recurrence.

**Keywords** periampullary duodenal duplication cyst (PDDC), endoscopic retrograde cholangiopancreatography (ERCP), pancreatitis

#### S I.5: LAPAROSCOPIC CHOLECYSTO-APPENDICOCOLONIC ANASTOMOSIS FOR THE TREATMENT OF PROGRESSIVE FAMILIAL INTRAHEPATIC CHOLESTASIS

Burak Tander\*<sup>1</sup>, Ezgi Gun<sup>3</sup>, Sertac Hancioglu<sup>3</sup>, Gonul Caltepe<sup>1</sup>, Muazzez Cevik<sup>2</sup> and Ferit Bernay<sup>3</sup>

E-mail: Burak Tander — buraktander@gmail.com

<sup>1</sup>Division of Pediatric Gastroenterology, Ondokuz Mayıs University, Kurupelit 55210 Samsun, Turkey; <sup>2</sup>Department of Pediatric Surgery, Acibadem University, Atakent Hospital, Turgut Ozal Blvd 16, Halkalı 34303 Istanbul, Turkey;

<sup>3</sup>Department of Pediatric Surgery, Ondokuz Mayıs University, Kurupelit 55210 Samsun, Turkey

**Background** Progressive familial intrahepatic cholestasis (PFIC) is a potentially fatal, autosomal recessive liver disease characterized by intermittent attacks of cholestasis and severe pruritus. Surgical biliary diversion methods are useful for resolving pruritus and for the delay of the progressive course. Among many diversion methods, cholecysto-appendicocolonic anastomosis is a newly developed one and its laparo-

scopic application is not reported yet. We present here a patient with PFIC and laparoscopic cholecysto-appendico-colonic anastomosis.

**Materials and methods** Two year old boy with PFIC was admitted with jaundice, severe pruritis and direct hyperbilirubinemia. A laparoscopic cholecysto-appendico-colonic anastomosis was decided. Three ports were used. The appendix was freed with protection of its vessels and cut off (isolated) from the cecum. Its position was retrocecal and it was carried to the gallbladder behind the ascending colon. The proximal tip is anastomosed to the gallbladder, the distal tip to the tenia of the transvers colon using intracorporeal suturing technics. No complication was encountered.

**Results** The postoperative course was uneventful. The pruritus was obviously reduced and the direct bilirubin levels were dropped.

**Conclusions** Laparoscopic cholecysto-appendico-colonic anastomosis is a feasible, safe and effective surgical method for the resolution of pruritus in patients with PFIC.

**Keywords** progressive familial intrahepatic cholestasis, laparoscopic repair, cholecysto-appendico-colostomy

### S 1.6: NOVEL MINIMAL INVASIVE TECHNIQUE FOR THE TREATMENT OF TRICHOBEZOAR IN CHILDREN

Lucas Matthyssens<sup>1</sup>, Ilia van Campenhout<sup>1</sup>, Dirk van de Putte<sup>1</sup>, Katrien van Renterghem<sup>1</sup> and Piet Pattyn<sup>1</sup>

E-mail: Lucas Matthyssens — lucas.matthyssens@uzgent.be

<sup>1</sup> Dept of Pediatric Surgery/GIHK, Ghent University Hospital, De Pintelaan 185, B-9000 Ghent, Belgium

**Background** Trichobezoars (TBZ) in children are relatively rare. They are mostly found in the stomach and removed by laparotomy. Little is known about the feasibility of minimal invasive removal of trichobezoars in children. The aim of this study is to describe a novel surgical approach for the removal of TBZ and compare it with the available literature.

**Materials and methods** Description of a novel minimal invasive technique, its use and results in a personal case series of three consecutive pediatric patients - with review of the literature.

**Results** Three girls aged between 9 and 10 years old presented with acute abdominal pain. Vomiting was seen in one patient, loss of appetite in two, weight loss in one. One girl had a history of trichotillomania, another of pica. An abdominal mass was palpable in two patients. Diagnosis of TBZ was by endoscopy in two girls and by Computed Tomography (CT) — scan in one. Two patients underwent unsuccessful attempts at endoscopic removal. The TBZ size was between 10–7 cm and 10–20 cm. One patient had also satellite lesions in the ileum.

All patients were treated by a novel minimal invasive technique and in all patients, the laparoscopic TBZ removal was successful without spilling. The total operating time was 130-160 minutes. Hospital stay was 3 to 4 days. No postoperative com-

plications were seen, with a mean follow-up of 2 years. Laparoscopic removal of TBZ in children has been described in 16 children in the literature, with a success rate of 87%. Compared to endoscopic removal, laparoscopy has a higher cited success rate (87% vs 10%).

**Conclusions** The novel minimal invasive technique described allows for a safe and straightforward diagnosis and treatment of large TBZ in children, without intra-abdominal spillage or other complications. We therefore recommend it as a standard technique for TBZ removal.

**Keywords** laparoscopy, trichobezoar, stomach, ileum, minimal invasive, technique

### S 1.7: TRICHOBEZOAR IN CHILDREN: A SYSTEMATIC REVIEW OF THE LITERATURE

Ilia van Campenhout<sup>\*1</sup>, Lucas Matthyssens<sup>1</sup>, Dirk van de Putte<sup>1</sup>, Katrien van Renterghem<sup>1</sup> and Piet Pattyn<sup>1</sup>

E-mail: Ilia van Campenhout — ilia.vancampenhout@ugent.be

<sup>1</sup> Dept of Pediatric Surgery/GIHK, Ghent University Hospital, De Pintelaan 185, B-9000 Ghent, Belgium

**Background** Trichobezoars (TBZ) are rare indigestible masses composed of hair. Little is known about the clinical presentation and optimal management of TBZ, especially in children. The aim of this study was to perform a systematic review of the literature on the clinical presentation, diagnosis and treatment of TBZ and possibly suggest recommendations for the optimal management of TBZ.

**Materials and methods** Systematic review of the literature according to the PRISMA guidelines, using the keywords 'trichobezoar', 'trichobezoars' and 'Rapunzel Syndrome', using the online PubMed/MedLine & WebOfScience databases. Article references were also studied. Articles written in English, French and Dutch were eligible. Articles in humans describing patient age, sex, treatment method and postoperative evaluation were included.

**Results** The systematic review of the literature resulted in 215 relevant articles describing 222 TBZ patients, of which 143 were under 16 years of age.

The youngest patient was 19 months old, the mean age at presentation 9.6 years and 93.7% were girls. Most pediatric TBZ patients present with abdominal pain (77.6%), non-bilious vomiting (62.2%) and loss of appetite (31.5%). A palpable mass is found in 61.5%. Anaemia is seen in 31.5%, leukocytosis in 11.9%. The imaging/diagnostic techniques described the most are plain abdominal X-ray (50%), endoscopy (42%) and CT scan (39.2%). Extension beyond the pylorus was reported in 60%. Removal by laparotomy is described in 79% with a 100% success rate and a 6% complication rate. Removal by endoscopy was attempted in 21% and successful in 10% with a complication rate of 10%. Laparoscopic removal was attempted in 16 children (11%), with a high success rate (87%), 12.5% conversions and no complications.

**Conclusions** TBZ in children are uncommon and rarely described in the literature, mostly as case reports. Most patients with TBZ are primary school girls presenting with vague gastrointestinal or abdominal symptoms. Minimal invasive removal of TBZ has been described by endoscopy (with low success rate) or by laparoscopy (in only 16 cases). Laparoscopic removal may be a promising alternative treatment in experienced hands.

**Keywords** trichobezoar, systematic review, PRISMA, laparoscopy, minimal invasive, treatment

### S I.8: LAPAROSCOPIC TREATMENT OF CELIAC ARTERY COMPRESSION SYNDROME IN CHILDREN

Alexander Razumovsky<sup>1</sup>, Victor Rachkov<sup>\*2</sup>, Zoricto Mitupov<sup>1</sup>, Abdumanap Alkhasov<sup>1</sup>, Said-Khassan Bataev<sup>2</sup> and Nikita Stepanenko<sup>1</sup>

E-mail: Victor Rachkov — vrachcov@mail.ru

<sup>1</sup>Filatov children's Hospital, Sadovaya-Kudrinskaya str. 15, Moscow, Russia;

<sup>2</sup>Russian National Research Medical University, Ostovityanova str. 1, Moscow, Russia

**Background** The celiac artery (CA) compression syndrome (CACS) is a rarely diagnosed disorder, which is characterized by chronic abdominal pain and vegetative symptoms. The role of surgical treatment in CA decompression has been discussed controversially by numerous authors.

**Materials and methods** Three patients (median age, 15 years) diagnosed with CACS underwent laparoscopic decompression. The patients presented with chronic abdominal pain, vegetative symptoms and a reduced quality of life. Doppler sonography showed an increased blood flow velocity of the CA with maximum of 190-300 cm/s (mean 205 cm/s). CT angiography and angiography demonstrated a characteristic hook-shaped appearance of the CA with severe localized compression.

**Results** All patients underwent laparoscopic decompression of the CA. The procedure consisted of division of the median arcuate ligament and complete mobilization of the CA from its origin on the aorta to its trifurcation. Average operating time was 65 minutes, and the average length of stay was 4 days. We did not observe any complications. Postoperatively all patients were immediately free of abdominal pain. Doppler sonography showed a marked reduction in CA blood flow velocity. An increase of vessel diameters to normal dimensions was documented by postoperative CT angiography.

**Conclusions** Laparoscopic treatment of celiac artery compression syndrome offers a novel, safe, reliable and, compared to open surgery, less invasive approach. The surgical treatment is indicated in patients with characteristic symptoms and typical findings at Doppler sonography and CT after exclusion of other abdominal pathologies.

**Keywords** celiac artery compression syndrome, laparoscopy

### S I.9: MINIMALLY INVASIVE APPROACH TO TREATMENT OF CHOLEDOCHOLITHIASIS IN NEONATES: CASE REPORT

Maria Grazia Scuderi<sup>\*1</sup>, Antonello Basile<sup>2</sup> and Vincenzo Di Benedetto<sup>1</sup>

E-mail: Maria Grazia Scuderi — mgscuderi@gmail.com

<sup>1</sup>Pediatric Surgery and NICU department Policlinico Vittorio Emanuele Hospital University of Catania, Via Santa Sofia 78, 95100 Catania, Italy; <sup>2</sup>Adult and Pediatric Radiology — University of Catania, Via Santa Sofia 78, 95100 Catania, Italy

**Background** The management of common bile duct stones in neonates has not been clearly fully standardized. Many therapeutic approaches have been proposed but there is no consensus on management for this age group, although percutaneous image-guided washing of the bile duct is generally adopted as the first-line treatment. We describe the case of a 4-months-old infant with complicated choledocholithiasis in whom laparoscopic cholecystostomy combined by image-guided cholangio-drainage was performed successfully. This mini-invasive strategy may be an alternative to surgery in cases of impacted and complicated choledocholithiasis.

**Materials and methods** CASE REPORT: a 4-months-old infant with a weight of 6350 gr was referred to our institution for progressive weight loss, white stools, and jaundice. There was familial history of maternal Gilbert syndrome with gallstones. He was born by normal vaginal delivery at full term with no significant antenatal history. The physical examination revealed an infant with marked jaundice, fever, normal neurologic responses, and mild hepatomegaly.

Biologic tests confirmed the cholestatic syndrome: bilirubin 16 mg/dl, and direct bilirubin 14 mg/dl. Abdominal ultrasound showed a choledocholithiasis in the middle of dilated common bile duct, MR evidenced dilatation of intrahepatic and extrahepatic biliary tracts. Oral therapy with ursodeoxycholic acid was unsuccessful. The baby was treated in two steps. First a laparoscopic cholecystostomy was performed to derive the bile and reduce direct bilirubin (5,6mg/dl) and to treat fever and infection. After 3 weeks we performed cholangiodrainage under fluoroscopy guidance. A percutaneous transcystic opacification confirmed the choledocholithiasis with complete resolution of intrahepatic biliary tract dilatation and the stone of 3 mm still present into the biliary duct. A 0.018-inch Jag guide wire (Boston Scientific, Boston, MA) was advanced and directed by fluoroscopy into the common bile duct, then a Bantam balloon (ClearStream) was used to dilate the duct and to push the stone into the duodenum. The 4-French catheter was inserted to wash and contrast the biliary tree with rapid opacification of duodenal lumen and was left in place for 3 days.

**Results** All clinical symptoms regressed and the cholecystostomy was closed after two weeks. There was no significant per-procedural or post-procedural morbidity. The patient is well and asymptomatic, with normal liver function tests and abdominal ultrasounds after over 5 months of follow-up.

**Conclusions** Choledocholithiasis is relatively uncommon in neonates and infants. In the perinatal period, cholelithiasis and choledocholithiasis may resolve spontaneously. However, cho-

lecystitis, cholangitis, or biliary pancreatitis may occur and the management of these complications in infants poses new therapeutic challenges. This minimal invasive approach was useful, safe in absence of complications.

**Keywords** cholelithiasis, neonates cholelithiasis, choledocholithiasis, laparoscopy

### S I.10: LAPAROSCOPIC TREATMENT OF CONGENITAL CHOLEDOCHAL CYSTS IN CHILDREN

Vasyl Prytula<sup>1</sup>, Oleg Godik\*<sup>3</sup>, Valerie Soroutchan<sup>1</sup>, Alexander Dubrovin<sup>1</sup>, Roman Zhezhera<sup>3</sup> and Dmitry Zhumik<sup>2</sup>

E-mail: Oleg Godik — ogodik@gmail.com

<sup>1</sup>National Medical University, 13 Tarasa Shevchenko bvl., Kiev, Ukraine;

<sup>2</sup>National Specialized Childrens Hospital, 28/1 Chernovola str., Kiev, Ukraine;

<sup>3</sup>Clinic, 3 Zoologicheskay str., Kiev, Ukraine

**Background** In the last decade the view upon surgical treatment of congenital biliary tract malformations has significantly changed. Today the approach tends to be laparoscopic in most cases. Nevertheless many authors indicate that the ability to perform laparoscopy for such conditions depends on the learning curve of the surgeon.

**Materials and methods** In the last 5 years we admitted to our clinics 5 patients with a congenital choledochal cyst (CDC). The median age was 4 years (range 11 months- 12 years). There were three of the type I and two of type IV cysts according to Todani's classification. Three patients had large cysts up to 6-8cm. Patients were positioned in the „French" position. For all the cases we used a 5 mm camera positioned transumbilicaly, and 4 working trocars 5 mm or 3 mm — depending on the age of the patient. The average time of operation was 160 ±25 minutes. The Roux-en-Y jejunal loop was carried out extracorporally through the umbilicus. In three cases we performed a cyst excision with a Roux-en-Y hepatico-jejuno-anastomosis, and in two cases we performed hepatico-duodeno-anastomosis.

**Results** We made a retrospective analysis of the laparoscopic treatment of children with CDC. All patients presented with abdominal pain. In two children there was pancreatitis, and three children had jaundice. The choice to perform a hepatico-duodeno- anastomosis after cyst resection was based on the small sizes of the cyst and its localization in the distal part of the common bile duct. There were no conversions in all the MIS cases. When analyzing the time of operation we came to see that performing a hepatico- duodeno- anastomosis instead of hepatico- jejuno- anastomosis shortens the time of operation by 1/3. However the post- op hospital stay did not depend on witch type of anastomosis was performed, the average of which was 6 days. The follow- up was up to 3 years after operation with no stenosis, cholangitis, or other complications.

**Conclusions** Laparoscopic resections of CDC in children is an excellent treatment option. Selecting the type of reconstruction of the bile system weather to perform a Roux-en-Y hepatico- jejuno-stomy or a direct hepatico- duodeno-stomy

depends on the size and localization of the cyst, and also the length of the bile duct after resection.

**Keywords** choledochal cyst, laparoscopic treatment, roux-en-y, hepaticojejunostomy, hepaticoduodenostomy, children

### S I.11: LAPAROSCOPIC TREATMENT OF ACHALASIA IN CHILDREN

Alexander Razumovsky<sup>1</sup>, Victor Rachkov\*<sup>2</sup>, Zoricto Mitupov<sup>1</sup>, Abdumanap Alkhasov<sup>1</sup>, Nikita Stepanenko<sup>1</sup> and David Chubko<sup>3</sup>

E-mail: Victor Rachkov — vrachcov@mail.ru

<sup>1</sup>Filatov Children's Hospital, Sadovaya-Kudrinskaya str. 15, Moscow, Russia;

<sup>2</sup>Russian National Research Medical University, Ostovityanova str. 1, Moscow, Russia;

<sup>3</sup>Krasnoyarsk Regional Clinical Children's Hospital, Krasnoyarsk, Russia

**Background** Several surgical techniques are used nowadays for the treatment of achalasia in children: balloon dilatation, injection of Botulinum toxin and surgical operation. The optimal management of oesophageal achalasia remains unclear in the paediatric population due to the rarity of the disease. This study reviews the single hospital experience of the laparoscopic Heller's cardiomyotomy (HC) procedure.

**Materials and methods** Between 1991 to 2017, 42 patients with achalasia were treated in our hospital. Since 2011, all patients (30 cases) underwent the laparoscopic HC with Dor fundoplication. Mean age was 9.9 (4-15) years. During the laparoscopic procedure, we mobilize the anterior wall of the distal esophagus and gastric fundus. Cardiomyotomy was formed near 3 cm above and 1,5-2 cm below gastroesophageal junction. The mucosa was exposed for ½ of esophageal circumference. The Dor fundoplication was performed in all cases.

**Results** The mean operative time was 75 minutes. Mean hospital stay was 6 days. Intraoperative complication - esophageal mucosa injury occurred during the myotomy in 3 cases (7.5%) which were cured during the laparoscopic procedure. There were no conversions to open procedure. Six (20%) required re-intervention: pneumatic dilatations (n=2), balloon dilatation (n=2) and redo-surgery (n=2).

**Conclusions** Laparoscopic HC for achalasia is effective in 80% of children. We consider the laparoscopic HC with Dor fundoplication the procedure of choice in the treatment of achalasia in children.

**Keywords** achalasia, laparoscopy

### S I.12: LAPAROSCOPIC HELLER MYOTOM FOR THE TREATMENT OF ACHALASIA IN CHILDREN

Oleg Godik\*<sup>1</sup>, Alexander Dubrovin<sup>1</sup>, Valerie Soroutchan<sup>1</sup>, Roman Zhezhera<sup>1</sup> and Vasil Nedbala<sup>2</sup>

E-mail: Oleg Godik — vrachcov@mail.ru

<sup>1</sup>National Medial University, 13 Tarasa Shevchenko blv., Kiev, Ukraine;

<sup>2</sup>National Specialized Children's Hospital, 28/1 Chernovola str. Kiev, Ukraine

**Background** In the past couple of decades there has been

much discussion about different methods for the treatment of achalasia in the child age: pharmacologic therapy; botulinum toxin injection; pneumatic dilatation. Since then surgery has been proven to be the most effective treatment for this pathology.

**Materials and methods** In the last 18 years 51 patients were admitted to our clinic with achalasia. For verification of diagnosis in all cases we performed a barium swallow and upper endoscopy. There were 29 (56.9%) patients with type I, and 22 (43.1%) children presented with type II achalasia. There were 26 (51%) boys and 25 (49%) girls. Out of all the cases, 16 (31.4%) patients underwent a Heller myotomy with Dor fundoplication, 4 (25%) open operations and 12 (75%) cases of MIS. Other 35 (68.6%) kept receiving pneumatic dilatation and medical therapy. In cases of MIS the mean age of the patients was 13 years  $\pm$  1 year. We used a 5 mm camera positioned transumbilically and 5 mm trocars positioned in a triangular fashion. The length of myotomy was 4–5 cm on the esophagus and 2.5–3 cm on the stomach, and the Dor fundoplication gap was fixated to the right diaphragmatic crus. To check the integrity of the esophagus after performing myotomy we had an upper endoscopy performed at operation for all MIS cases. The average time of MIS was 82 $\pm$ 4 minutes. In all cases children started drinking and eating mesh food with in 12–18 hours after operation. Barium swallow was performed on the third post-op day.

**Results** Analyzing the results of treatment in 51 patients with achalasia, in 46 of them we carried out pneumatic dilatation. In 5 children surgery was the primary treatment. Out of all the patients that received dilatation in 23.9% with unsatisfactory results we performed an MIS Heller myotomy. From the 35 children that kept receiving dilatation 29 (82.8%) patients required repeated dilatations up to once or twice a year within the next 5 years after first dilatation. In the group of patients who had an MIS performed there were two cases with complications. In one case there was perforation of the esophagus when performing myotomy. The second complication was a left-sided pneumothorax. In the group that underwent an open operation we did not have complications. From the children who had MIS performed we saw a faster recovery and smaller duration of hospital stay.

After surgical treatment within the next 54 months children did not require further treatment and all patients had post-op follow ups with a clinical score Visik 1.

**Conclusions** We believe that the first line of treatment for achalasia in children should be surgery, as after its performance children do not require any further treatment, compared to treatment with dilatations where all the patients require following procedures. Laparoscopic Heller myotomy with Dor fundoplication is a safe and effective method for the surgical treatment of achalasia in children and should be the method of choice.

**Keywords** achalasia, children, laparoscopic Heller myotomy with Dor fundoplication

### S I.13: LAPAROSCOPIC CARDIOMYOTOMY FOR THE TREATMENT OF ACHALASIA IN CHILDREN

Andrzej Grabowski\*<sup>1</sup>, Wojciech Korlacki<sup>1</sup>, Michał Pasierbek<sup>1</sup> and Maciej Ilewicz<sup>1</sup>

E-mail: Andrzej Grabowski — grendolino@wp.pl

<sup>1</sup>Medical University of Silesia, Katowice, Poland School of Medicine with the Division of Dentistry in Zabrze Department of Children's Developmental Defects Surgery and Traumatology, ul. 3 Maja 13-15, 41-800 Zabrze, Poland

**Background** Achalasia is rarely seen in children but is characterized by greater severity and less susceptibility to conservative treatment even with botulinum toxin injection and balloon dilation. There are indications for early implementation of surgical treatment. Laparoscopic cardiomyotomy has become the method of choice in recent years. Evaluation of laparoscopic efficacy of Heller's cardiomyotomy in the management of pediatric achalasia.

**Materials and methods** In the years 2010-2015 laparoscopic cardiomyotomy was performed in 8 patients (6 boys and 2 girls) between 9 and 17 years of age (mean 13.5 years). Symptoms of dysphagia occurred in all patients, 90% of them reported vomiting, 70% had weight loss or insufficient growth. Mean duration of symptoms and conservative treatment was 16 months. Qualification for treatment based on positive manometry (100%), gastroscopy (45%), and radiological examination (100%).

**Results** There were no conversions. Three patients had an intraoperative perforation of the oesophageal mucosa which was sutured laparoscopically. In patients with mucosal perforations Thal's anterior fundoplication was done in the remaining 5 patients posterior Toupet's fundoplication. The average hospital stay was 5.3 days, average diet time 2.6 days. In 6 patients lasting improvement was achieved. In 2 children partial recurrences of dysphagia was observed. Endoscopic dilations were performed — in 1 case with excellent result, in 1 with significant subjective improvement.

**Conclusions** Laparoscopic Heller's cardiomyotomy is a safe and effective method to restore the function of the oesophagus in children with achalasia. Supplemented with postoperative oesophageal dilation allows to eliminate the symptomatic dysphagia. The laparoscopic method gives excellent visualisation of the operative field, better cosmetics effect, less postoperative pain, and shorter convalescence.

**Keywords** achalasi, laparoscopic, Heller cardiomyotomy, children

## Session II, Gastrointestinal II

### S II.1: LAPAROSCOPIC APPROACH IN HIRSCHSPRUNG'S DISEASE

Maricarmen Olivos<sup>1</sup>, Simon Clarke<sup>1</sup>, Muhhamad Choudhry<sup>1</sup> and Munther Haddad\*<sup>1</sup>

E-mail: Maricarmen Olivos — maricarmen.olivos@gmail.com

<sup>1</sup>Chelsea and Westminster Hospital NHS Foundation Trust/Paediatric Surgery Service, 369 Fullman Road. London, UK

**Background** Since the introduction of laparoscopy in paediatric surgery, classic pullthrough techniques for Hirschsprung Disease's (HD) were adapted, with less postoperative pain and superior cosmetic result. We evaluate the outcomes of patients with HD underwent procedures with minimally invasive surgery (MIS).

**Materials and methods** The data of all cases which underwent MIS for HD over an 8 years period in a single institution were reviewed. Demographics, operative details, complications and outcomes were examined.

**Results** 50 patients were included. In 29 patients primary videoassisted pullthrough was performed, with laparoscopic abdominal inspection, evaluation of colonic dilatation, biopsies, identification of transitional zone, and colonic mobilization. (26 Soave, 2 Duhamel and 1 Swenson).

14 patients had a previous ostomy and were managed with videoassisted pullthrough and ostomy closure (11 soave, 3 duhamel).

4 patients during the laparoscopic inspection of the abdominal cavity, significant colonic dilatation was found, and a levelling colostomy was performed. 2 of them are waiting for definitive surgery.

3 cases required conversion, one of which had neonatal bowel perforation.

Medium age at surgery was 12 months (1 up to 110).

In the first 30 days postoperative 2 patients required another surgical procedure, 1 intestinal obstruction for adhesions and 1 drainage for buttock abscess. In the medium and long-term outcomes 7 patients develop stenosis and 4 required a redo pullthrough. 4 patients presented with enterocolitis, 2 intestinal obstructions for adhesions and 1 anastomotic leak post ileostomy closure.

**Conclusions** The laparoscopic approach is a safe alternative in patients with HD, with the advantage to inspect the colon before start the pullthrough and avoid a excessive stretching of the muscular anorectal complex for the dissection of mesocolon and allow to dismiss any torsion of the descended colon.

**Keywords** Hirschsprung's Disease, videoassisted pullthrough, laparoscopic

## S II.2: SINGLE CENTER EXPERIENCE IN TREATMENT OF HIRSCHSPRUNG'S DISEASE IN CHILDREN WITH MODERN APPROACH

Vasyl Prytula<sup>1,2</sup>, Mykhailo Silchenko<sup>2</sup>, Anatolii Levytskyi<sup>1,2</sup>, Oleg Kurtash<sup>\*1,2</sup>, Faizullah Hussaini<sup>1,2</sup>, Oleg Godik<sup>1,2</sup> and Andriy Kuzyk<sup>1,2</sup>

E-mail: Vasyl Prytula — prytulavp@yahoo.com

<sup>1</sup>Bogomolets National Medical University, Chornovola str. 28/1, Kyiv 01135, Ukraine; <sup>2</sup>National Children's Specialized Hospital „Ohmatdyt”, Chornovola str. 28/1, Kyiv 01135, Ukraine

**Background** Hirschsprung's disease (HD) belongs to a group of severe congenital abnormalities of the colon. The frequency of HD has increased in the world by 15 times in recent years. It has been significantly promoted by early diagnosis. For HD treatment many surgical techniques were used O. Swenson (1948), B. Duhamel (1956), F. Rehbein (1959), F. Soave (1963), H. Lynn (1956). There are many modifications of these techniques. However, none of the techniques have produced good functional results. Currently, modern approach for many surgical diseases in pediatric surgery is the use of minimal invasive technique. Georgeson K. E. et al conducted multi-centre study in 1999 determined that the new golden standard for treatment of HD is laparoscopic assisted transanal endorectal pull-through (TEPT). Our center has vast experience in treatment of HD in children. We have been through all the historical operations for HD since last 40 years but since 2011 we are treating HD with TEPT and laparoscopic assisted TEPT. The aim of the study. Analyze results of treatment of HD in children with minimal invasive approach.

**Materials and methods** With the use of minimal invasive technique we treated 152 children with HD from October 2011 to March 2017. They included 87 patients with TEPT and 65 patients with laparoscopic assisted TEPT. 32 (21.05%) patients aged up to 1year, 69 (45.40%) patients aged from 1 to 3 years, 33 (21.71%) patients aged from 4 to 5 years and 18 (11.84%) patients aged over 6. Rectal form of aganglionosis was diagnosed in 109 (71.71%) patients, rectosigmoid was observed in 40 (26.32%) patients, subtotal one was detected in 3 (1.97%) patients. For diagnosis we considered results of general clinical tests, thorough anamnesis, physical examination, laboratory and instrumental tests: complete blood and urine test, ECG, ultrasound of internal organs, barium enema, barium swallow, proctosigmoidoscopy, colonoscopy, anorectal manometry, histological determination of acetyl cholinesterase.

**Results** After HD diagnosis patients were prepared for the surgery. Colon lavage was performed with enemas.

We noticed that in children under the age of 4 TEPT can be performed without laparoscopic assistance, even for the patients with sigmoid colon aganglionosis, without significant colon dilatation. Laparoscopic assisted TEPT was used in the other cases.

Two teams worked at the same time during laparoscopic assisted TEPT. First team of laparoscopic stage (1 surgeon and 1 assistant) and the second team of transanal dissection of the rectum and endorectal pull-through stage (1 surgeon and 2 assistants).

Child was placed in lithotomy position on the operating table. Three ports 5.5 mm in diameter were used: the 1st one below the umbilicus for 30° optics, 2nd and 3rd were working ports for the surgeon (left upper and right lower quadrants).

Revision of colon was performed to determine the level of colon resection; colon was mobilized starting from the peritoneum transitory fold to the necessary resection level, by ligating mesentery vessels, and separating colon along the flanks.

After determination of the proximal resection line, mesentery dissection was started using ultrasonic scalpel „Lotus” and bipolar coagulator to avoid bleeding. If aganglionic area was longer than the mid-point of sigmoid colon, we usually additionally mobilized the colon with a view to provide resection of 10–20 cm of the colon above the aganglionic area. This colon is usually dilated will not function and can be the reason for the defecation delay and chronic enterocolitis which occur after radical surgeries on HD.

The next stage involved transanal demucosation of the rectum, till peritoneum transitional fold forming the serous-muscular pouch, similar to Soave operation.

Before that anus was perfectly extended applying 6–8 retracting ligature sutures around the entire circumference of the anus. From the dentate line to perianal skin (3 cm) in the radial direction. These sutures were tied for anus evagination which simplified transanal dissection. From 0.5 to 1 cm above the dentate line mucous membrane was dissected and stay sutures were put around its circumference. Stay sutures were put both before and after dissection of rectal mucosa which promoted mucosa traction and facilitated endorectal dissection. Endorectal dissection was continued in the proximal direction until the muscle layer of the rectum easily evaginated. Another sign that our dissection reached the level of the abdominal cavity was arrest of bleeding in blunt separation of the mucosa from the muscle layer.

The posterior wall of the muscular pouch was further dissected 1–2 cm above endorectal dissection of the mucosa. If we did not reach the level of the transition folds, we continued demucosation until we reached free access to the abdominal cavity. The pouch should be at least 5 cm in length, and the back wall must be dissected to the level of 1 cm above the line of the intended anastomosis formation. Dissection of the back wall is important in order for neorectum to be free as not dissected pouch narrows formed rectum in most patients. Pull-through is not a problem when dissection of the pouch is conducted above the level of the intended anastomosis. Transanal dissection extends anal pouch (serous-muscular pouch) to such a width that would allow the formation of normal rectal pouch. Usually a reduction of muscular layer of not dissected pouch may reach such an extent that it prevents the formation of a rectal pouch in neorectum which in turn can cause relapse.

Mobilized colon was pulled through via serous-muscular pouch to the level of the intended colon resection and colo-anal anastomosis was performed using interrupted absorbable stitches. Endotracheal tube was inserted above the line of anastomosis with its fixing to the buttocks skin.

Carbo-peritoneum was re-performed for revision of pull-through colon. Attention was paid to correct placing of colon because the twist of colon can cause obstruction and to prevent internal hernia. Then, carbo-peritoneum was eliminated, ports were removed. Sites of ports were sutured.

The duration of laparoscopic assisted TEPT constituted 120–175 minutes, hospital stay lasted 5–10 days, the length of the resected colon 20–65 cm. Follow-up duration in the postoperative period constituted from 1 month to 5 years.

Colo-anal anastomosis insolvency was noted in two (1.32%) children due to physical activity in the early postoperative period which was managed by open stage treatment. It included ascending colon colostomy with conservative treatment (stage 1), and colostomy closure with colon (stage 2) after 2 months.

In the remote period all children underwent rehabilitation treatment with good functional results.

TEPT is a fragment of the laparoscopic assisted TEPT. The main positive qualities of TEPT combined with laparoscopic assisted TEPT include low injury rate; low probability of abdominal organs trauma, minimized blood loss, reduced risk of adhesions; reduction in the duration of surgical treatment and anesthesia; more favorable postoperative period with less pain simplified patient care, reduction of hospital stay.

We consider severe anus injury during rectum demucosation and further mobilization of pull-through colon to be the main disadvantages of TEPT method which may be the main reason for anal sphincters failure. This requires further thorough investigations with the research, development and implementation of more sparing technical elements of this stage.

Generally, the advantages of laparoscopic assisted TEPT involve the fact that such an operation provides improvement in correction of HD in children. Laparoscopic stage offers the opportunity for a thorough revision of the affected colon. Laparoscopic revision makes it possible to easily remove mesenteric end without tension. Such intervention allows elimination of the additional ligaments holding the rectum, provides an opportunity to avoiding tension in colo-anal anastomosis, and to control the correct position of pull-through colon to prevent its twisting which may cause an obstruction. In older patients proximal end of the rectum may be dissected laparoscopic assistance making TEPT simpler quicker and safer.

## Conclusions

1. TEPT with laparoscopic assistance can be performed in children above 4 years with significant dilation of the colon, more longer forms of HD. In children below 4 years TEPT can be performed without laparoscopic assistance.
2. TEPT and laparoscopic assisted TEPT has low injury rate; low abdominal organs trauma, minimized blood loss, reduced risk of adhesions; reduction in duration of operation and anesthesia; more favorable postoperative period with less pain simplified patient care, reduction of hospital stay.

**Keywords** Hirschsprung’s disease, treatment, laparoscopy, results, children

## S II.3: ANALYSIS OF ENDOLOOPS AND ENDOSTAPLER FOR CLOSING THE APPENDICEAL STUMP DURING LAPAROSCOPIC APPENDECTOMY

Miro Jukić<sup>\*1</sup>, Mislav Rakić<sup>2</sup>, Zenon Pogorelic<sup>1</sup>, Ivana Mrklič<sup>1</sup>, Robert Kliček<sup>2</sup>, Nikica Družijanić<sup>1</sup>, Zdravko Perko<sup>1</sup> and Leonardo Patrlj<sup>2</sup>

E-mail: Miro Jukić — mirojukic.mefst@gmail.com

<sup>1</sup>University hospital of Split, Spinčićeva 1, Croatia; <sup>2</sup>Clinical hospital Dubrava Zagreb, Avenija Gojka Šuška 6, Croatia

**Background** An inadequate closure of the appendiceal stump can lead to intra-abdominal surgical site infections. The aim of this study was to assess the efficiency of different closure techniques by focusing on the intraoperative and postoperative complications versus cost.

**Materials and methods** From June 2011 to June 2013, 333 patients from two different hospitals undergoing laparoscopic appendectomy were included in this study. The patients were divided into two groups based on the technique used for appendiceal stump closure: there were 104 patients in the stapler group and 229 in the loop group.

**Results** Among the 333 patients who underwent laparoscopic appendectomy, there were two (0.6%) intraoperative complications and 22 (6.6%) postoperative complications. There were no significant differences between the groups with respect to the intraoperative and postoperative complications. The length of the operation was 7 min shorter when the endoloop was used ( $p=0.014$ ). The mean costs of the operation were significantly lower when the loop was used (<euro> 554.93) compared to the stapler (<euro> 900.70) ( $p=0.000$ ).

**Conclusions** There is no clinical evidence supporting the routine use of endoscopic staplers. The appendiceal stump can be secured safely with the use of endoloops in the majority of patients. Surgeons have to be more selective when choosing how to perform closure, and an endostapler should be used only in cases where it is clinically indicated.

**Keywords** appendicular stump, children, endoloop, laparoscopic appendectomy, endostaples

#### S II.4: A COMPARISON OF ENDOLOOP LIGATURES AND NONABSORBABLE POLYMERIC CLIPS FOR THE CLOSURE OF THE APPENDICULAR STUMP DURING LAPAROSCOPIC APPENDECTOMY IN CHILDREN

Zenon Pogorelić<sup>1</sup>, Boris Kostovski<sup>2</sup>, Ana Jerončić<sup>2</sup>, Tomislav Šušnjar<sup>1</sup>, Ivana Mrklič<sup>1</sup>, Miro Jukić<sup>1</sup> and Ivo Jurić<sup>1</sup>

E-mail: Zenon Pogorelić — zpogorelic@gmail.com

<sup>1</sup>University hospital of Split, Spinčićeva 1, Croatia; <sup>2</sup>University of Split, School of Medicine, Soltanska 2, Split, Croatia

**Background** The aim of this prospective trial was to evaluate the clinical outcomes of nonabsorbable polymeric clips in laparoscopic appendix stump closure in children by comparing the endoloop ligature.

**Materials and methods** From June 2011 to June 2016, 277 children who underwent laparoscopic appendectomy were included in the study. The patients were divided into two groups based on the technique used for appendiceal stump closure: there were 101 patients in the polymeric clips group and 176 in the endoloop group. The risk of intraoperative and postoperative complications was investigated for two different techniques to close the appendiceal stump.

**Results** Among the 277 patients who underwent laparoscopic

appendectomy, no intraoperative complications and 17 (6.1%) postoperative complications were recorded. There were no significant differences between the groups with respect to the postoperative complications ( $P=0.546$ ). The median length of the operation was 10 minutes shorter when the polymeric clips were used ( $P<0.001$ ). The median hospital stay was also shorter in the polymeric clips group ( $P=0.008$ ). Costs of polymeric clip were significantly lower (€ 17.64) compared to endoloop (€ 34.16).

**Conclusions** Closure of the appendix stump with polymeric nonabsorbable clips in laparoscopic appendectomy reduces operative time and may be a cost-effective and simpler alternative to widely used endoloops.

**Keywords** appendicular stump, children, endoloop, laparoscopic appendectomy, polymeric clips

#### S II.5: LAPAROSCOPIC TREATMENT FOR COMPLICATED APPENDICITIS IN CHILDREN: A COMPARATIVE STUDY WITH OPEN APPENDECTOMY

Roman Zhezhera<sup>\*1</sup>, Vasyl Prytula<sup>2</sup>, Oleksandr Grishin<sup>1</sup>, Oleg Godik<sup>2</sup> and Valaerie Soroutchan<sup>2</sup>

E-mail: Roman Zhezhera — roman.zhezhera83@gmail.com

<sup>1</sup>National Specialized Children's Hospital, Chernovola str. 28/1, Ukraine;

<sup>2</sup>National Medical University, Tarasa Shevchenka bulv. 13, Ukraine

**Background** This study is aimed to show the benefits of MIS for the treatment of complicated forms of appendicitis in children and compared the open approach of treatment.

**Materials and methods** We retrospectively analyzed 1502 cases of acute appendicitis in children who were admitted to the National Specialized Children's Hospital «OKHMATDYT» from 2009 to 2016. We compared the results of laparoscopic appendectomy (LA) and the open appendectomy (OA) for the treatment of complicated forms of appendicitis. Comparison was based on such parameters: analgesia and antibiotic use, length of hospital stay, return to activity, and complication rates.

**Results** In total there were 1426 cases of complicated acute appendicitis in children from age 1,8 to 18 years old. 448 cases were treated with the laparoscopic approach and 978 cases with the open approach. According to the parameters of comparison the group with open approach had a significantly longer mean of hospital stay (LA -  $5\pm 1,5$  days vs OA -  $8\pm 2,4$  days), longer analgesia use (LA —  $3\pm 1$  days vs OA —  $5\pm 2$  days) and a longer admission of antibiotics ( LA —  $4\pm 1$  days vs OA —  $6\pm 1,4$  days) than those treated with laparoscopic appendectomy. The incidence of wound infection (10/448 [2.23%] for LA vs 52/978 [5.31%]) and postoperative intraabdominal infiltrate (7/448 [1.56%] for LA vs 32/978 [3.27%] for OA) was lower in the LA group. There were no postoperative intraabdominal abscess in both groups. No mortality was observed in either group.

**Conclusions** The minimally invasive laparoscopic technique is feasible, safe, and efficacious for the surgical treatment of complicated appendicitis. Laparoscopic appendectomy should be

the initial procedure of choice for most cases of complicated appendicitis in children.

**Keywords** complicated appendicitis, laparoscopic, appendectomy, open appendectomy, children

## S II.6: SINGLE PORT VERSUS 3-PORT LAPAROSCOPIC APPENDECTOMY IN CHILDREN – A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL COMPARING INFLAMMATORY RESPONSE AFTER TISSUE TRAUMA

Andrzej Gołębiewski<sup>1</sup>, Stefan Anzelewicz\*<sup>1</sup>, Agnieszka Wiejek<sup>1</sup>, Dominika Lubacka<sup>1</sup> and Piotr Czauderna<sup>1</sup>  
E-mail: Andrzej Gołębiewski — angol@gumed.edu.pl

<sup>1</sup>Department of Surgery and Urology for Children and Adolescents, Medical University of Gdansk, ul. M. Skłodowskiej-Curie 3a, 80-210 Gdańsk, Poland

**Background** The aim of the study was to evaluate single port laparoscopic appendectomy (SPLA) in comparison with conventional 3-port laparoscopic appendectomy (3PLA) in children in relation to the extent of surgical trauma after SPLA and 3PLA measured by serum interleukin 6 and C-reactive protein concentrations.

**Materials and methods** A total of 50 patients with a median age of 11,5 were randomized to either SPLA or 3PLA groups. The surgeries were performed by experts in both methods. The decision on the type of planned surgery was determined after admission. Serum interleukin 6 (IL-6) and C-reactive protein (CRP) levels were measured using an enzyme-linked immunosorbent assay before surgery, 12 and 36 hours after surgery. In addition, we compared operating time, hospital stay, postoperative pain and complication rates.

**Results** The operative time in the 3PLA group was significantly shorter than that in the SPLA group. Preoperative IL-6 levels were not different between the two groups, but the rise (preoperative vs postoperative) of IL-6 in the SPLA group was remarkably higher compare to the 3PLA group. Similar results were obtained for CRP; basal serum CRP levels were not different between the 2 groups, but the rise of CRP in the 3PLA group was significantly lower compared with that in the SPLA group. During the first 12 hours post-op the SPLA patients reported more severe postoperative pain and longer inpatient opiate usage was noted than after 3-port laparoscopy. Only 1 SPLA case was converted to 3PLA. There were no conversions to open surgery. The length of hospital stay and complication rate were not different between the two groups.

**Conclusions** Single port laparoscopic appendectomy in children is associated with longer operative times, increased pain level and more severe surgical trauma as measured by postoperative CRP and IL-6 levels in comparison with 3-port laparoscopic appendectomy. The two approaches were comparable in terms of length of hospital stay and complication rates.

**Keywords** child, laparoscopic surgery, inflammation

## S II.7: SINGLE PORT LAPAROSCOPIC APPENDECTOMY

Michał Puliński\*<sup>1</sup>, Wojciech Choiński<sup>1</sup>, Tomasz Janowicz<sup>1</sup> and Marta Szymańska<sup>2</sup>

E-mail: Michał Puliński — pulinski@wp.pl

<sup>1</sup>Clinical Ward of Pediatric Surgery and Urology, Provtional Specialistic Childrens' Hospital in Olsztyn, ul. Żołnierska 18 10-566 Olsztyn, Poland; <sup>2</sup>Pediatric surgery students' association, Faculty of Medical Science, University of Warmia and Mazury in Olsztyn, ul. Żołnierska 18 10-566 Olsztyn, Poland

**Background** 317 laparoscopic appendectomies were performed in Provtional Specialistic Childrens' Hospital in Olsztyn since January 2006. We are able to offer more techniques of appendectomy since 30-degree optics with 5mm working channel was bought and we learned how to perform this type of surgery. First single port laparoscopic appendectomy was performed on October 27th, 2012.

**Materials and methods** There were 52 SPLA successfully performed between 2012 – 2017. For this kind of surgery patient have to comply with three criteria: short time of presenting symptoms, in physical examination the appendix is not palpable, and there is no significant inflammatory infiltration visible around appendix in abdominal ultrasound examination. 30-degree optics with 5mm working-channel is used to perform SPLA. Longitudinal incision in the navel is made and 11mm trocar is placed accros he abdominal wall. Inspection of abdominal cavity is performed after optics is placed through the trocar. Position of the appendix and its condition is rated and decision about continuation of the surgery using single port is made. If there is no possibility to continue with this method, two additional 5 mm trocars are placed in abdominal cavity and classic laparoscopy is performed. In SPLA appendix is grasped on its end and pulled out through the navel into extra abdominal space. Bipolar coagulation is used to close supplying vessels and the appendix is ligated and cut off. The cecum is placed back in the abdomen. Second abdominal cavity inspection always is made to avoid postsurgical complications.

**Results** After SPLA the scar is placed in the navel what makes it invisible. 4 patients had navel abscess. After qualifications modification and disinfection of the navel before suturing, this kind of complications appeared. 2 patients had peritonitis and were qualified for longer antibiotic therapy. In 1 case navel's skin was burned with coagulation tool.

**Conclusions** SPLA in specific cases is easy and safe method and it is riddled with low grade of complications. In case of impossibility of SPLA continuation, it can be easily converted into classic laparoscopy and laparotomy.

**Keywords** SPLA, laparoscopic appendectomy, single port

## S II.8: MINIMALLY INVASIVE APPROACH TO GASTROINTESTINAL TRACT DUPLICATION CYSTS IN CHILDREN

Ufuk Ates\*<sup>1</sup>, Gulnur Gollu<sup>1</sup>, Kutay Bahadir<sup>1</sup>, Orkan Ergun<sup>1</sup>,

Aydin Yagmurcu<sup>1</sup>, Tanju Aktug<sup>1</sup>, Huseyin Dindar<sup>1</sup> and Meltem Bingol-Kologlu<sup>1</sup>

E-mail: Ufuk Ates — drufukates@gmail.com

<sup>1</sup>Ankara University Faculty of Medicine Department of Pediatric Surgery, Dikimevi Ankara, Turkey

**Background** Alimentary tract (AT) duplications are rare lesions in children. They can be seen at any level of AT, from esophagus to rectum and can be in cystic or tubular shape. The treatment is complete surgical removal of the cyst. Minimal invasive surgery (MIS) has become procedure of choice in management of AT. Therefore, we aimed to evaluate the results of MIS at AT duplications in children.

**Materials and methods** The medical records of the children who underwent MIS for GIT duplications were reviewed retrospectively. The demographic data, clinical presentation, location, type of surgery, operation time, length of hospital stay and complications were recorded and analyzed.

**Results** Nine children underwent minimal invasive surgery for AT duplications. Among them, three had ileal duplications, two had gastric duplications and other patients had duodenal, pancreatic, cecal and esophageal duplications. All procedures were completed laparoscopically or thoracoscopically; except for a child with ileal duplication cyst. The median age of children was 3 years (1 month- 9 years). The mean operation time was 92 minutes (55 minutes- 135 minutes) and the mean length of hospital stay was 3 days (2 days- 8 days). There was no complication intraoperatively or in postoperative period.

**Conclusions** Minimal invasive surgery for management of GIT duplications in children is safe, technically feasible and effective. Excellent exposure of the duplication, better cosmetic appearance and shorter and more comfortable postoperative period are the advantages of the minimal invasive approach in management of GIT duplications in children.

**Keywords** minimally invasive approach, duplication cysts, children

## S II.9: LAPAROSCOPIC NISSEN FUNDOPLICATION FOR TREATMENT OF GER-RELATED RESPIRATORY SYMPTOMS IN CHILDREN

Ciro Esposito<sup>1</sup>, Maria Escolino<sup>\*1</sup>, Amulya Saxena<sup>2</sup>, Sabine Irtan<sup>3</sup>, Holger Till<sup>4</sup>, Mariapina Cerulo<sup>1</sup>, Francesco Turrà<sup>1</sup>, Giovanni Severino<sup>1</sup> and Alessandro Settini<sup>1</sup>

E-mail: [Ciro Esposito — x.escolino@libero.it](mailto:c.esposito@libero.it)

<sup>1</sup>Federico II University of Naples, Naples, Italy; <sup>2</sup>Chelsea Children's Hospital, London, UK; <sup>3</sup>Hopital Trousseau, Paris, France; <sup>4</sup>Medical University of Graz, Graz, Austria

**Background** Gastroesophageal reflux disease (GERD) represents the second most common cause of chronic cough in adult population. Respiratory manifestations of GERD, particularly chronic cough, are being recognized with increased frequency also in children. This survey aimed to investigate the efficacy of laparoscopic Nissen fundoplication for treatment of

GER-related chronic cough not responsive to medical therapy in neurologically normal children.

**Materials and methods** We collected data of children with GER-related chronic cough (>8 weeks) not responsive to medical therapy underwent laparoscopic Nissen fundoplication in 4 European centers of Pediatric Surgery over a 10-years period. We excluded children with neurological impairment. Pre-operative workup included chest X-ray and pH-impedance study in all patients. Bronchoscopy with bronchoalveolar lavage (BAL) and positive lipid-laden alveolar macrophage (LLAM) scoring was performed in only 1 centre.

**Results** A total of 220 laparoscopic Nissen procedures were performed in all centers in the period 2005-2015. Twenty-four (12 boys and 12 girls, average age 9.5 years) out of the 220 patients (10.9%) presented with chronic cough and other respiratory manifestations including asthma, reactive airway disease and recurrent pneumonia. Pathologies associated were esophagitis in 4 patients and a Barrett's esophagus in 1 child. Average operative time was 65 minutes. Four conversions to open surgery (1.8%) were reported. As for postoperative complications, we recorded 2 tight wraps requiring endoscopic dilatation (Clavien IIIb) and 2 relapses of GERD for slipped Nissen requiring re-operation (Clavien IIIb). Average follow-up length was 8 years. At clinical controls, respiratory symptoms solved with a significant improvement of quality of life scoring in 22/24 patients (91.6%).

**Conclusions** Our results suggest that GERD may be considered as one of the possible contributing factors in any child with chronic cough or other persistent respiratory complaints. In patients with symptoms not responsive to medical GER therapy, laparoscopic Nissen fundoplication is the treatment of choice with a very high success rate (>90% in our series) and a very low morbidity rate with a significant improvement in quality of life of patients and their families.

**Keywords** GERD, children, chronic cough, Nissen, respiratory symptoms

## S II.10: LAPAROSCOPIC REDO FUNDOPLICATIONS IN CHILDREN

Wojciech Korlacki<sup>\*1</sup>, Andrzej Grabowski<sup>1</sup>, Michał Pasierbek<sup>1</sup> and Filip Ahtelik<sup>1</sup>

E-mail: [Wojciech Korlacki — woko@plusnet.pl](mailto:woko@plusnet.pl)

<sup>1</sup>Medical University of Silesia in Katowice, School of Medicine with the Division of Dentistry in Zabrze, Department of Children's Developmental Defects Surgery and Traumatology, ul. 3 Maja 13-15, 41-800 Zabrze, Poland

**Background** Laparoscopic fundoplication is still controversial in patients with recurrent GERD who underwent surgery. The aim of this study was to assess the feasibility and efficacy of laparoscopic redo fundoplication and causes of recurrence.

**Materials and methods** In period 2000-2015 laparoscopic fundoplication was performed in 311 children (158 girls and 153 boys) in age from 3 months to 18 years (average 9.4 years).

17 (5.5%) patients (4 girls and 13 boys) required re-operation for recurrent GERD and/or symptomatic hiatal hernia. All re-operations were performed with laparoscopic technique. Redo was performed 0.5 to 13 years (average of 4.2 years) after the previous antireflux surgery. Intraoperatively in 10 (58.8%) patients rupture of hiatal crura and sliding hernia, in 5 (29.4%) sliding hernia and wrap disruption, in 1 (5.8%) wrap disruption and 1 (5.8%) paraesophageal hernia with normal wrap location were recognized. In all patients hiatal crura were re-stitched and in 10 (58.8%) strengthened using synthetic mesh. Nissen fundoplication was performed in 14 patients, Toupet in 3.

**Results** There were no intraoperative complications and conversion. Postoperative course was uneventful in all patients. In all good result was achieved and postoperative control 24-hours pH-metry confirmed the effectiveness of reoperation. Two neurologically impaired patients died due to general health conditions.

**Conclusions** The main cause of GERD recurrences is a crura disruption and sliding hernia so important is to pay special attention to the proper suturing of crura during first operation. Laparoscopic redo fundoplication is feasible, effective, but difficult technically. The use of mesh to strengthen crura seems to be reasonable and prevents further recurrences.

**Keywords** GERD, laparoscopic redo fundoplication, children

### S II.11: THE LAPAROSCOPIC PYLOROMYOTOMY: THE OWN EXPERIENCE

Andriy Dvorakevych<sup>1</sup>, Andriy Pereyaslov\*<sup>2</sup>, Bohdan Malovanyy<sup>1</sup> and Roman Dats<sup>2</sup>

E-mail: Andriy Dvorakevych — davor.andr@gmail.com

<sup>1</sup>Lviv Regional Children's Clinical Hospital OHMATDYT, Lysenka 31, 79010 Lviv, Ukraine; <sup>2</sup>Medical University, Department of Pediatric Surgery, Pekarska 69, 7910 Lviv, Ukraine

**Background** Laparoscopic pyloromyotomy (LP) is the safe alternative for the conventional pyloromyotomy since 1991. At the present time continuing the quests for the improvement of surgical technic of the LP. The goal of this study is the to describe our initial experience with modified of LP.

**Materials and methods** LP was performed in 11 infants through a single skin incision in the umbilicus, using a 3-mm 30-degree endoscope and 5-mm trocar. The 3-mm working instruments were inserted into the abdomen in the right and left subcostals space using stab-incision technic. The arthrotomy knife #11, which permits to control the depth of the pylorus dissection, was used. For the stratification of seromuscular layer the 2.7-mm laparoscopic Kelly's grasper was applied. All patients were prospectively evaluated.

**Results** The procedure was performed in 11 infants (8 male), with mean age 25±4 days and mean weight of 3,65±0,4 kg. On average, operating time was 27,6±10,2 min, and postoperative length of stay was 2,1±0,5 days. The damage of serous layer was noted in one patient that was sutured laparoscopically.

Any other complications during surgery and the nearest postoperative period did not observed. All patients were discharged home on full feeds. Follow-up was scheduled 3-4 weeks after discharge, and no postoperative complications were noted in any of the patients.

**Conclusions** Thus, the applying of the stab-incision method decreased the traumatic of surgery and the quantity of postoperative wound complications. Applying of arthrotomy knife technically did not complicate the surgery, permits carefully control of the depth of pyloromyotomy, and significantly decrease the costs of the management.

**Keywords** infants, pyloromyotomy, laparoscopy

### S II.12: THE EXPERIENCE WITH TROCAR SITE PRIMARY GASTROSTOMY IN CHILDREN

Ufuk Ates<sup>1</sup>, Anar Gurbanov<sup>1</sup>, Gulnur Gollu<sup>1</sup>, Nil Yasam Tastekin<sup>1</sup>, Sumeyye Sozduyar<sup>1</sup>, Orkan Ergun<sup>1</sup>, Aydin Yagmurlu<sup>1</sup>, Murat Cakmak<sup>1</sup>, Tanju Aktug<sup>1</sup>, Huseyin Dindar<sup>1</sup> and Meltem Bingol Kologlu\*<sup>1</sup>

E-mail: Ufuk Ates — drufukates@gmail.com

<sup>1</sup>Department of Pediatric Surgery, Ankara University Medical Faculty, Ankara, Turkey

**Background** Laparoscopic gastrostomy is a widely used procedure in children with failure to thrive, feeding disorders, or neurologic impairment. Various methods of laparoscopic gastrostomy and fixing stomach to abdominal wall have been described. U-stitch laparoscopic method is the most common technique with reported complication rates of 18% to 22%. However this method requires special dilatation kit and has additional cost. Trocar site primary gastrostomy under laparoscopic control described by Rothenberg et al is a simple and easy technique which does not require special instrumentation and a kit. We reviewed our experience with this technique to find out if the complication rates are acceptable.

**Materials and methods** The charts of 128 children on who underwent laparoscopic gastrostomy between 2007 and 2016 were retrospectively reviewed. The data including demographics, operative procedures and complications were recorded. All children underwent preoperative contrast imaging and 24-hour Ph monitorization. In all patients trocar site primary gastrostomy was done. The gastrostomy tube or button inserted to stomach in the center of a pursestring suture loop and the stomach is fixed to the anterior rectus sheath extracorporeally.

**Results** There were 49 girls (38.3%) and 79 males (61.7%). The mean age was 50 months at surgery time (1 days-18 years) and the average body weight was 13 kg (2300 gr–65 kg). Both laparoscopic Nissen fundoplication and gastrostomy was done in 116 (90.6%) patients and 12 (9.4%) patients had only laparoscopic gastrostomy. Gastrostomy site infection treated by antibiotics was the most common complication which is observed 14 (11%) patients. Peristomal leakage within 30 days was seen in 9 (7%) patients. Severe dislodgement of gastrostomy resulting in operative intervention occurred in 5 (3.9%) patients. Granu-

loma treated with silver nitrate application was developed in 4 (3.1%) patients.

**Conclusions** Trocar site primary laparoscopic gastrostomy is a safe, easy and cost effective technique with complication rates comparable with other laparoscopic gastrostomy methods.

**Keywords** gastrostomy, children

### S II.13: LAPAROSCOPIC SUBTOTAL COLECTOMY WITH ILEORECTAL ANASTOMOSIS (IRA) IN TWO CHILDREN WITH FAMILIAL ADENOMATOUS POLYPOSIS (FAP)

Bartosz Bogusz\*<sup>1</sup>, Anna Taczanowska-Niemczuk<sup>1</sup>, Małgorzata Smolec-Zamora<sup>1</sup>, Piotr Sołtysiak<sup>1</sup> and Wojciech Górecki<sup>1</sup>  
E-mail: Bartosz Bogusz — bbogusz@usdk.pl

<sup>1</sup>Department of Pediatric Surgery, Jagiellonian University Medical College, Wielicka 265, 30-663 Kraków, Poland

**Background** Familial adenomatous polyposis (FAP) is the most common inherited polyposis syndrome, characterized by the development of multiple colorectal adenomatous polyps. Colectomy is currently the only effective therapy, eliminating the inevitable risk of colorectal cancer (CRC) in those patients. Crucial considerations in the management of FAP are the timing and type of surgical intervention. Usually, surgery is undertaken in the late teens or early twenties. However, the increased safety and the availability of laparoscopic approach, combined with an increasing number of patients below the age of 10 years, presenting with symptomatic disease, cause earlier qualification for colectomy. Surgical options include restorative proctocolectomy with ileal pouch anal anastomosis (IPAA), and subtotal colectomy with ileo-rectal anastomosis (IRA). In comparison to IPAA, IRA procedure seems to offer a better functional outcome, and consequently, a better quality of life. In case of young women, the avoidance of the risk of fertility loss, connected with IPAA procedure (pelvic dissection), is especially worth emphasizing. The main drawback of subtotal colectomy with IRA is that adenomas and carcinomas can develop in the retained rectum, predominantly at the age of 35–50 years. Therefore careful follow up on a six monthly to annual basis is required.

**Materials and methods** A retrospective review of medical records of 2 patients with early presentation of FAP symptoms, treated with laparoscopic subtotal colectomy with IRA, in the Department of Pediatric Surgery, Jagiellonian University Medical College, in 2016.

**Results** Two girls at the age of 9 and 13, with confirmed FAP, underwent prophylactic laparoscopic subtotal colectomy with IRA between October 2015 and December 2016. In both cases, the procedure was performed with standard 4 port technique (one 10 mm port and three 5 mm ports). IRA was performed with 21 and 25 mm circular staplers. The operating time was 135 and 155 minutes. The postoperative hospital stay was 7 and 6 days. The duration of follow-up period is 13 and 6 months. There was no observed perioperative or postoperative compli-

cations. Endoscopic examination of the rectal stump with histopathological assessment of polyp biopsies, performed 6 months after the operation revealed a significant reduction of the number of polyps, without lesions greater than 2 mm or with high-grade dysplasia.

**Conclusions** Laparoscopic subtotal colectomy with IRA in children with FAP, younger than 15 years of age is safe, feasible and offers quick recovery. Pediatric patients with FAP, qualified for prophylactic treatment with this method, should be offered laparoscopic surgery. Tentative results of endoscopic follow-up examinations of the rectal stump after IRA procedures are promising, requiring further careful surveillance.

**Keywords** familial adenomatous polyposis, FAP, laparoscopy, IRA

### S II.14: TREATMENT OF MESENTERIC LYMPHATIC MALFORMATIONS - A COMPARATIVE ANALYSIS OF SURGICAL OPEN EXCISION AND LAPAROSCOPICALLY ASSISTED SCLEROTHERAPY

Dariusz Wyrzykowski<sup>1</sup>, Stefan Anzelewicz\*<sup>1</sup>, Maciej Murawski<sup>1</sup>, Andrzej Gołębiewski<sup>1</sup>, Marcin Łosin<sup>1</sup> and Piotr Czauderna<sup>1</sup>

E-mail: Dariusz Wyrzykowski — dwyrzyk@gumed.edu.pl

<sup>1</sup>Department of Surgery and Urology for Children and Adolescents, Medical University of Gdańsk, ul. M. Skłodowskiej-Curie 3a 80-210 Gdańsk, Poland

**Background** Congenital lymphatic malformations that penetrate deeply into the mesentery remain an important therapeutic issue. They can occupy most of the abdominal cavity leading to abdominal compartment syndrome. The established methods of treatment required wide intestinal excisions with prolonged lymphatic leakage.

**Materials and methods** We analyzed data of patients treated in the years 2007–2016. The study design was retrospective, cohort study. All of the patients with lymphatic malformations were included into the analysis. Patients with lymphatic malformations localized in other regions than the mesentery, were excluded from the study.

**Results** A total of 19 patients with mesenteric lymphatic malformations were admitted to the Department. 22 procedures were performed — 10 open surgical excisions, 10 minimally invasive procedures (7 laparoscopically assisted sclerotherapies and 3 percutaneous sclerotherapies under ultrasound guidance) and two biopsies. Patient follow-up data showed results favoring sclerotherapy and minimally invasive techniques.

**Conclusions** Even though radical surgical excision remains the mainstay treatment of intraabdominal lymphatic malformations the utilization of minimally invasive techniques and sclerotherapy leads to a significant reduction in complication rates and even leads to complete disappearance of the disease.

**Keywords** child, sclerotherapy, lymphatic malformation, laparoscopic surgery

## S II.15: THE ROLE OF LAPAROSCOPY IN THE MANAGEMENT OF ENTERIC DUPLICATIONS IN CHILDREN

Bartosz Bogusz\*<sup>1</sup>, Piotr Sołtysiak<sup>1</sup>, Joanna Godlewska<sup>1</sup>, Marcin Maślanka<sup>1</sup> and Wojciech Górecki<sup>1</sup>

E-mail: Bartosz Bogusz — bbogusz@usdk.pl

<sup>1</sup>Department of Pediatric Surgery, Jagiellonian University Medical College, Wielicka 265, 30-663 Kraków, Poland

**Background** Wide availability of sonographic investigation contributes to an early diagnosis of enteric duplications (ED) before the onset of clinical symptoms. Proposed management of such pathologies consists in elective mini-invasive surgical treatment during infancy. The study presents the feasibility and safety of elective laparoscopic and laparoscopy-assisted, mini-invasive resection of gastroduodenal (GD), ileal (IL) and ileocecal (IC) duplications without bowel resection.

**Materials and methods** Retrospective review of medical records of 13 patients aged between 3 and 22 months with the diagnosis of ED, treated in the Department of Pediatric Surgery, Jagiellonian University Medical College, Krakow, Poland, within the period from January 2012 to April 2017.

**Results** The initial diagnosis of enteric duplication cyst was made in 13 patients. In 8 children the diagnosis was based on sonographic study alone. All patients were qualified for elective surgical treatment. Eleven procedures were performed until 30.04.2017. Cyst excision without bowel resection was performed in 9 children. Laparoscopic removal was performed in seven patients. In two cases of gastroduodenal duplications located on the posterior wall of the first and second part of the duodenum, laparoscopy allowed to confirm the diagnosis and the excision was performed by laparotomy. Resection of the cecum and Bauhin's valve was necessary in one patient with a large IC duplication and malrotation. In one girl laparoscopic assessment excluded ED. A pelvic mass was revealed suspected to be vaginal duplication cyst, which was later confirmed with cystoscopy, vaginoscopy and NMR studies. The postoperative course was satisfactory in all the cases. Further two interventions in children with ED diagnosed based on ultrasound examination are scheduled for September 2017.

**Conclusions** The laparoscopic approach for ED excision allows for confirming the diagnosis and accurately defining the exact site of duplication, as well as for an effective and safe mini-invasive treatment. In our experience laparoscopic or laparoscopy-assisted excision of ED without bowel resection is a safe treatment option.

**Keywords** enteric duplication, laparoscopy

## Session III, Innovations and Robotics I

### S III.1: DOES PERITONEAL LAVAGE DURING LAPAROSCOPY INCREASE INFLAMMATORY RESPOND OF ABDOMINAL TISSUES? EXPERIMENTAL STUDY

Mateusz Palczewski\*<sup>1</sup>, Agnieszka Hałoń<sup>2</sup>, Sylwester Gerus<sup>1</sup>, Piotr Skrzypczak<sup>3</sup>, Przemysław Prządka<sup>3</sup>, Bartłomiej Liszka<sup>3</sup>, Zdzisław Kiełbowski<sup>3</sup> and Dariusz Patkowski<sup>1</sup>

E-mail: Mateusz Palczewski — mp@mdcse.com

<sup>1</sup>Pediatric Surgery and Urology Department, Wrocław Medical University, M. Curie-Skłodowskiej 52 Street, 50-369 Wrocław, Poland; <sup>2</sup>Department of Pathological Anatomy, Wrocław Medical University, Borowska 213 Street, 50-556 Wrocław, Poland; <sup>3</sup>Department of Surgery, Faculty of Veterinary Medicine, Wrocław University of Environmental and Life Sciences, Grunwaldzki Square 51, 50-366 Wrocław, Poland

**Background** Peritoneal lavage (PL) is widely and frequently used method in course of many conditions of abdominal cavity. It is being used in classic open approach and in laparoscopy. We hypothesis that in laparoscopy, insufflation gas (carbon dioxide - CO<sub>2</sub>) easily dissolves in rinsing solutions and carbonic acid is being created what leads to increased inflammatory respond of abdominal tissues.

**Materials and methods** Experimental study has been projected — 18 domestic pigs where randomly divided into 3 groups. All animals undergo 15 minutes laparoscopy. Group 1 (control) — without peritoneal lavage, group 2 — with 100 ml 0,9% NaCl peritoneal lavage and group 3 with 100 ml betadine-water 10% solution. On the beginning and on the end of procedure fluid samples were taken and their pH were measured. After 7 days animals were euthanized and dissected. Samples from peritoneum, omentum and bowels serosa were taken and immunohistopathological (IHC) examination (expression of IL-1b, IL-6, IL-8, IL-10) were made.

**Results** In group 2 pH were significantly lower ( $p < 0,001$ ) in fluids after laparoscopy then on the beginning of procedure — in group 3 that change was also noticed but without statistical significance ( $p = 0,057$ ). Physiological fluids in control group had the same pH before and after laparoscopy.

In IHC examination (tissues taken after euthanasia) we have noticed significantly higher ( $p < 0,05$ ) rIRS score (Remmele scale — staining intensity and positive cells ratio) of IL-1b from bowel's serosa in group 2 and group 3 than in control group. We have also noticed significantly higher (in comparison to control group) staining intensity of IL-1b from omentum in group 2 and group 3, rIRS score of IL-6 from omentum in group 3, rIRS score of IL-8 from peritoneum in group 2 and staining intensity of IL-10 from peritoneum in group 2 and 3.

**Conclusions** It seems that peritoneal lavage during laparoscopy may lead to increased inflammatory respond. Further studies need to be performed.

**Keywords** peritoneal lavage, laparoscopy, laparoscopic lavage

### S III.2: APPLICATION OF ONE-HANDED KNOT TYING IN SCARLESS LAPAROSCOPIC EPIGASTRIC HERNIA REPAIR

Ruben Lamas-Pinheiro\*<sup>1,2</sup>, Peter Etlinger<sup>1,2</sup>, Catarina Barroso<sup>1,2</sup>, José Luis Carvalho<sup>2</sup> and Jorge Correia-Pinto<sup>1,2</sup>

E-mail: Ruben Lamas-Pinheiro — rubenlms@gmail.com

<sup>1</sup>School of Medicine of University of Minho, Braga, Portugal; <sup>2</sup>Hospital de Braga, Braga, Portugal

**Background** Open repair of epigastric hernia might be unaesthetic, in this context a few laparoscopic approaches have been described. In this study, we present our preliminary experience with a scarless laparoscopic approach using only a 5 mm umbilical incision and a 3 mm stab incision by applying a one-handed knot tying technique.

**Materials and methods** Three consecutive patients presenting with epigastric hernia 15 mm or further away from the umbilicus were submitted to laparoscopic repair. A 5-mm 30°-angle laparoscope was introduced through an umbilical trocar and a 3 mm laparoscopic dissector was introduced through a stab incision placed in the right flank. The parietal peritoneum was open, dissected and the fascial defect identified. Differently from previous publications, the closure of the defect was performed using a 3 mm needle driver and 2–0 polyglactin thread by applying the one-handed knot tying technique. Intraoperative and postoperative clinical data were collected.

**Results** All patients (2 males, 1 female) were successfully submitted to laparoscopic epigastric hernia repair. Median age at surgery was 7 years (range 5–14). Operative time ranged from 40 to 61 min. Every hernia was successfully closed without any incidents. Follow-up period ranges from 1 to 3 months. No postoperative complications or recurrence was registered. No scar was visible in the patients.

**Conclusions** The application of the one-handed knot tying technique in the scarless laparoscopic repair of epigastric hernia is safe and reliable. The use of one-handed knot tying might be a step forward to the widespread of laparoscopy epigastric hernia repair.

**Keywords** laparoscopy, epigastric hernia, one-handed knot, scarless

### S III.3: VALIDATION OF AN ORGANIC MODEL FOR TRAINING MINIMAL INVASIVE SURGERY OF ESOPHAGEAL ANASTOMOSIS

Blanca Fernández Tomé<sup>\*1</sup>, Laura Correa<sup>1</sup>, Idoia Díaz-Güemes<sup>1</sup>, Miguel Ángel Sánchez-Hurtado<sup>1</sup>, Araceli García-Vázquez<sup>2</sup>, Indalecio Cano<sup>2</sup>, Francisco Berchi<sup>2</sup> and Francisco Miguel Sánchez-Margallo<sup>1</sup>

E-mail: Blanca F. Tomé — bfernandez@ccmijesususon.com

<sup>1</sup>Minimally Invasive Surgery Centre Jesús Usón. Cáceres, Spain; <sup>2</sup>Hospital Universitario 12 de Octubre. Madrid, Spain

**Background** We present the results of the validation of an organic model created for training thoracoscopic treatment of esophageal atresia (EA).

**Materials and methods** We employed a porcine esophagus piece placed on a synthetic plate. This device was inserted into the laparoscopic simulator, SIMULAP®. Twenty international laparoscopic pediatric surgeons attending hands on courses with

different levels of training in minimal invasive surgery (MIS). Posterior experience in MIS course, anatomical appearance of the model, surgical anatomy compared to a real patient, and utility as a training method were analyzed. A Likert-type scale was used to evaluate results. To analyze the results we used a T-test.

**Results** Twenty questionnaires were completed. All of surgeons has an experience of ≥30 EA by open surgery approach and ≥100 MIS procedures as surgeon.

In relation to the anatomical characteristics of the model, 95% (n=19) respondents considered that the model has a high degree of similarity or good similarity; in relation to surgical anatomy. 85% (n=17) respondents considered that the model can generate a good amount of skills and can generate great majority of skills to thoracoscopic EA repair. Participants strongly believed that this model should be included in the thoracoscopic training programs.

**Conclusions** Our organic model has demonstrated that is a good device to develop specific skills in the thoracoscopic treatment of esophageal atresia.

**Keywords** esophageal atresia repair, neonatal minimal invasive surgery, surgical simulation, thoracoscopy, training model

### S III.4: CO<sub>2</sub>-PNEUMOTHORAX DO NOT ALTER THE SURVIVAL OF NEWBORN NEURONS IN THE DORSAL HIPPOCAMPUS: STUDY IN A NEONATAL RODENT MODEL

Alice Miranda<sup>\*1</sup>, José Miguel Pêgo<sup>1</sup> and Jorge Correia-Pinto<sup>1</sup>  
E-mail: Alice Miranda — alicemiranda@med.uminho.pt

<sup>1</sup>Life and Health Sciences Research Institute (ICVS), School of Medicine, University of Minho, Braga, Portugal

**Background** Concerns about the safety of the CO<sub>2</sub>-pneumothorax have been drawing the attention of health professionals, being the effects over brain oxygenation and perfusion the most investigated events [1–4]. The neonatal period is a fundamental phase in normal brain development, and early life events can induce permanent changes in neurogenesis, synaptogenesis and neuronal connectivity in neonatal hippocampus. The hippocampus is highly involved in cognitive functions and the birth of new granule neurons in the dentate gyrus (DG) is important for maintaining memory function throughout life. With the help of a neonatal rodent model, this work aims to investigate the effect of CO<sub>2</sub>-pneumothorax on the survival of hippocampal cells undergoing division prior the CO<sub>2</sub>-insufflation event.

**Materials and methods** Neonatal rats on postnatal day 9 (PND 9) received an intraperitoneal injection of a thymidine analog (BrdU) that incorporates into dividing cells during DNA synthesis. At PND 10, animals were anesthetized, mechanically ventilated and submitted to CO<sub>2</sub>-pneumothorax. Twenty-eight days after BrdU injection, brains were collected and brain sections of 20 μm thick were cut in a frozen section cryostat. Every 8th section throughout the hippocampus was processed for BrdU immunohistochemistry. Cell survival was estimated in the sub-

granular zone (SGZ) and granular cell layer (GCL) of the hippocampal DG by estimating cell density of BrdU positive cells (ratio between the total number of immunostained cells and the area of the SGZ and GCL). Statistical significance was set at  $P \leq 0.05$ . This animal study was performed following the EU Directive 2010/63/EU and was approved by national competent authority.

**Results** Four weeks after the injection, the density of BrdU-positive cells in SHAM animals revealed to be non-significantly different than animals exposed to mechanical ventilation (PTO) or thoracic CO<sub>2</sub>-insufflation (PT2) ( $F_{2,12} = 0.07603$ ;  $p = 0.9273$ ).

**Conclusions** It has become of utmost importance the investment in research studies to unravel the acute and long-term effects of CO<sub>2</sub>-insufflation in neonatal patients. The long-term human studies are far from being completed and the use of altricial neonatal animal models may in the meanwhile contribute to clarify some of those concerning issues. At the cellular level, CO<sub>2</sub>-pneumothorax did not alter the survival of newborn cells undergoing division in the hippocampal dentate gyrus. Although no effect was observed over cell survival, further studies in which BrdU is injected after the CO<sub>2</sub>-insufflation may additionally help to clarify if the rate of cell proliferation is altered after the CO<sub>2</sub>-pneumothorax.

**Keywords** CO<sub>2</sub>-pneumothorax, neonate, hippocampus, proliferation

## References

1. Tytgat S.H., van Herwaarden M.Y., Stolwijk L.J. *et al.* Neonatal brain oxygenation during thoracoscopic correction of esophageal atresia. *Surg Endosc*, 2016. 30(7):2811–7. doi:10.1007/s00464-015-4559-1.
2. Bishay M., Giacomello L., Retrosi G., Thyoka M. *et al.* Decreased cerebral oxygen saturation during thoracoscopic repair of congenital diaphragmatic hernia and esophageal atresia in infants. *J Pediatr Surg*, 2011. 46(1):47–51. doi:10.1016/j.jpedsurg.2010.09.062.
3. Stolwijk L.J., van der Zee D.C., Tytgat S. *et al.* Brain Oxygenation During Thoracoscopic Repair of Long Gap Esophageal Atresia. *World J Surg*, 2017. 41(5):1384–92. doi:10.1007/s00268-016-3853-y.
4. Stolwijk L.J., Tytgat S.H., Keunen K. *et al.* The effects of CO<sub>2</sub>-insufflation with 5 and 10 mmHg during thoracoscopy on cerebral oxygenation and hemodynamics in piglets: an animal experimental study. *Surg Endosc*, 2015. 29(9):2781–8. doi:10.1007/s00464-014-4009-5.

### S III.5: AN EFFICIENT HOME MADE SIMULATION MODEL FOR LAPAROSCOPIC PYLOROMYOTOMY

Quentin Ballouhey<sup>\*1</sup>, Liviu Micle<sup>1</sup>, Céline Grosos<sup>1</sup>, Yohan Robert<sup>2</sup>, Aurélien Binet<sup>3</sup>, Alexis Arnaud<sup>4</sup>, Olivier Abbo<sup>5</sup>, Hubert Lardy<sup>3</sup>, Bernard Longis<sup>1</sup>, Jean Bréaud<sup>6</sup> and Laurent Fourcade<sup>1</sup>

E-mail: Quentin Ballouhey — q.ballouhey@gmail.com

<sup>1</sup>CHU Limoges, 8 Avenue Dominique Larrey 87042 Limoges, France; <sup>2</sup>CHU Grenoble, France; <sup>3</sup>CHU Tours, 49 Boulevard Béranger 37000 Tours, France; <sup>4</sup>CHU Rennes, 16 Boulevard de Bulgarie 35203 Rennes, France; <sup>5</sup>CHU Toulouse, 330

Avenue de Grande Bretagne 31059 Toulouse, France; <sup>6</sup>CHU Nice Lénval, 57 Avenue de la Californie 06200 Nice, France

**Background** A key concern regarding laparoscopic pyloromyotomy (LP) lies with the process of learning this skill. Surgical procedures and especially laparoscopic procedures require a minimal number of procedures before the technique is safely performed. Respective learning processes for open and LP appear to be different, with a higher and earlier increased risk of perforation or incomplete pyloromyotomy for LP. Our aim was to develop a simple and validated simulation tool to reduce these specific complications.

**Materials and methods** A model of hypertrophic pyloric stenosis (HPS) was created and inserted in a Paediatric Laparoscopic Surgery (PLS) simulator. First, the reproducibility of model assembly was evaluated by sending a „do it yourself simulation kit” of HPS to different centers. In the second phase, a cohort of paediatric surgeons, considered as experts, completed a 6-item questionnaire, using a four-point scale about model’s realism and accuracy. The third phase consisted in recruiting trainees to test the LP simulator. Evaluation of the LP procedure was performed using a dedicated Objective Structured Assessment of Technical Skills (OSATS). Three groups were enrolled for the final validation of this model: experts, surgical fellows and medical students.

**Results** Reproducibility of the model construction was considered as satisfactory. A total of 57 participants were enrolled in this study, including 15 experienced surgeons, 25 surgical residents and 17 medical students. Paediatric surgeons agreed that the model accurately simulated essential components of the pyloromyotomy (mean  $3,03 \pm 0,7$ ). Concerning OSATS scores, paediatric surgeons performed significantly ( $p < 0,001$ ) better ( $26,2 \pm 1,7$ ) than surgical residents ( $21,3 \pm 3,1$ ) and students ( $18,0 \pm 2,7$ ).

**Conclusions** This model appears simple, reproducible, and cheap but accurate enough as a support to teach LP. These arguments could promote this model as an efficient tool for early and effective LP simulation teaching in our fellow teaching program.

**Keywords** pyloromyotomy, laparoscopic, simulation, teaching

### S III.6: ASSESSMENT OF A RABBIT MODEL FOR THE PEDIATRIC MINIMALLY INVASIVE SURGERY (MIS)

Blanca Fernández Tomé<sup>\*1</sup>, Laura Correa<sup>1</sup>, Idoia Díaz-Güemes<sup>1</sup>, Silvia Enciso<sup>1</sup>, Araceli García-Vázquez<sup>2</sup>, Indalecio Cano<sup>2</sup>, Francisco Berchi<sup>2</sup> and Francisco Miguel Sánchez-Margallo<sup>1</sup>

E-mail: Blanca F. Tomé — bfernandez@ccmijesususon.com

<sup>1</sup>Minimally Invasive Surgery Centre Jesús Usón. Cáceres, Spain; <sup>2</sup>Hospital Universitario 12 de Octubre. Madrid, Spain

**Background** The porcine model is the most widely used animal model for laparoscopic training. However, in pediatric surgery, an experimental setting with smaller animals could im-

prove the training conditions. We present the results of the validation of the rabbit model for training in pediatric minimally invasive surgery (MIS).

**Materials and methods** At the Minimally Invasive Surgery Centre Jesús Usón from Cáceres, Spain, 26 pediatric surgeons underwent training sessions on rabbit under the supervision of experienced tutors.

All the participant performed four laparoscopic techniques in New Zealand white rabbit: gastrectomy, Pyloromyotomy, Nissen fundoplication and nephrectomy. The inclusion of the rabbit in pediatric gastrotomy laparoscopic surgery courses, the adequacy of this model for the surgery techniques and the acquisition of skills after the completion of the course was evaluated by the participants. The questionnaires were composed by items rated on a 5-point Likert scale.

**Results** Participants rated the adequacy of the rabbit in the training programs with  $4,8 \pm 0,31$  and the adequacy for surgery techniques was  $4,42 \pm 0,76$  for gastrectomy,  $4,11 \pm 0,38$  for Pyloromyotomy,  $4,32 \pm 0,69$  for Nissen fundoplication and  $4,17 \pm 0,43$  for gastrotomy. Finally the acquisition of skills obtained a score of  $4,89 \pm 0,36$ .

**Conclusions** On the basis of our preliminary results, rabbit is a good training model in pediatric MIS. In this model it is possible to perform procedures in a similar way as would be done in a real pediatric patient.

**Keywords** training model, minimally invasive surgery (MIS), rabbit model, pediatric surgery

## Poster I, Gastrointestinal

### P I.1: TRANSUMBILICAL LAPAROSCOPIC-ASSISTED APPENDECTOMY FOR COMPLICATED APPENDICITIS IN CHILDREN: OUR SEVEN-YEAR EXPERIENCE

Fabrizio Vatta\*<sup>1</sup>, Silvia Cavaiuolo<sup>1</sup>, Marco Brunero<sup>1</sup>, Alessandro Raffaele<sup>1</sup>, Piero Romano<sup>1</sup> and Luigi Avolio<sup>1</sup>

E-mail: Fabrizio Vatta — fabriziovatta@gmail.com

<sup>1</sup>Department of Pediatric Surgery, Fondazione IRCCS Policlinico San Matteo, Piazzale Golgi 16, 27100 Pavia, Italy

**Background** The purpose of the present study is to review our seven-year experience in a tertiary referral hospital in treating acute complicated appendicitis with one-port transumbilical laparoscopic-assisted appendectomy (TULAA) in children

**Materials and methods** Our study is a retrospective review of the pediatric patients who underwent TULAA at our Institute from 2010 to 2017. We focus our attention on complicated appendicitis, defined by presence of abscess or peritonitis. We evaluate the impact of preoperative abdominal ultrasound, the rate of conversion to open surgery, the management of post-surgical intra-abdominal abscesses, the use of antibiotics and the role of abdominal drainage after surgery.

**Results** We performed 64 (40 males) TULAA from January 2010 to March 2017 for acute complicated appendicitis with signs of peritonitis or abscess. 41 patients (64%) underwent abdominal ultrasound before surgical procedure. The mean age at the time of surgery was 8.68 years, while the mean length of stay was 8.03 days. The operation was completed using one port in 32 patients (50.0%) and two and three ports in 18 patients (28.1%). 14 patients (21.9%) needed conversion to open surgery: rate of conversion was 41.6% in 2010 and 2011, 7% in 2016 and 2017. An intra-abdominal drainage was used in only 2 patients: one was inserted after a second-look laparoscopy 6 days after the appendectomy, the other was inserted after 9 days using ultrasound-guidance to drain a recurrent abscess.

**Conclusions** Based on our experience TULAA is a safe, simple and cost-effective approach for complicated appendicitis that provides an excellent exploration of the abdomen, a minimal post-surgical pain, a short hospital stay and a good cosmetic result. The use of intra-abdominal drainage is limited to exceptional cases. Furthermore, our review demonstrates how chances of conversion to open surgery for complicated appendicitis decrease as the surgical team gains experience.

**Keywords** appendicitis, peritonitis, transumbilical laparoscopic-assisted appendectomy

### P I.2: WE STILL DON'T KNOW WHAT WAS THAT. LAPAROSCOPY FOR SUSPECTED APPENDICITIS MAY SURPRISE YOU ANYTIME

Małgorzata Grochot\*<sup>1</sup>, Małgorzata Zamora<sup>1</sup>, Damian Młynarski<sup>2</sup>, Grażyna Drabik<sup>2</sup> and Wojciech Górecki<sup>1</sup>

E-mail: Małgorzata Grochot — gosia.grochot@gmail.com

<sup>1</sup>Department of Pediatric Surgery, Jagiellonian University Medical College, University Children's Hospital of Cracow, Wielicka 265, 30-663 Kraków, Poland; <sup>2</sup>Department of Pathology, University Children's Hospital of Cracow, Wielicka 265, 30-663 Kraków, Poland

**Background** Right lower quadrant abdominal pain may result in emergent laparoscopy for suspected appendicitis. Our finding supplement the common list of alternative causes when appendicitis is misdiagnosed.

**Materials and methods** We present a 15-years-old girl with the right lower quadrant abdominal pain for two days, with no previous morbidity and symptoms. The pelvic and abdominal ultrasounds showed no pathology but miserly volume of liquid in small pelvis. The laboratory tests showed normal white blood cells count and elevated level of C-reactive protein. After 24h of watchful waiting the girl was subjected to laparoscopy because of aggravating abdominal pain, guarding and tenderness at palpation. The laparoscopy showed torsion of pathological structure in jejunal mesentery, not connected with bowel's lumen, ended on posterior abdominal wall. Excision of structure was done. Normal appendix in retrocolic location was left in situ. Meticulous inspection of pelvis and abdominal cavity revealed no other pathology. The girl was discharged home free of symptoms in the second postoperative day.

**Results** Resected structure was 38 cm long and 0,5–2 cm wide with winding vessels on the surface. Early histological evaluation showed fibrous tissue and calcification, specimens are being evaluated with further staining. Presumptive diagnosis is fetal partial torsion of midgut bowel with spontaneous restoration of the continuity of alimentary tract.

**Conclusions** The list of alternative diagnoses for appendicitis is not complete. Laparoscopy is the superior method in uncommon findings because it allows to explore the whole abdominal cavity.

**Keywords** right lower quadrant pain, pathological structure in jejunal mesentery, emergent laparoscopy

### P 1.3: ANTIBIOTICS IN COMPLICATED APPENDICITIS: HOW LONG IS ENOUGH?

Alexandra Scarlett<sup>\*1</sup>, Debasish Banerjee<sup>2</sup>, Senegal Manoharan<sup>3</sup>, and Thomas Tsang<sup>1</sup>

E-mail: Alexandra Scarlett — alexandra.scarlett@nnuh.nhs.uk

<sup>1</sup>Department of Paediatric Surgery, Norfolk & Norwich University Hospital, Colney Lane, Norwich NR4 7UY, United Kingdom; <sup>2</sup>Department of Paediatric Surgery, Great Ormond Street Children Hospital, London, United Kingdom; <sup>3</sup>Department of Paediatric Surgery, Southampton University Hospital, United Kingdom

**Background** Complicated appendicitis (CA) remains a staple of paediatric surgical practice and routinely is managed post-operatively with a prolonged course of intravenous (IV) antibiotics. Appropriate antibiotic use (and overuse) endures as a concern within the global medical profession. In 2006 a new departmental antibiotic guideline for management of appendicitis was introduced. We aim to review antibiotic use post CA to assess safety and efficacy of a shorter course of IV antibiotics.

**Materials and methods** This is a retrospective review of patients undergoing an emergency appendectomy by a single surgeon over an 11-year period (2006–2016). All patients diagnosed with CA (ie perforated or gangrenous) were included. The antibiotic guideline recommends initial three days IV amoxicillin, metronidazole and gentamicin; with a review of clinical progress, with any cultures, and a clinical decision regarding antibiotic duration as appropriate. Patient records were examined for operative findings, duration of IV and oral antibiotics and post-operative complications.

**Results** 79 patients identified underwent an appendectomy (laparoscopic 74, open 5) for CA and were managed as per the antibiotic guideline. 48% (38 patients) were discharged home after 3 days IV antibiotics; with 7.9% complication rate (2 wound infections; 1 intra-abdominal abscess (IAA)). 5% (4 patients) were home after 4 days with no further complications. Remaining 47% (37 patients) had ≥5 days IV antibiotics with 16.2% complications (2 wound infection; 4 IAA). Standard home oral antibiotics were prescribed for positive streptococcal milleri (15) or pseudomonas (1) peritoneal culture. No significant dif-

ference was seen between the patient cohorts regarding intra-operative findings or micro-organism involved.

**Conclusions** This data suggests that early review and consideration of short course IV antibiotics based on clinical picture is a safe and efficient method to treat CA without adverse effects on complication rates. We propose that management of these „self-selecting“ patients with short course IV antibiotics should become the norm.

**Keywords** appendicitis, postoperative antibiotics

### P 1.4: LAPAROSCOPIC MALONE/MONTI PROCEDURE IN A GIRL WITH A PREVIOUS ABDOMINOPELVIC DISASTROUS TRAUMA

Burak Tander<sup>\*1,2</sup>, Dilek Demirel<sup>2</sup>, Sertac Hancioglu<sup>2</sup>, Unal Bicakci<sup>2</sup>, Beytullah Yagiz<sup>2</sup> and Ferit Bernay<sup>2</sup>

E-mail: Burak Tander — buraktander@gmail.com

<sup>1</sup>Department of Pediatric Surgery, Acibadem University, Atakent Hospital Istanbul, Turkey; <sup>2</sup>Department of Pediatric Surgery, Ondokuz Mayıs University, Samsun, Turkey

**Background** We present here a 16 year old girl with a previous surgery for abdominopelvic serious trauma and a subsequent Malone/Monti procedure for incontinence.

**Materials and methods** Sixteen year old girl had an abdominopelvic blunt and sharp very serious trauma involving anorectal area. Initially she underwent primary repair of trauma and a colostomy. Afterwards, the colostomy was closed, but she remained incontinent. An „anterior continent enema“ (ACE) was indicated. But, the intraabdominal adhesions and anatomic problems due to previous trauma surgery were considering. Still, we decided to perform a laparoscopic Malone/Monti procedure. At laparoscopy, all adhesions were released. The cecum and appendix were freed and carried to the right lower quadrant to establish the ACE. No complication was encountered.

**Results** The postoperative course was uneventful and the girl makes the washouts successfully and she is continent.

**Conclusions** Incontinence due to pelvic trauma can be treated by laparoscopic Malone/Monti procedure in spite of previous major abdominal surgery.

**Keywords** Malone procedure, Monti procedure, abdominal trauma, fecal incontinence

### P 1.5: A DISSIMILAR INDICATION OF LAPAROSCOPIC CHOLANGIOGRAPHY

Burak Tander<sup>\*1,2</sup>, Sertac Hancioglu<sup>2</sup>, Ezgi Gun<sup>2</sup> and Gonul Caltepe<sup>3</sup>

E-mail: Burak Tander — buraktander@gmail.com

<sup>1</sup>Department of Pediatric Surgery, Acibadem University, Atakent Hospital Istanbul, Turkey; <sup>2</sup>Department of Pediatric Surgery, Ondokuz Mayıs University, Samsun, Turkey; <sup>3</sup>Division of Pediatric Gastroenterology, Ondokuz Mayıs University, Samsun, Turkey

**Background** We present here an infant with dense biliary plug

leading to biliary obstruction treated by laparoscopic cholangiography.

**Materials and methods** Three months old male was admitted with acholic stool, jaundice and direct hyperbilirubinemia. He had an uneventful jejunal atresia repair in his newborn period. He received total parenteral nutrition at the postoperative period. Abdominal ultrasonography revealed a bilious plug within the common bile duct leading to dilatation and complete obstruction. Ursodesoxycholic acid treatment was unresponsive. Due to age barrier, ERCP was not possible. An operative cholangiography with biliary wash-out was planned. At laparoscopy, the gallbladder was injected and filled with diluted ionic iodinated contrast media up. Gradually, the contrast media passed through common hepatic duct to the intrahepatic biliary ducts, the whole common hepatic duct and finally to the duodenum.

**Results** In the postoperative period, the stool has been darkened, bilirubin levels dropped and the jaundice resolved.

**Conclusions** Laparoscopic cholangiography might be a good alternative for the treatment of infants with dense biliary plug leading to biliary obstruction.

**Keywords** biliary plug, direct hyperbilirubinemia, laparoscopic cholangiography

**P 1.6: RECTAL RED BLOOD LOSS IN A HEALTHY TODDLER: NOT ALWAYS A JUVENILE POLYP**

Thais Rousseff<sup>\*1</sup>, Lucas Matthyssens<sup>2</sup>, Dirk Van De Putte<sup>2</sup>, Katrien Van Renterghem<sup>2</sup>, Dominique DE WULF<sup>1</sup>, Piet Pattyn<sup>2</sup> and Stefanie Van Biervliet<sup>1</sup>

E-mail: Thais Rousseff — thais.rousseff@ugent.be

<sup>1</sup>Dept of Paediatric Gastroenterology, Ghent University Hospital, Ghent, Belgium; <sup>2</sup>Dept of Pediatric Surgery/GIHK, Ghent University Hospital, Ghent, Belgium

**Background** Heterotopic gastric mucosa is a well-known congenital anomaly in Meckel's diverticula and gastrointestinal duplication cysts. Solitary heterotopic gastric mucosa in the rectum (HGMR) is a rare and frequently overlooked abnormality. The aim of this study was to present a new pediatric case of HGMR treated by a minimal invasive approach, together with a review of the literature, outlining the differences to the adult presentation and to the prior reported cases as for diagnosis and management.

**Materials and methods** Case report of a 3-year-old girl with recurrent rectal blood loss caused by HGMR, treated successfully by an innovative minimal invasive approach. The online database PubMed/MedLine was consulted to identify all reported cases of HGMR published in the last 20 years, focussing on presentation, diagnosis and management.

**Results** HGMR is a rare finding that has been reported up till now in 29 adults and 24 children, including this case. An overall male predominance of 71% is seen (66% of children and 77% of adults). In children, recurrent fresh blood loss per anum was a constant complaint in 96% of cases, 46% also complained of pa-

in, 25% displayed perineal ulcers, 8% had associated diarrhoea and one had an ano-cutaneous fistula. Endoscopy revealed a mucosal elevation and slightly different aspect in 33%, a polyp in 42% and a solitary ulcer in 25% of cases. Diagnosis is often delayed and in children, therapy consists mainly in a combination of medication and surgery. Minimal invasive treatment by endoscopic submucosal dissection (ESD)/mucosectomy for HGMR has been reported in only two pediatric patients in the literature.

**Conclusions** Although HGMR is rare, in children with recurrent rectal bleeding in good general health, HGM should be part of the differential diagnosis, indicating the need for sufficient biopsies to be taken during endoscopy. Up till now, 24 children have been reported with HGMR. We present the third pediatric patient in the literature treated successfully by endoscopic submucosal dissection/mucosectomy.

**Keywords** heterotopic, gastric mucosa, rectum, endoscopy, ESD, mucosectomy, minimal invasive

**P 1.7: A RARE COEXISTENCE OF HIATAL HERNIA AND HYPERTROPHIC PYLORIC STENOSIS IN A CASE WITH GASTROESOPHAGEAL REFLUX**

Ayşe Parlak<sup>\*1</sup> and Hasan Dogruyol<sup>1</sup>

E-mail: Ayşe Parlak — dr.ayse\_sengun@hotmail.com

<sup>1</sup>Uludag University, Faculty of Medicine, Department of Pediatric Surgery, Bursa, Turkey

**Background** The pathogenesis of gastroesophageal reflux disease is multifactorial. These factors may be potentiated by the hiatal hernia and delayed gastric emptying. Reflux may manifest as vomiting or be implicated as a silent cause of aspiration pneumonia, apnea, bradycardia, and rarely sudden infant death syndrome. Fundoplication is required in symptomatic infants with gastroesophageal reflux that does not respond to medical treatment.

**Materials and methods** We report a five-month-old case of a low weight (3.100 gram) with gastroesophageal reflux and complete cleft palate and lip, who had severe respiratory and nutrition problems despite all medical therapy and transpyloric feeding by jejunostomy. We performed laparoscopic Nissen Fundoplication and gastrostomy tube placement due to recurrent vomiting and aspiration problems. We discovered hiatal hernia and hypertrophic pyloric stenosis incidentally during the management of other primary surgical condition. Pyloromyotomy was performed additionally. We demonstrated dramatic clinical and radiological improvement after surgery.

**Results** Symptomatic GER in infant, initial management is medical; however, in some cases early surgery can be required. An awareness of the unusual presentations of hypertrophic pyloric stenosis during treatment for other primary surgical conditions can help in earlier diagnosis and treatment

**Conclusions** Symptomatic GER in infant, initial management is medical; however, in some cases early surgery can be required

ired. An awareness of the unusual presentations of hypertrophic pyloric stenosis during treatment for other primary surgical conditions can help in earlier diagnosis and treatment.

**Keywords** hiatal hernia, hypertrophic pyloric stenosis, gastroesophageal reflux

### P I.8: EXPERIENCE WITH LAPAROSCOPIC MESH REPAIR IN RECURRENT HIATAL HERNIA

Kutay Bahadır<sup>1</sup>, Ufuk Ates<sup>1</sup>, Gulnur Gollu<sup>1</sup>, Coskun Ozbicer<sup>1</sup>, Erol Varlı<sup>1</sup>, Aydin Yagmurlu<sup>1</sup> and Murat Cakmak\*<sup>1</sup>

E-mail: Ufuk Ates — drufukates@gmail.com

<sup>1</sup>Department of Pediatric Surgery, Ankara University Medical Faculty, Ankara, Turkey

**Background** Nowadays laparoscopic approach is the most commonly used and effective treatment method for hiatal hernia in children. Sometimes reoperation is needed. Reoperation may be difficult because of possible adhesions from the previous surgery. Mesh reinforcement of the muscular crural closure may be needed in hiatal hernia repair. In the presented case mesh was placed because of hiatal hernia with transmigration of the fundoplication wrap. The aim of this presentation is to show the technical details of a recurrent hiatal hernia repair with mesh by laparoscopic approach.

**Materials and methods** A three months old boy who was followed for left hydronephrosis which was diagnosed antenatally without neurologic problem, realized hiatal hernia in ultrasonography (US). Laparoscopic hiatal hernia repair and Nissen fundoplication was performed. Upper GI contrast study was normal three weeks after the operation. Patient started to gag after feeding with formula two months after surgery. Control US was performed and stomach was detected in thorax. Child underwent laparoscopic hiatal hernia repair with mesh and re-Nissen fundoplication was done. There was no adhesion as a result of previous laparoscopic surgery.

**Results** The operation time was 50 minutes. The feeding time was two days after the operation and the length of hospital stay was three days. There was no complication intraoperatively or in postoperative period. US and upper GI contrast studies were normal 30 days after the operation and postoperative course was uneventful.

**Conclusions** The use of mesh reduces the risk of recurrence for hiatal hernia in some cases. Laparoscopic approach is the choice of surgery because of its better cosmetic results and shorter hospitalization. Second operation was shorter and intrabdominal adhesion was less visible because of previous laparoscopic surgery in first operation.

**Keywords** laparoscopy, hiatal hernia, child

### P I.9: LAPAROSCOPIC DUODENAL ATRESIA: INTRAOPERATIVE VIDEOS ON YOUTUBE — TARGET AUDIENCE?

Amulya K. Saxena\*<sup>1</sup> and Simone Maechler<sup>1</sup>

E-mail: Amulya K. Saxena — amulya.saxena@nhs.net

<sup>1</sup>Department of Paediatric Surgery, Chelsea Children's hospital, Chelsea and Westminster Healthcare NHS Fdn Trust, Imperial College London, United Kingdom

**Background** In recent years YouTube has played an increased role in providing the public details of information about diseases and their treatments. As a result of this intraoperative videos can also be found on the platform. The aim of this study was to analyze the kind of existing videos regarding laparoscopic duodenal atresia with regards to demographics in reporting, language of audio comments, distribution and duration.

**Materials and methods** A search on YouTube was performed using the key words „Laparoscopic duodenal atresia“. The inclusion criteria consisted of any operative videos over the last ten (10) years. The data was collected with regards to the number of videos addressing the desired topic, origin of the video, language of the audio comments, published year, views, format and duration. Exclusion criteria consisted of all the outdated videos, as well as 3D animations or nonrelated search results. All the videos were viewed and evaluated by a clinician.

**Results** The YouTube search identified 693 videos and video playlists. From of which only 13 videos were directly topic related to the disease duodenal atresia. Only 8 of these videos dealt solely with laparoscopic duodenal atresia. Since one of them was a simulation, a total of 7 intraoperative videos could be identified that met the previously set inclusion criteria. With 2 videos each, the origin was Chile and USA, furthermore 1-Mexico, 1-Israel and 1-Columbia. The videos were published from 2011-2016 with maximum uploads in 2013. With regards to the language: 2-English and 5-no audio/background music. 1 video was had Spanish subtitles. All 7 videos were in a normal format, none in HD. The number of views ranged from 126 -10,366 with a mean of 3,449 views. The duration of videos was between 01:00 and 15:27 minutes with a mean duration of 5:59 minutes.

**Conclusions** YouTube searches are the most accessible method to search intraoperative information on surgical procedures. Nevertheless the vast amounts of results are often imprecise and unrelated to the desired topic as shown above. The small number of videos dealing with intraoperative laparoscopic duodenal atresia repair had experts as their target audience rather than the general public who are unfamiliar with the topic. A complete intraoperative video providing explanation for the family of the affected child could not be found.

**Keywords** laparoscopic duodenal atresia, laparoscopy, intraoperative video, YouTube, search engines, surgical procedures

### P I.10: TRANSANAL ENDOSCOPIC BIOPSY TO THE WALL OF THE LARGE INTESTINE AS A METHOD OF DIAGNOSTICS OF CONGENITAL AND ACQUIRED DISEASES IN CHILDREN

Rybalchenko Vasul Fedorovuch\*<sup>1</sup> and Tsyborovsky Yaroslav Olegovsch<sup>2</sup>

E-mail: Rybalchenko Vasul Fedorovich — pedsurge-ry\_ua@ukr.net

<sup>1</sup>Shupyk National Medical Academy of Postgraduate Education Kyiv, Ukraine;

<sup>2</sup>Pediatric Hospital N.1, Kyiv, Ukraine

**Background** The problem of constipation and fecal incontinence common to all countries, one way or another disease affects 30 to 50% of the population and from 5 to 20% of children according to some data, and other data this problem affects 25% of the child population and 3 times more often are in preschool children and 70% of patients the disease begins to 5 years. Currently, the number of patients has the tendency to decrease. The development of telecommunications, including computer games, are a cause of sedentary lifestyles, both adults and children, leading to progression of disease. Timely diagnosis and successful emptying abuse as one of the symptoms of defects colon is the key to a successful operation.

**Materials and methods** In clinics Department of Pediatric Surgery National Medical Academy of Postgraduate Education from 2000 to 2016 held 64 transanal endoscopic biopsy of the colon, the age of patients ranged from 5 to 17 years. Duration emptying dysfunction lasted from 1 A to 3 years. Patients were 38 males (59.4%), 26 women (40.6%). Fibroskop biopsy using OLYMPUS GIF-XT30 and kolonofyroskop OLYMPUS CF-40L. Biopsy was performed three to 4 persons. According to 3 cm by 15 cm. Biopsy was performed under general anesthesia.

**Results** In carrying out endoscopy, the following changes in the mucous membrane, catarrhal colitis in 11 (17.2%), atrophic colitis in 38 (59.4%), erosive colitis in 7 (10.9%), pathological changes were found in 8 (12.5%). Successful biopsy considered when biopsies were at least areas of submucosal mucous and muscular wall of the colon. In our study, 59 (92.2%) patients biopsy was successful, and 5 (7.8%) in biopsies was slimy and partially entire layer submucosal membrane. The results of histological examination, the following results: agangliosis in 4 biopsies in 12 (18.7%) in agangliosis 3 - hipogangliosis biopsies and the fourth in 10 (15.6%), hipoagangliosis 2 — x biopsies and neuromuscular dysplaziya in the next two in 8 (12.5%), atrophic colitis in four biopsies in 15 (23.4%), colitis subatrofichnyy hipogangliosis with all four biopsies in 6 (9.4%), catarrhal proktosyhmoyidit 5 (7.9%). Pathology stipulated in 8 (12.5%). With transanal endoscopic biopsy wall of the colon agangliosis established in 22 (34.3%) patients, and hipogangliosis and neuromuscular dysplasia in 8 (12.5%). Different types of colitis and proktosyhmoyiditu found in 26 (40.7%) patients. Pathology stipulated in 8 (12.5%). Surgical treatment is performed in 30 (46.8%) patients. Complex conservative therapy lasted for a year and further supports twice a year every year was positive in 34 (53.2%) patients, both in terms of normalization of stool suspension and inflammation of the colon. Of complications of transanal endoscopic biopsy is not installed.

**Conclusions** Transanal endoscopic biopsy of the wall of the colon as a method of diagnosis of congenital and acquired dise-

ases in children is an effective screening method for diagnosis of congenital and acquired diseases of the colon, manifested as constipation and fecal incontinence. Found that in 46.8% of patients had constipation causes malformation agangliosis — Hirschsprung's disease different length parts. Effective and reasonable method of surgical treatment of Hirschsprung's disease Delimitation resection only its preoperative verification.

**Keywords** agangliosis, hipoagangliosis colon, colitis, proktosyhmoyidit

### **P I.11: CLINICAL OBSERVATION OF LONG — TERM UNDIAGNOSED MESENTERY ILEUM LYMPHANGIOMA. DIAGNOSTIC SPECIFICATIONS OF UNKNOWN ETIOLOGY ABDOMINAL PAIN**

Alexey Gusev<sup>\*1</sup>, Elena Dyakonova<sup>1</sup>, Tatiana Prudnikova<sup>1</sup>, Igor Timofeev<sup>1</sup>, Evgeniy Okulov<sup>1</sup>, Alexander Bekin<sup>1</sup>, Ekaterina Romanova<sup>1</sup>, Polina Khrolenko<sup>1</sup> and Makeenko Nikolay<sup>1</sup>

E-mail: Alexey Gusev — drgusev@yandex.ru

<sup>1</sup>National Scientific and Practical Center of Children Health, Lomonosovskiy avenue 2\62, Moscow, Russian Federation

**Background** Important problem in clinical practice of surgeon and pediatrician is correct and early diagnosis in the case of abdominal pain syndrome. Purpose of this article is to reveal the necessity of multidisciplinary approach with carrying out complex diagnostics in patients with unknown genesis lasting abdominal pain on the example of clinical observation protractedly undiagnosed ileum mesenteric lymphatic malformation (MLs), complicated by bowel volvulus.

Lymphangiomas are benign tumors of the lymphatic system, which are, in the most cases, congenital disorders of lymphatic vessels. Morbidity ranges from 1 in 20,000 to 1 in 100,000 hospitalizations, amount 6% of all benign abdominal lesions in children. Up to the 70% abdominal lymphangiomas localize in bowel mesentery.

**Materials and methods** Girl A, 12 years old, visited surgeon with complaints for recurrent intense abdominal pain lasting 9 months, which became more frequent by the time of visit our clinic.

In repeated hospital admissions, during which abdominal ultrasound, small bowel series, colonoscopy, and radionuclide diagnostics were carried out, surgical pathology was not revealed. For subsequent hospitalization recurrent intense abdominal cramping began to be considered by specialists as specific behavioral reactions, parents were recommended psychoneurologist consulting.

After further episode of pain, accompanied by repeated vomiting, parents consulted surgeon again. For the differential diagnosis in our clinic was performed gastrointestinal tract MRI with enteral and parenteral contrast. As result volume formation of cystic structures with liquid content in the lower part of abdomen with the spread on presacral space was visualized.

During diagnostic laparoscopy volvulus of ileum to 180 degrees around its mesentery without microcirculation disorder was founded, in liquidation of which was revealed multicom-

partment cystic formation. Cystic formation was resected in single block with mesentery and bowel loop, and double — layer enteroenterostomy fistulization was performed. Histomorphological conclusion: MLs, intestinal dysplasia, type B. Postoperative period was uneventful.

**Results** In children with abdominal pain differential diagnosis with rare gastrointestinal diseases, including MLs, must be carried out.

In presence of mesenteric lymphangiomas with long asymptomatic period, primary manifestation can occur as clinical picture of „acute abdomen” induced by intestinal rotation, its subsequent volvulus with strangulation of main branches of mesenteric arteries, obstruction and subsequent necrosis of bowel, requiring emergency surgery and potential necessity of extensive intestine resections.

MRI with vascular and internal organs contrast gives indication of the anatomical localization of lesions, surrounding organs and tissues involvement, relationship with major vessels, size and characteristics of liquid content of lymph cysts.

Using high-technology diagnostic methods, of course, increases probability of correct diagnosis, but does not solve the problem as whole, therefore, children with lasting unknown etiology abdominal pain must have wider indications for diagnostic laparoscopy.

**Conclusions** Lasting abdominal pain syndrome requires careful history taking, with emphasize on „surgical” symptoms of life history. Long — term abdominal pain requires multidisciplinary approach, with participation of wide range of professionals and high — technology examination. If necessary, wider indications for diagnostic laparoscopy allow to avoid diagnostic errors, reduce duration of postoperative rehabilitation and cost, and improve quality of life.

**Keywords** ileum, lymphangioma, abdominal pain, mesenteric lymphatic malformation, MRI, intestinal dysplasia, laparoscopy

## Poster II, Miscellaneous, Robotics and Innovations I

### P II.1: PEDIATRIC ROBOTIC SURGERY: EPIDEMIOLOGICAL TRENDS IN REPORTING IN THE LAST DECADE

Kristi Sun\*<sup>1</sup> and Amulya K. Saxena<sup>1</sup>

E-mail: Kristi Sun — kristi.sun12@imperial.ac.uk

<sup>1</sup>Department of Pediatric Surgery, Chelsea Children's Hospital, Chelsea and Westminster Hospital NHS Foundation Trust, Imperial College London, United Kingdom

**Background** Robotic surgery in the past decade found application in the pediatric population. The aim of this epidemiological study was to determine the global diversity of robotic surgery solely in the pediatrics based on peer-reviewed reporting in order to predict the trends in the past decade.

**Materials and methods** Pubmed was search for terms „lapa-

roscopy”, „robotics” and „children”. Data was collected with regards to the number of publications per year, peer-reviewed journal preference, origin of the publication, language of publication, population size and surgical spectrum. Inclusion criteria included publications with age range 0-19, with review articles excluded for this analysis. Articles were selected by 2 reviewers to minimize bias.

**Results** The literature search identified 104 articles published between 2005–2015 in 24 Journals with 2957 patients. The Journal of Urology had the highest publications (n=19); whereas among the pediatric specific publications the Journal of Pediatric Urology topped the list (n=19)- combined 36%. There was an exponential rise in the number of publications from 2005 (n=4) until 2010 (n=8) after which a plateau was observed with 10–14 publications between 2011–2015. With regards to the country of reporting, USA was predominant 75 (72%); followed by UK-4; India, Sweden-4 each; Germany-3; Spain, France, Hong Kong-2 each; and Saudi Arabia, Netherlands, Korea, Italy, Denmark, Brazil, Switzerland -1 each. Urological procedures dominated the list in 81 publications with 24 publications specifically reporting on robotic pyeloplasty. 21 publications reported application in infants <1 years of age.

**Conclusions** Epidemiological reporting trends in pediatric robotic surgery identified 105 articles in 2005–2015 published in 24 Journals. The USA led the list in peer-reviewed publications accounting for 2/3rd articles in the last decade. The 2 most cited Urology Journals accounted for 1/3rd of the total publications. There was an exponential rise in publications evident from 2005-2010 after which a plateau in reporting is observed.

**Keywords** robotic surgery, pediatrics, epidemiology, demographics and trends

### P II.2: ROBOT-ASSISTED THORACOSCOPIC CORRECTION OF A LATE ON-SET CONGENITAL DIAPHRAGMATIC HERNIA

Mario Lima<sup>1</sup>, Tommaso Gargano<sup>1</sup>, Niel Di Salvo\*<sup>1</sup> and Sara Ugolini<sup>1</sup>

E-mail: Mario Lima — mario.lima@unibo.it

<sup>1</sup>Sant'Orsola Hospital/University of Bologna, Italy

**Background** Congenital diaphragmatic hernia (CDH), is a major malformation, most commonly found in newborns. CDH is defined by the presence of an orifice in the diaphragm, more often to the left and postero-lateral, that permits the herniation of abdominal contents into the thorax. Rarely, these hernias present later in life, some even in adulthood. Many approaches have been tried for such pathology. We present the first case of robot-assisted thoracoscopic correction of CDH.

**Materials and methods** We present a 27 year old patient who was referred to our center being specialized in surgical correction of congenital thoracic anomalies. Medical history revealed three episodes of pneumonia during infancy; he also had suffered from chronic back pain in the last 10 years. A thorax Computed Tomography (CT) confirmed the diagnosis of left postero-

lateral diaphragmatic hernia (Bochdalek hernia) with herniation of fat tissue. We then proposed a robot-assisted thoracoscopic correction. One-lung ventilation was conducted through the whole procedure. We used the DaVinci Xi Robotic Surgical System, using 4 8-mm ports (1 optical, 2 working and 1 assistant ports). We resected the omentum through a laparoscopic ligasure device at the entrance of the thorax. We then proceeded with the suture of the defect (simple interrupted suture in non-adsorbable braided material). The fat tissue previously resected was removed by widening one of the trocar ports (2 cm incision). Two thoracic drains were put in place and then removed on the III post-operative day (no significant out-put registered). Post-operative course was uneventful and the patient was discharged on day IV. Chest x-ray on a one-month check was normal (no effusion or hernia).

**Results** Diaphragmatic hernias are rare among adult population; in this case we presented a symptomatic patient treated successfully with a robotic thoracoscopic approach. The surgical approach for the resolution of this pathology is variable; robotic thoracoscopy could be a feasible, safe and valid alternative to CHD correction in selected cases.

**Conclusions** A Bochdalek hernia is a congenital defect of the diaphragm located in the posterior insertion. They are generally discovered in neonates thanks to pre-natal ultrasound screening and the early respiratory distress in the first hours of life. Late on-set diaphragmatic hernia in older children or even in adults is extraordinary, like in our case. While most of these hernias are symptomatic and present with pain or complications such as strangulation, there are others that are detected incidentally during investigations for another cause. From the analysed literature, it is clear the most frequent symptoms found in adult patients are slight respiratory and digestive symptoms. The majority of authors agree that for congenital diaphragmatic hernia, surgical repair should be performed as soon as the diagnosis is confirmed in order to avoid serious complication such as incarcerated bowel, intra-abdominal organ dysfunction or severe pulmonary disease. Many surgical approaches have been proposed for this pathology, both open (laparotomy or thoracotomy) and minimally-invasive (laparoscopic or thoracoscopic). As matter of fact in the last 10 years we have gained a certain experience in the thoracoscopic correction of CDH. In this case, we had the opportunity to apply successfully the robotic assistance to thoracoscopy.

**Keywords** congenital diaphragmatic hernia, robot assisted thoracoscopy

### P II.3: SPLEEN-PRESERVING ROBOTIC SURGERY IN TREATMENT OF A SPLENIC CYST IN CHILDREN: A CASE REPORT AND REVIEW OF THE LITERATURE

Mario Lima<sup>1</sup>, Tommaso Gargano<sup>1</sup>, Niel Di Salvo<sup>1</sup> and Sara Ugolini\*<sup>1</sup>

E-mail: Mario Lima — mario.lima@unibo.it

<sup>1</sup>Sant'Orsola Hospital/University of Bologna, Italy

**Background** Splenic cysts are relatively rare entities. The estimated incidence ranges from 0,5 to 2% in the population of all ages.

Non-parasitic cysts are more common in Caucasian population and in females and can be congenital or acquired. Congenital cyst are classified as epidermoid, dermoid and endodermoid cysts according the inner layer. Acquired cysts are often secondary to trauma and are pseudocysts without epithelial inner layer.

**Materials and methods** We report a case of splenic cyst removal in pediatric age with robot-assisted surgery.

**Results** Laparoscopic approaches progressively gained popularity due to a shorter hospital stay, less post-operative pain and improved cosmesis. The major risk for laparoscopic spleen surgery is uncontrolled bleeding. Robotic approach, ensuring a better 3D view and a better maneuverability of instruments can offer a feasible option to reduce this risk.

**Conclusions** Treatment is recommended for symptomatic or lesions bigger than 5 cm or when a malignant process cannot be excluded. Surgical treatment in the past years consisted of total splenectomy. Nowadays spleen-preserving options are more appropriate.

**Keywords** robotic surgery, splenic cyst

### P II.4: HEMODYNAMIC CHANGES MONITORING DURING LAPAROSCOPY IN INFANTS WEIGHING LESS THAN 10 KG

Gloria Pelizzo\*<sup>1</sup>, Anna Guddo<sup>2</sup>, Aurora Puglisi<sup>2</sup>, Luciana Marino<sup>2</sup>, Giovanni Mura<sup>1</sup>, Salvatore Amoroso<sup>1</sup>, Annalisa De Silvestri<sup>3</sup>, Gianfranco Coffaro<sup>2</sup> and Valeria Calcaterra<sup>4</sup>

E-mail: Gloria Pelizzo — gloriapelizzo@gmail.com

<sup>1</sup>Pediatric Surgery Unit, children' Hospital, Palermo, Italy; <sup>2</sup>Anesthesiology and Intensive Care Unit, Palermo, Italy; <sup>3</sup>Biometry & Clinical Epidemiology, Scientific Direction, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy; <sup>4</sup>Pediatrics and Adolescentology Unit, Department of Internal Medicine University of Pavia, Italy

**Background** Hemodynamics changes during laparoscopy are not yet well defined in very young children. Modifications in cerebral and systemic oxygenation and in hemodynamics are intraoperatively evaluated during pediatric laparoscopy in infants weighing less than 10 kg.

**Materials and methods** Ten infants (7M/3F), aged 1 to 60 days (mean weight 3.6 ±1.1 kg), underwent laparoscopy (LAP Group, n=5) or open surgery (Open Group, n=6). Cerebral regional (crScO<sub>2</sub>) and renal regional oxygenation (rrScO<sub>2</sub>), peripheral oxygen saturation (SpO<sub>2</sub>), heart rate (HR), diastolic (DP) and systolic pressure (SP), transcutaneous CO<sub>2</sub> (TcCO<sub>2</sub>), end-tidal CO<sub>2</sub> (EtCO<sub>2</sub>) and body temperature (TC), and are monitored at different intervals: basal (T<sub>0</sub>); anesthesia induction (T<sub>1</sub>); CO<sub>2</sub>PP insufflation (T<sub>2</sub>); surgery (T<sub>3</sub>); CO<sub>2</sub>PP cessation (T<sub>4</sub>); before extubation (T<sub>5</sub>). An arterial blood gas test is also performed at the start of the intervention and after T<sub>5</sub>. The anesthesiology pro-

tol includes hypotension management with fluid expansion before T<sub>1</sub> and T<sub>2</sub>.

**Results** Significant difference in crScO<sub>2</sub> (p=0.009, LAP<OPEN values), HR (p>0.001, LAP>OPEN values) and EtCO<sub>2</sub> (p=0.03, LAP>OPEN values) is noted in LAP compared to OPEN group.

In LAP group significant changes in rrSCO<sub>2</sub> from T<sub>1</sub> to T<sub>4</sub> vs T<sub>0</sub> (p≤ 0.01), in HR at T<sub>5</sub> vs T<sub>0</sub> (p=0.007), in SP from T<sub>1</sub> to T<sub>4</sub> vs T<sub>0</sub> (p<0.001) and in TcCO<sub>2</sub> from T<sub>2</sub> to T<sub>5</sub> (p>0.01) are revealed; no relevant variation in crSO<sub>2</sub> and other hemodynamic variables is noted during other surgical intervals.

OPEN group, at T<sub>1</sub> shows lower crScO<sub>2</sub> values compared with T<sub>0</sub> (p=0.015); no significant changes are recorded in other parameters during procedure.

Correlation between changes in crScO<sub>2</sub> and SP (p=0.01) and in rrSO<sub>2</sub> and SP (p=0.001) and DP (p=0.008) are also reported.

**Conclusions** The hemodynamic stability is a critical determinant during laparoscopic procedures in infants. Close monitoring, dedicated anesthesiological procedure and multidisciplinary pediatric collaboration are essential to guarantee the infant's safety during minimally invasive surgical procedures.

**Keywords** laparoscopy, infants, monitoring, hemodynamics, changes

### P II.5: DIFFERENTIAL DIAGNOSIS OF IMPERFORATE HYMEN: PHYSICAL, RADIOLOGICAL AND LAPAROSCOPIC EXAMINATION

Umut Alici\*<sup>1</sup>, Pinar Demir<sup>1</sup>, Cigdem Arslan Alici<sup>1</sup> and Baran Tokar<sup>1</sup>

E-mail: Baran Tokar — btokar@ogu.edu.tr

<sup>1</sup>Eskisehir Osmangazi University, Faculty Of Medicine, Department Of Pediatric Surgery, Division Of Pediatric Urology, Eskisehir, Turkey

**Background** In patients who were admitted with hydrometrocolpos; distal vaginal atresia and transverse vaginal septum should be considered in differential diagnosis of imperforate hymen.

**Materials and methods** This video shows 3 patients in adolescence age who were referred to our center with prediagnosis of imperforate hymen and hydrometrocolpos.

**Results** Distal vaginal atresia was detected in two patients and the third one had transverse vaginal septum. The age range of the patients was between 12 to 13 years old. The video emphasize importance of preoperative radiological investigation; preoperative laparoscopic, ultrasonographic and rectal examination guided perineal exploration. Laparoscopy guided perineal vaginoplasty was performed in patients with diagnosis of distal vaginal atresia. One of the patients had a previous surgery for anal atresia. In case with diagnosis of transverse vaginal septum, vaginovaginoplasty was done following a puncture of thick septum. Dilatation schedule was planned following the procedures and patients did well postoperatively.

**Conclusions** Following evaluation of patients with hydrometrocolpos with preoperative physical and radiological examinations, surgeon may need laparoscopic exploration and laparoscopy and ultrasound assisted perineal vaginoplasty.

**Keywords** imperforate hymen, laparoscopy, vaginal atresia, transverse vaginal septum, vaginoplasty

### P II.6: OVARIAN SPARING LAPAROSCOPIC RESECTION OF GIANT MATURE TERATOMAS IN FEMALES <12 YEARS

Amulya Saxena\*<sup>1</sup>,

E-mail: Amulya Saxena — amulya.saxena@nhs.net

<sup>1</sup>Chelsea children's hospital, Chelsea and Westminster Healthcare NHS Fdn Trust, Imperial College London, United Kingdom

**Background** The guidelines of The Royal College of Obstetricians and Gynecologists (RCOG) recommend that when surgery is indicated, a laparoscopic approach be generally considered to be the gold standard for the management of all benign ovarian masses. However, the maximum cyst size above which laparotomy should be considered is controversial, with some investigators recommended laparotomy for mature cystic teratoma >10 cm. The aim of this case series is to present ovarian sparing laparoscopic resection of giant mature teratomas >10cm in 3 females <12.

**Materials and methods** The case series selected 3 female patients <12 years who presented with ovarian masses >10cm and underwent Magnetic Resonance Scans. Tumor markers were included in the preoperative work-up and were found to be negative. The procedures were performed using a 3 port technique. The most prominent side of the ovarian mass was carefully incised, and careful preparation using Ligasure® was performed to completely free the mass from the normal ovarian tissue attachment. The masses were placed in large endoscopic specimen bags and extracted through the umbilical port after the extension of the skin incision facilitated further by a larger fascia incision to remove the masses.

**Results** The procedures were completed in 90 min (75, 95, and 100) and the patients recovered well after surgery. Follow-up examinations during the past 3 years have demonstrated follicular function in the residual ovaries. In one patient that presented with an ovarian torsion, the residual ovary demonstrates presence of follicular function, however it is markedly reduced (max 3 follicles/scan). Tumor markers during the follow-ups have also demonstrated normal baseline values.

**Conclusions** Ovarian sparing laparoscopic resection of giant mature teratomas >10cm in females <12 years are challenging procedures, especially as there is little space to maneuver between the ovarian capsule and the teratoma, breaching of which risks spillage of contents into the abdominal cavity. These procedures need careful planning along with long-term follow-up of patient.

**Keywords** ovarian sparing, laparoscopy, giant mature teratoma, girls

### P II.7: ISOLATED FALLOPIAN TUBE TORSION WITH HYDROSALPINX: REVIEW OF A DEBATED MANAGEMENT IN A PEDIATRIC POPULATION

Mirko Bertozzi<sup>\*1,2,3</sup>, Sara Riccioni<sup>3,4</sup>, Paolo Giovenali<sup>5,6</sup> and Antonino Appignani<sup>1,2,3</sup>

E-mail: Mirko Bertozzi — [mirkobertozzi@hotmail.com](mailto:mirkobertozzi@hotmail.com)

<sup>1</sup>S.C. di Clinica Chirurgica Pediatrica, Perugia, Italy; <sup>2</sup>University of Perugia, Perugia, Italy; <sup>3</sup>S. Maria della Misericordia Hospital, Perugia, Italy; <sup>4</sup>Sezione di Radiologia 2 University of Perugia, Perugia, Italy; <sup>5</sup>S.S. Dipartimentale Citologia ed Istologia Diagnostica, Perugia, Italy; <sup>6</sup>Azienda Ospedaliera di Perugia, Perugia, Italy

**Background** To quantify our experience and that of the literature with diagnosis and management of isolated fallopian tube torsion (IFTT) with hydrosalpinx (HSX) in children.

**Materials and methods** A PubMed search was performed for pediatric cases of IFTT with HSX to provide a comprehensive review to analyze details and management of this association focusing on the problem of fertility preservation.

**Results** In addition to our 3 cases, 17 patients of pediatric IFTT associated to HSX were identified, for a total of 21 cases (median age 12.2 years). Menarchal status was present in 76.9%; blood tests were reported in 9/20 (42%) showing leukocytosis in 7/9 (75%). Ultrasonography was performed in all cases except one. Laparoscopy was the surgical approach in 84.6% of reported cases. The side of torsion was right in 36.8% while left in 63.2%. In one case the torsion was bilateral and asynchronous. Performed procedures were salpingectomy (52.4%) and partial salpingectomy (14.3%); Conservative management was reported in 33.3% of cases.

**Conclusions** Literature describes different management techniques. Salpingectomy is the most performed procedure but recently conservative management seems to be increasingly applied. A long-term study is necessary to define the most effective treatment for the preservation of future fertility in pediatric patients.

**Keywords** isolated fallopian tube torsion, hydrosalpinx, salpingectomy, conservative management, fertility, children

### P II.8: BARIATRIC SURGERY FOR POLISH ADOLESCENTS — OUR EXPERIENCE

Dominika Smyczek<sup>\*1,2</sup>, Dariusz Basek<sup>1,2</sup>, Agnieszka Burkacka<sup>1,2</sup>, Tomasz Koszutski<sup>1,2</sup>, Marc P. Michalsky<sup>3</sup> and Renata B. Fabia<sup>3</sup>

E-mail: Dominika Smyczek — [nika\\_sm@vp.pl](mailto:nika_sm@vp.pl)

<sup>1</sup>The Independent Public Clinical Hospital no. 6 of the Medical University of Silesia in Katowice, Poland; <sup>2</sup>John Paul II Upper Silesian Child Health Centre, Poland; <sup>3</sup>Nationwide Childrens' Hospital, Columbus, USA

**Background** The World Health Organization named obesity the first, global epidemic of the 21st century, and the problem relates to ever-younger children. The studies prove that exces-

sive body mass during childhood and adolescence leads to obesity in adulthood with all complications of this disease. It emphasizes the occurrence of complications of obesity or obesity-related diseases (comorbidities), the frequency and aggravation of which may lead to severe disease or death in the future. Proceeding bariatric surgeries in children shortens duration time of the influence of unfavourable factors connected with obesity and improves the prognosis for longer life in health.

**Materials and methods** The analysis of 3 children with class III obesity after sleeve gastrectomy performed the year before, and the evaluation of the treatment results.

The presentation of the surgical method which is gastric sleeve gastrectomy as the one of metabolic surgery procedures.

**Results** The physical state of these children is good. There has been an improvement in glucose tolerance, which has resulted in withdrawal of metformin. All of the children have lost weight. Our first girl has lost 50 kg (current BMI 30.4), the other one 42 kg (current BMI 34.9), whereas the boy has lost 26 kg (BMI 32.5). There were no surgical complications.

**Conclusions** One of the procedure from spectrum of metabolic surgeries is anything but a „quick fix” for obesity and cannot be considered lightly. Potential patients must meet strict criteria and should first be evaluated by endocrinologists, pediatricians, dietitians and psychologists in Pediatric Metabolic and Obesity Clinic. Together with their families, patients must also commit to lifelong lifestyle changes. But this should be an option for treatment obesity from childhood or adolescence - not after gaining eighteen years old.

**Keywords** adolescence bariatric surgery, obesity treatment, laparoscopic gastric sleeve gastrectomy

### P II.9: SINGLE PORT SURGERIES IN DEVELOPING COUNTRIES

Hawkar Kak-Ahmed<sup>\*1</sup>, Jose A. Uroz Tristán<sup>2,3,4,5,6,7</sup>, Jalil Wardak<sup>8</sup> and Jaime González Bertot<sup>2</sup>

E-mail: Hawkar Kak-Ahmed — [joseurozt@yahoo.es](mailto:joseurozt@yahoo.es)

<sup>1</sup>Raparin Hospital, Erbil, Iraq; <sup>2</sup>Hospital Infantil Sur Docente, Santiago de Cuba, Cuba; <sup>3</sup>Hospital Pediátrico Universitario de Centro Habana, Cuba; <sup>4</sup>Hospital Pediátrico de Holguín, Cuba; <sup>5</sup>Hôpital pour enfants de Cotonou, Benin; <sup>6</sup>L'Hôpital de la mère et l'enfant à Nouakchott, Mauritania; <sup>7</sup>Chaîne de L'espoir, France; <sup>8</sup>French Medical Institute for Children, Kabul, Afghanistan

**Background** The development and improvement of lenses with a working channel and the hand made single port are facilitating the introduction of minimal invasion laparoscopy through a single port or single incision, in different and frequent operations, in developing countries.

**Materials and methods** We present our experience in more than 250 patients who have been operated through single port laparoscopy.

**Results** Our very good-good outcomes reach the 100%.

**Conclusions** Minimal surgical aggression.

Easy conversion or continuation to 2 or 3 ports.

Average surgical time less than 30 minutes (10–40).

Feasible in uncomplicated appendicitis and some complicated ones, with many benefits and advantages by single umbilical port.

Lower rate of infections at the surgical site ( $p \leq 0.5$ ).

Less postoperative pain: less need for postoperative analgesia.

Shorter postoperative paralytic ileus ( $\leq 0.5$ ).

Shorter hospital stay.

Less expenses.

Better aesthetic results: only one scar.

Ideal for the diagnosis of recurrent abdominal pain and acute abdomen in situations of precariousness of diagnostic means by the image.

In developing countries it is an easily reproducible technique with very short learning curve.

**Keywords** single port laparoscopies, innovation in developing countries

### P II.10: MINIMAL INVASIVE REPAIR OF MORGAGNI HERNIA IN CHILDREN

Ulgen Celtik<sup>\*1</sup>, Zafer Dokumcu<sup>1</sup>, Emre Divarci<sup>1</sup>, Coskun Ozcan<sup>1</sup> and Hakki Ata Erdener<sup>1</sup>

E-mail: Ulgen Celtik — ulgenceltik1988@gmail.com

<sup>1</sup>Ege University Faculty of Medicine Department of Pediatric Surgery, İzmir, Turkey

**Background** This study aimed to present our laparoscopic treatment of morgagni hernia.

**Materials and methods** Medical records of patients who underwent repair of Morgagni hernia were reviewed for demographics, presenting symptoms, diagnosis, surgical details and postoperative period.

**Results** There were twelve patients with hernia between years 2006–2016 (twelve boys). Median age at operation was 36 months (5–72 months). Eight incidentally diagnosed were asymptomatic. Presenting symptoms were; recurrent lung infection in three patients, and one patient had respiratory distress. Twelve defects were repaired with extracorporeal non absorbable sutures with subcutaneous knots. The one patient was repaired intracorporeal suturing was preferred in one patient with the largest defect. All patients were repaired primarily. Colon was the only organ herniated in all. Hernia sacs were excised except three fibrotic ones. There is only one suture reaction in the subcutaneous tissue at postoperative 4 months. There were no complications or recurrence in postoperative 71.5 months (12–130 months) follow up.

**Conclusions** Minimal invasive repair was efficient and safe in morgagni hernia. Patch may not be necessary even in large defects.

**Keywords** morgagni hernia, extrocorporeal

## Poster III, Miscellaneous, Robotics and Innovations II

### P III.1: ACCURACY OF A WRIST-WORN WEARABLE DEVICE FOR MONITORING HEART RATES DURING LAPAROSCOPIC PEDIATRIC PROCEDURES

Gloria Pelizzo<sup>\*1</sup>, Aurora Puglisi<sup>2</sup>, Giovanni Mura<sup>1</sup>, Salvatore Amoroso<sup>1</sup>, Maria Lapi<sup>2</sup>, Calogero Valenti<sup>2</sup>, Annalisa De Silvestri<sup>3</sup>, Giancarlo Coffaro<sup>2</sup> and Valeria Calcaterra<sup>4</sup>

E-mail: Gloria Pelizzo — gloriapelizzo@gmail.com

<sup>1</sup>Pediatric Surgery Unit, Children's Hospital, Palermo, Italy; <sup>2</sup>Anesthesiology and Intensive Care Unit, Children's Hospital, Palermo, Italy; <sup>3</sup>Biometry & Clinical Epidemiology, Scientific Direction, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy; <sup>4</sup>Pediatrics and Adolescentology Unit, Department of Internal Medicine University of Pavia, Italy

**Background** The ability of wearable photoplethysmography sensors to reliably measure heart rate in the output population and in hospital inpatients has been demonstrated in adults. Their accuracy in pediatrics has not been described. We evaluated the accuracy of heart rate (HR) monitoring by a personal fitness tracker (PFT) among pediatric patients undergoing to elective surgery.

**Materials and methods** HR monitoring are performed using a wrist-worn PFT (Fitbit Charge HR<sup>®</sup>) in 14 children (7M, 7F; mean age 8.74±3.14 yrs) underwent laparoscopy (LAP Group, n=8) or open surgery (OPEN Group, n=6). HR values are analyzed preoperatively (at the induction of anesthesia) and during surgery, every 5 minutes for 30 minutes. Accuracy of HR recordings is compared with gold standard measurements derived from continuous electrocardiographic (cECG) monitoring. The accuracy of HRs measured by pulse oximetry (Spo2R) is also measured as a positive control. Lin's concordance correlation coefficient and the Bland and Altman limits of agreement (LOA) are used as statistical methods.

**Results** HR monitoring are performed using a wrist-worn PFT (Fitbit Charge HR<sup>®</sup>) in 14 children (7M, 7F; mean age 8.74±3.14 yrs) underwent laparoscopy (LAP Group, n=8) or open surgery (OPEN Group, n=6). HR values are analyzed preoperatively (at the induction of anesthesia) and during surgery, every 5 minutes for 30 minutes. Accuracy of HR recordings is compared with gold standard measurements derived from continuous electrocardiographic (cECG) monitoring. The accuracy of HRs measured by pulse oximetry (Spo2R) is also measured as a positive control. Lin's concordance correlation coefficient and the Bland and Altman limits of agreement (LOA) are used as statistical methods.

**Conclusions** PFT-derived HR showed a good accuracy compared to HR derived from cECG and Spo2.R during laparoscopic pediatric procedure. Further clinical evaluation is needed to define if PFTs can use in health care settings.

**Keywords** personal fitness tracker, heart rate, monitoring, laparoscopic procedure, children

### P III.2: LAPAROSCOPIC ADRENALECTOMY IN CHILDREN

Wojciech Korlacki<sup>1</sup>, Andrzej Grabowski<sup>1</sup>, Anna Modrzyk\*<sup>1</sup> and Michał Pasierbek<sup>1</sup>

E-mail: Wojciech Korlacki — woko@plusnet.pl

<sup>1</sup>Medical University of Silesia in Katowice, School of Medicine with the Division of Dentistry in Zabrze, Department of Children's Developmental Defects Surgery and Traumatology, Zabrze, Poland

**Background** Adrenal surgery is undoubtedly a challenge for a pediatric surgeon due to the rarity of indications for adrenalectomy in children and the small series of patients being treated. The main indications for adrenalectomy are neurogenic tumors. Very few other indications exist. Laparoscopic techniques have become the standard of choice in many centers in recent years. The aim of this paper is to present the usefulness of laparoscopic adrenalectomy in children.

**Materials and methods** In the years 2012-2016 laparoscopic adrenalectomy was performed in 8 patients (6 girls and 2 boys) aged 0.8 months to 16 years (average 7.8 years). In all patients transperitoneal lateral access was used.

**Results** 5 right adrenalectomy and 3 left were done. Indications for surgery were: neuroblastoma in 6 cases and pheochromocytoma in 2 cases. The diameter of the tumour ranged from 2.5 cm to 6 cm (average 4.2 cm). There were no intraoperative and postoperative complications. There were no conversions. Mean time of surgery was 84 min. The average hospitalization time was 2.7 days.

**Conclusions** Laparoscopic adrenalectomy is a beneficial alternative to adrenal surgery in children, even in oncological cases. Transperitoneal access gives an excellent visualization of the surgical field, which increases intraoperative safety, reduces the risk of complications, and improves the resection efficiency. The laparoscopic method gives a better cosmetic effect, less postoperative pain, and shorter hospital stay. In centers experienced in minimally invasive techniques and endocrine surgery, laparoscopic adrenalectomy should be the method of choice for pediatric patients.

**Keywords** laparoscopic adrenalectomy, children

### P III.3: THE BENEFITS OF SEMI-LATERAL APPROACH IN THE LAPAROSCOPIC SPLENECTOMY FOR MASSIVE SPLENOMEGALY

Marco Gambino\*<sup>1</sup>, Antonio La Riccia<sup>1</sup>, Patrizia Manfredi<sup>1</sup> and Maria Grazia Raffaella Aceti<sup>1</sup>

E-mail: Marco Gambino — marcogambino75@gmail.com

<sup>1</sup>Department of Pediatric Surgery, Civil Hospital of Cosenza, Italy

**Background** Hereditary spherocytosis (hs) is the most common cause of congenital hemolysis resulting in anemia and hypersplenism. Total splenectomy has been shown to reduce hemolysis, thus prolonging the red cell life span and resulting in

improvement of severe anemia. Actually the laparoscopic splenectomy (ls) has become feasible and gained favor among surgeons as an alternative to the open approach also for the massive splenomegaly. We report our experience in the ls using a semi-lateral approach in 7 cases of hs with massive hypersplenism.

**Materials and methods** Preoperative diagnosis and indications for splenectomy were established in pediatric hematology departments. Indications for surgery were hypersplenism, symptomatic splenomegaly and recurrent thrombocytopenia necessitating repeated blood transfusions. All patients received routine preoperative vaccination and antibiotic prophylaxis. Pre-operative exams (us - tc) showed a massive splenomegaly with a length  $\geq 17$  cm (range 17–23). We realized the ls using a semi-lateral approach placing the child in a supine decubitus with left side elevated 30 degrees and the operative table rotated to right. We used 4 trocars. In all cases we realized a proximal ligation of the splenic vessels on the superior pancreatic limit that permits to perform the procedure with a safer vascular control and no risk of bleeding.

**Results** All the procedures were successfully completed. Mean operating time was 180 minutes. We had no intra or postoperative complications or conversion. A drainage was left in the splenic bed for 48 hours in postoperative period. The oral feeding started after 48 hours. The median length of hospital stay was 5 days.

**Conclusions** Our short experience showed that ls is a feasible and effective procedure in pediatric age also for massive splenomegaly. ls showed equally hematologic results compared to open splenectomy but associated with less operative pain, shorter length of hospital stay, earlier return to full function, decrease in hospital costs and a cosmetically superior aspect. We believe that the semi-lateral approach is the position of choice in case of spleen  $\geq 17$  cm for the better exposure and easier dissection of splenic hilar structures.

**Keywords** hypersplenism, laparoscopic splenectomy, semilateral approach

### P III.4: LAPAROSCOPIC MANAGEMENT OF A RARE COMPLICATION OF VENTRICULO-PERITONEAL SHUNTING

Laszlo Sasi Szabo\*<sup>1</sup>, Levente Szabo<sup>1</sup>, and Laszlo Novak<sup>1</sup>

E-mail: Laszlo Sasi Szabo — sasi.szabo.laszlo@med.unideb.hu

<sup>1</sup> University of Debrecen, Institute of Pediatrics, Department of Pediatric Surgery, Debrecen, Hungary

**Background** In parallel with the increasing ratio of preterm infants, intracranial hemorrhage and subsequent hydrocephalus has become a common pathology. Approximately 75% of severe hydrocephalic patients undergoes ventriculoperitoneal (VP) shunt placement, where the intraabdominal shaft is placed into the peritoneal space through a trocar blindly. Although the complication rate of this method is low, we present an uncommon complication and its minimal invasive surgical solution.

**Materials and methods** A former premature infant with a corrected age of 1,5 months and body weight of 3400 grams underwent VP shunting in the Department of Neurosurgery. The child was easily extubated but 5 hours after the fast and uneventful surgery she started to cough heavily and nurses discovered a plastic tube hanging out of her mouth which proved to be the peritoneal shaft of the VP shunt.

**Results** An emergency surgery was performed in a team-work with the neurosurgeons. During laparoscopy a iatrogenic perforation on the anterior surface of the stomach was detected which was closed with interrupted sutures and a new shunt was placed in the peritoneal cavity. The postoperative period was uneventful and the child is having a good liquor drainage ever since.

**Conclusions** Although any laparoscopic procedure on an infant should only be done with much responsibility, still it is a reliable way to diagnose and treat uncommon complications of iatrogenic origin. The known better cosmesis and smaller postoperative pain of minimal invasive surgery are important factors which may help to regain the trust and satisfaction of the parents.

**Keywords** VP shunt, complication, laparoscopy

### **P III.5: LAPAROSCOPIC SPLENOPEXY FOR WANDERING SPLEEN IN PEDIATRIC PATIENT OPERATED FOR CONGENITAL DIAPHRAGMATIC HERNIA**

Aisha Khan<sup>\*1</sup>, Esmaeel Taqi<sup>1</sup>, Sunil Yadav<sup>1</sup>, Yousuf Khan<sup>1</sup> and Yaqoub Ashkanani<sup>1</sup>

E-mail: Aisha Khan — aisha.newlife@gmail.com

<sup>1</sup>Ibn Sina Hospital, Kuwait

**Background** Wandering spleen is an uncommon pathology observed due to maldevelopment, laxness or absence of suspensory splenic ligaments resulting in inadequate non anatomical positioning of spleen therefore consistently increasing the risk of splenic torsion, infarction and trauma. Wandering spleen can be associated to patients with congenital diaphragmatic hernia as a consequence of malformation or absence of the ligamentous attachments of the spleen.

**Materials and methods** A full term male patient post neonatal repair of non syndromic isolated left congenital diaphragmatic hernia presented at age of 2.5 years with symptoms of episodic intermittent abdominal pain, abdominal fullness mostly at right side with mobile abdominal swelling. Wandering spleen was suspected clinically and confirmed by doppler ultrasound of abdomen during post operative followups for the congenital diaphragmatic hernia repair. Laparoscopic splenopexy was achieved by securing the spleen in a peritoneal pouch created at left upper quadrant and covering the spleen with an absorbable vicryl mesh. At followup of more than 1 year of post laparoscopic splenopexy, patient is asymptomatic with ultrasound doppler showing spleen at fixed position post operatively.

**Results** Even though wandering spleen, more over associated

to congenital diaphragmatic hernia, is a rare phenomenon and has limited research study, the case presented at our institution was managed successfully with satisfactory outcomes.

**Conclusions** Laparoscopic splenopexy is a feasible and safe procedure for persuasively managing wandering spleen in pediatric patients in addition to all the benefits of minimal invasive surgery.

**Keywords** laparoscopic splenopexy, wandering spleen, congenital diaphragmatic hernia

### **P III.6: DOUBLE PURSE STRING SUTURING PLICATION TECHNIQUE FOR THE TREATMENT OF BILATERAL DIAPHRAGMATIC EVENTRATION**

Ayşe Parlak<sup>\*1</sup> and Hasan Doğruyol<sup>1</sup>

E-mail: Ayşe Parlak — dr.ayse\_sengun@hotmail.com

<sup>1</sup>Uludağ University, Medical Faculty, Department of Pediatric Surgery, Bursa, Turkey

**Background** Diaphragmatic eventration is defined as an abnormally high or deviated position of all or partial of the hemidiaphragm. It may occur congenital or acquired. Bilateral congenital eventration of diaphragm is a very rare condition. Different minimally invasive plication techniques are being used for the treatment of eventration. We developed a new plication technique (Double Purse String Suturing) and applied it in an infant with bilateral diaphragmatic eventration, successfully. In this technique, handling of whole diaphragm is very easy and damages on nerves and arterial supply can be well protected. The pulling pressure on diaphragm muscles after plication is simmetrical. And at the end of the procedure, diaphragmatic shape and costo-phrenic sinuses are well protected and functioning. In addition diaphragm is supported by buried double layers of diaphragmatic folds.

**Materials and methods** The one-year old boy who born 35 weeks with cesarean section had a history which staying in hospital for 7 days due to respiratory distress. The infant had recurrent respiratory infections. He was referred to us due to right diaphragmatic eventration detected in chest X-ray and magnetic resonance images during the treatment for pneumonia. Physical examination revealed scaphoid abdomen. Family story revealed that his father also has left diaphragmatic eventration. Right side repair of the eventration was treated by double purse string suturing technique. A left side diaphragmatic eventration was also detected by chest X-ray post operatively after the correction of right diaphragmatic eventration, and corrected it by the same technique.

**Results** Double purse string suturing technique for plication of diaphragmatic eventration is feasible and safe and can be used successfully for bilateral cases also.

**Conclusions** Double purse string suturing technique for plication of diaphragmatic eventration is feasible and safe and can be used successfully for bilateral cases also.

**Keywords** bilateral diaphragmatic eventration

### P III.7: LAPAROSCOPIC INGUINAL HERNIA REPAIR IN CHILDREN USING THE PIRS TECHNIQUE

Paweł Wawrzaszek<sup>1</sup>, Magdalena Frankowicz\*<sup>1</sup>, Natalia Retkowska-Tomaszewska<sup>1</sup> and Nawal Matar<sup>1</sup>

E-mail: Paweł Wawrzaszek — pawel.wawrzaszek@gmail.com

<sup>1</sup>SZOZ nad Matką i Dzieckiem, Oddział Chirurgii Dziecięcej i Leczenia Oparzeń, Poznań, Poland

**Background** Inguinal hernias are related to the persistent patency of processus vaginalis. Their repair remains one of the most common operations for children. In last years the laparoscopic approaches have become more popular among pediatric surgeons. We report our own experience with percutaneous internal ring suturing (PIRS) technique.

**Materials and methods** Retrospectively the evaluation of 17 patients with inguinal hernia treated with laparoscopic assisted technique was performed. The study period was last 12 months and percutaneous internal ring suturing (PIRS) technique was a method of choice.

**Results** Eight boys and nine girls were operated in the study period. Mean age at operation was 5.2years (5months – 10years). In all of the operated patients one side inguinal hernia was diagnosed preoperatively - in 11 cases it was the right side and in 6 cases the left side. In 3 cases the patency of the contralateral processus vaginalis was diagnosed intraoperatively. In the study group we noted 2 cases of intraoperative complications. Both were iliac vessels injuries and in one case it required conversion to an open procedure. There was one hernia recurrence.

**Conclusions** In children with inguinal hernias PIRS is a safe and effective technique. Apart from excellent cosmetic results it allows to treat an open contralateral processus vaginalis and avoid additional operations.

**Keywords** PIRS technique, inguinal hernia, children, laparoscopic hernia repair

### P III.8: LAPAROSCOPIC APPROACH TO ADNEXAL TORSION: ADVANTAGES AND LIMITS

Isabela Draghici\*<sup>1</sup>, Anca Raicu<sup>2</sup>, Maria Popescu<sup>3</sup>, Roxana Boloaga<sup>2</sup>, Cornel Draghici<sup>2</sup>, and Liviu Draghici<sup>1</sup>

E-mail: Isabela Draghici — isabelamagdalena@yahoo.com

<sup>1</sup>'Carol Davila' University of Medicine and Pharmacy, Bucharest, Romania;

<sup>2</sup>Clinical Emergency Hospital for Children 'Maria Sklodowska Curie', Bucharest, Romania; <sup>3</sup>Medlife Pediatric Hospital, Bucharest, Romania

**Background** This paper highlights the role of emergency laparoscopic approach in case of adnexal torsion in young girls and adolescents with large ovarian cysts. The objective is to assess the benefits of minimally invasive approach and the difficulties of laparoscopic dissection in case of annexes greatly increased in size, which narrow the workspace in the pelvis.

**Materials and methods** Our paper presents a retrospective

study covering a period of 10 years (from 2007 to 2016) built on the experience of the Pediatric Surgery Clinic at the Clinical Emergency Hospital for children „Maria Sklodowska Curie” in Bucharest. In the study were included groups of patients operated either through classical approach or laparoscopically for uncomplicated ovarian cyst, respectively adnexal torsion. As a standard rule, laparoscopy has been used in emergency whenever a gonadal suffering through vascular impairment.

**Results** In many cases, the aspects found intraoperatively were discordant to the results of imaging examinations performed preoperatively (Doppler ultrasound). Exploratory laparoscopy has proved to have great utility and applicability in the diagnostic and therapeutic management of adnexal torsion, with high accuracy, attaining the objective of preserving a morphologically adequate and functional gonad.

**Conclusions** Laparoscopic approach represents the first choice in the diagnosis and surgical treatment of adnexal torsion in girls and adolescents, exceeding by far the accuracy of imaging explorations and the benefits of classical surgery for such pathology.

**Keywords** emergency, adnexal torsion, vascular impairment, laparoscopic treatment

### P III.9: NOISE EXPOSURE IN A UNIVERSITY OPERATING THEATRE DURING THE COURSE OF PEDIATRIC SURGICAL PROCEDURES

Samah Osailan\*<sup>1</sup>,

E-mail: Samah Osailan — Samah.osailan@gmail.com

<sup>1</sup>University Hospitals of Strasbourg, Strasbourg, France

**Background** Our objectives were to measure noise level in our university operating rooms and to identify different phases during the course of surgical procedures in which noise level exceeding 40 decibels (National Recommendation).

**Materials and methods** A prospective randomized single blinded study was conducted for a period of 5 months starting from January 2016. A sonometer was placed randomly in the different operating theatres. Recording started from the patient's entry to the operating theatre and ended upon his/her exit. We divided the surgical course in three different periods: P1 (from the entry of the patient until the start of surgical procedure); P2 (from the surgical incision to the end of the procedure); P3 (from the completion of closure till the exit from the OR). Strict inclusion criteria (general pediatric surgery case, elective surgery, during normal working hours, operations performed by board certified surgeons) and exclusion criteria (non-general pediatric surgery cases, emergency case, after hours, resident performing the procedure as first surgeon) were applied. We used the equivalent continuous noise level (Leq level) which is the metric of choice for the assessment of noise dose or sound exposure in the workplace.

**Results** The sonometer was present in a total of 64 operations. It was recording in 26 operations. The surgical procedure

res were: 54% open surgery, 34% laparoscopic surgery and 12% were endoscopic procedures. The total recorded time was 2419 minutes, around 40.4 hours. The average P1 time was 25', P2 65' and P3 7'. T test was performed and found the average to be significantly P value < 0.0001 from the 40 dBA recommended limit. LEQ noise level was 56.48 dBA during P1, 53.14 dBA during P2 and 55.50 dBA during P3. We registered 813 incidents or sudden noise peaks > 70 dBA during P1, 912 incidents during P2 and 293 incidents during P3. Most often the incidents were due to conversations within the staff at the level > 75 dBA. Only 1.5% incidents were more than 80 dBA. More rarely we registered sounds of bells from cellular phones sometimes more than 90 dBA. The surgical team involved did use one of or a combination of electrical machines such as: monopolar diathermy, bipolar diathermy or suction. A multivariable linear regression of average noise levels with the different instruments did not show any significant relationship.

**Conclusions** It is as if there is a first period with excited staff before the beginning of surgery. Then, a second period follows, where the staff is quieter due to required concentration: it looks like the major period of the surgical procedure. The third period, at the end of the surgical act, appeared like a moment of relaxation with a noisy ambiance. By this point of view, as we didn't find any relation between the use of electrical machines during surgeries and increase noise incidences. Noisy distractions are considered one of the main causes of perioperative incidences which appear to be related to the staff seriousness.

**Keywords** noise, operating room, incidences

### **P III.10: EXPERIENCE IN THE PRACTICE OF PEDIATRIC MINIMALLY INVASIVE SURGERY: A REVIEW OF THE LAST FIVE YEARS AT OUR DEPARTMENT**

Elisa Zolpi\*<sup>1</sup>, Cosimo Bleve<sup>1</sup>, Maria Luisa Conighi<sup>1</sup>, Valeria Bucci<sup>1</sup>, Lorenzo Costa<sup>1</sup>, Lorella Fasoli<sup>1</sup> and Salvatore Fabio Chiarenza<sup>1</sup>

E-mail: Elisa Zolpi — zolpielisa@yahoo.it

<sup>1</sup>Department of Pediatric Surgery and Pediatric Minimally Invasive Surgery and New Technologies, San Bortolo Hospital, Vicenza, Italy

**Background** Minimally invasive surgery (MIS) is one of the most significant advances of the twentieth century. The purpose of our study was to review the clinical indications to the MIS, the temporal variations of the duration of surgery, the percentage and rate of conversion to open surgery and post-operative complications.

**Materials and methods** The current retrospective study was conducted at our hospital and comprised of MIS cases performed by different surgeons from January 2011 to December 2016.

**Results** We performed a total of 1062 minimally invasive procedures in patients younger than 18 years.

Of these procedures were 973 laparoscopy; 61 thoracoscopies and 28 retroperitoneoscopy.

Among the major clinical indications to laparoscopy find:

simple and complicated acute appendicitis (360); varicocele (216), endoabdominal testicle (128), GERD (59), adnexal diseases (38), cholelithiasis (30), intrinsic stenosis of the ureteropelvic junction (14), extrinsic hydronephrosis (30) and a miscellany between intestinal and abdominal neonatal malformations, cystic lesions, Meckel's diverticulum, intestinal invaginations, etc...

For thoracoscopic procedures were as follows: 18 pleural empyema, 20 procedures in 16 esophageal atresia, 11 congenital cystic adenomatous malformation of the lung (CCAM), 9 bullous emphysema, 2 esophageal duplications, 1 mediastinal lymphangioma.

The retroperitoneoscopic procedure was performed in 16 patients with intrinsic stenosis of the ureteropelvic junction and 12 for heminephrectomy-nephroureterectomy.

We analyzed the type of surgery performed, time of surgery, hospital stay and complications. We had an improving trend in surgical time, the conversion rate and intra and postoperative complications, even among different surgeons.

**Conclusions** The authors also describe their experience with minimally invasive surgery and report the results of 1062 MIS procedures performed during the last 5 years. In many minimally invasive procedures the outcome has been favorable; the rates of conversion was very low with no significant postoperative complications, especially in the neonatal period. The use of laparoscopy facilitated not only the therapeutic efficacy but also the diagnostic approach in certain diseases.

**Keywords** MIS, retroperitoneoscopy, thoracoscopy, laparoscopy

## **Session IV, Miscellaneous I**

### **S IV.1: ENDOSCOPIC PILONIDAL SINUS TREATMENT (EPSIT) IN PEDIATRIC POPULATION: OUR PRELIMINARY EXPERIENCE**

Ciro Esposito<sup>1</sup>, Serena Izzo<sup>1</sup>, Maria Escolino<sup>1</sup>, Mariapina Cerulo<sup>1</sup>, Giuseppe Cortese<sup>1</sup>, Francesco Turrà\*<sup>1</sup>, Francesca Gargiulo<sup>1</sup>, Giovanni Severino<sup>1</sup> and Alessandro Settini<sup>1</sup>

E-mail: [Ciro Esposito](mailto:Ciro.Esposito@libero.it) — x.escolino@libero.it

<sup>1</sup>Federico II University of Naples, Italy

**Background** This study aims to report our preliminary experience with endoscopic pilonidal sinus treatment (EPSIT) in pediatric population.

**Materials and methods** We retrospectively reviewed the reports of 11 pediatric patients, 4 girls and 7 boys with an average age of 16 years (range 13-18 years) with pilonidal sinus disease underwent EPSIT in our institution in a 18 months period. Surgical outcomes of sinus healing, recurrence of disease, postoperative pain, hospital stay, analgesic requirements and patient satisfaction levels were evaluated.

**Results** All procedures were completed via endoscopy and

performed under subarachnoid anesthesia. From the technical point of view we always adopted an operative cystoscope of 9.5 Fr, introduced through the fistula hole, using a grasping forceps and a bugbee monopolar electrode to remove the hair and to heal the fistula. The average length of surgery was 30 minutes (range 26-34 minutes). There were no intraoperative neither postoperative complications. The average pain score evaluated using VAS pain scale during the first 48 postoperative hours was 3.2 (range 2-5). The analgesic requirement (Paracetamol every 6 hours) was limited to the first 24 postoperative hours. All patients were discharged on the first or second postoperative day. They changed dressing daily, by applying a silver sulfadiazine spray, without physical limitation. At 1 month postoperatively, the external openings were closed in all patients and there were no recurrences of pilonidal disease at a median follow-up of 12 months (6 months-18 months). All patients were highly satisfied of the postoperative outcome.

**Conclusions** We believe on the basis of our preliminary experience that EPSiT represents the technique of choice for surgical treatment of pilonidal sinus in children. It is technically easy and quick to perform, with a short and painless hospital stay, without recurrences in our series. EPSiT permits to patients operated an early return to daily activities without restrictions as happened for the old classic treatment. However a larger series and a longer follow-up are needed to confirm these preliminary results.

**Keywords** endoscopic, pilonidal sinus, children, cystoscope

## S IV.2: LAPAROSCOPIC APPROACHES FOR TREATMENT OF LIVER CYST IN CHILDREN

Vasyl Prytula<sup>1</sup>, Danylo Krivchenya<sup>1</sup>, Anatolii Levytskyi<sup>1</sup>, Mykhailo Silchenko<sup>2</sup>, Faizullah Hussaini<sup>1</sup>, Andriy Kuzyk\*<sup>1</sup>, Oleg Godik<sup>1</sup> and Oleg Kurtash<sup>1</sup>

E-mail: Vasyl Prytula — prytulavp@yahoo.com

<sup>1</sup>Bogomolets National Medical University, Kyiv, Ukraine; <sup>2</sup>National Children's Specialized Hospital „Ohmatdyt”, Kyiv, Ukraine

**Background** Intensive introduction of laparoscopic operations in liver surgery became possible due to the progress in the development of new technologies and their significant advantages that these techniques have. The use of special equipment has made such operations for liver cysts (LC) in children more acceptable without compromising its effectiveness. Morphological and topographic-anatomical features of the liver in children of different age groups make it necessary to develop careful approaches in laparoscopic surgery of treatment of LC.

The aim of the study. Analysis and evaluation of the experience of using laparoscopy in the treatment of LC in children.

**Materials and methods** We have experience of laparoscopic treatment of LC in 54 children aged 2 to 16 years. Among them, 14 patients had parasitic (echinococcal) LC, and 40 children had LC of nonparasitic origin. To establish the diagnosis, clinical and laboratory data were used ultrasound of the liver, abdominal organs and retroperitoneal space, CT scan, MRI and serological tests.

**Results** In the treatment of LC in children, we have used a differentiated approach using laparoscopic methods of surgical interventions, depending on the origin and location of the cyst.

The main stages of laparoscopic treatment of LC were: diagnostic laparoscopy, during which we confirmed the location of LC, then the cyst, was punctured with special needle, aspiration of the contents, sanitation or de-epithelization of the cyst cavity (depending on the etiology). If the anatomical localization of LC permitted then the excision cysts and sutures were placed to decrease the cavity which was drained. In other cases, the cyst cavity was drained with subsequent prolonged sanitation and constant active aspiration of the contents of this cavity.

An effective method for anti-parasitic treatment of echinococcal LC was suggested, which is based on the administration of 10% alcohol solution of iodine and 96% ethanol, with an exposure of 7 minutes each, followed by 0.02% chlorhexidine for 5 minutes each, followed by the excision of cyst cavity and removal of the chitinous shell with scolex. Successful de-epithelisation of nonparasitic LC was sufficient to sequential processing with swabs of 10% alcoholic solution of iodine, 96% ethanol and 0.02% chlorhexidine for 5 minutes each.

The proposed tactics of laparoscopic surgical treatment of children with LC allowed eliminating cysts in liver and achieving complete absence of relapses.

The advantages of the laparoscopic method of treatment of LC compared to traditional method (Open): low injury rate; low abdominal organs trauma, minimized blood loss, reduced risk of adhesions; reduction in duration of operation and anesthesia; more favorable postoperative period with less pain simplified patient care, reduction of hospital stay. The disadvantages of laparoscopic interventions for LC were: a greater danger of leakage of the contents of the echinococcal cyst into the abdominal cavity, through the rigidity of the cyst wall and high intra-cystic pressure, the difficulty of evacuating the dense contents of the parasitic cyst, laparoscopic intervention only superficially located LCs are available, with a deep intra-parenchymal location of the cysts it is impossible to use the laparoscopic method. Treatment, laparoscopic intervention cannot be performed after the previous open operations in upper abdominal areas.

**Conclusions** For the treatment of LC in children a differentiated approach can be laparoscopic method depending on the origin and location of the cysts.

Laparoscopic interventions are advisable for surface-located LC on the anteroposterior surface of liver.

The differentiation of pathogenic variants of the liver cysts determines the choice of methods of surgical approach, methods of correction and postoperative management of patients what basically influences on the postoperative period and on the final prognosis of surgical treatment.

**Keywords** liver cyst, diagnosis, treatment, laparoscopy, children

### S IV.3: LAPAROSCOPIC APPROACH FOR NON-PARASITIC CONGENITAL HEPATIC CYSTS

Ulgen Celtik\*<sup>1</sup>, Zafer Dokumcu<sup>1</sup>, Emre Divarci<sup>1</sup>, Orkan Ergun<sup>1</sup> and Ahmet Celik<sup>1</sup>

E-mail: Ulgen Celtik — ulgenceltik1988@gmail.com

<sup>1</sup>Ege University Faculty of Medicine Department of Pediatric Surgery, Izmir, Turkey

**Background** Non-parasitic hepatic cysts are rare lesions in the children. Surgical excision may be necessary when the lesion is symptomatic or to prevent malignancy. There is very few data for minimal invasive treatment of CHC in English literature. In this report we present our experience and algorithm in the treatment of CHC.

**Materials and methods** Medical records of patients who underwent surgery for CHC between years 2007–2016 were reviewed. Data including; demographics, radiological, operative, pathological findings, and outcome were collected.

**Results** Fourteen patients (four boys, eight girls) underwent surgery for CHC between years 2007–2016 with median age 4.4 years (4 months–14 years). The diagnosis was made by USG in all patients, MRI or MRCP were indicated in six. Mean cyst diameter was 6.4 cm (3–13 cm). Laparoscopic excision was preferred in eight patients with cysts located in the growth. Remaining patients with radiological malignancy suspicion (n=3) and centrally located cysts (n=3) underwent excision with laparotomy. Pathology revealed simple epithelial liver cyst (n=7), cili hepatic foregut cyst (n=4), mesenchymal hamartoma (n=3). There was no complication or recurrence in the median follow up 19.1 (3–100 months) months.

**Conclusions** Laparoscopy is efficient and safe for selected cases of CHC.

**Keywords** hepatic cysts, congenital, laparoscopy

### S IV.4: LAPAROSCOPIC REPAIR OF MORGAGNI DIAHRAGMATIC HERNIA IN CHILDREN: RESULTS OF A MULTICENTRIC SURVEY

Ciro Esposito<sup>1</sup>, Maria Escolino\*<sup>1</sup>, Francois Varlet<sup>2</sup>, Amulya Saxena<sup>3</sup>, Sabine Irtan<sup>4</sup>, Paul Philippe<sup>5</sup>, Francesco Turra<sup>1</sup>, Holger Till<sup>6</sup>, Francois Becmeur<sup>7</sup> and George W. Holcomb 3rd<sup>8</sup>

E-mail: [Ciro Esposito — x.escolino@libero.it](mailto:ciro.escolino@libero.it)

<sup>1</sup>Federico II University of Naples, Italy; <sup>2</sup>CHU, Hopital Nord, Saint Etienne, France; <sup>3</sup>Chelsea Children's Hospital, London, United Kingdom; <sup>4</sup>Hospital Armand Trousseau, Paris, France; <sup>5</sup>CHU de Luxembourg, Luxembourg; <sup>6</sup>Medical University of Graz, Austria; <sup>7</sup>Hopitaux Universitaires de Strasbourg, France; <sup>8</sup>Mercy Children's Hospital, Kansas City, Missouri, USA

**Background** This study aimed to standardize the surgical correction technique of congenital Morgagni diaphragmatic hernia (CMDH), analyzing the results of an international multicentric survey.

**Materials and methods** The medical records of 43 patients (29 boys, 14 girls) underwent laparoscopic repair of CMDH

in 8 pediatric surgery units in a 5 years period were retrospectively reviewed. Their average age was 3.3 years. Ten patients (23.2%) presented associated malformations: 9 Down syndrome (20.9%) and 1 palate cleft (2.3%). Thirty-five patients (81.4%) were asymptomatic, whereas 8 patients (18.6%) presented symptoms such as respiratory distress, cough or abdominal pain. As for preoperative work-up, all patients received a chest x-ray (100%), 15/43 (34.8%) a CT scan, 8/43 (18.6%) a barium enema and 4/43 (9.3%) a US.

**Results** No conversion to open surgery was reported. Average operative time was 61.2 minutes (range 45–110 min). In 38/43 (88.3%) patients a trans-parietal stitch was positioned in order to reduce the tension during the repair. In 14/43 cases (32.5%) the sac was resected; in only 1/43 case (2.3%) a dual mesh of goretex was adopted to reinforce the closure. Average hospital stay was 2.8 days. The average follow-up was 4.2 years and it consisted in annual clinical controls and chest x-ray. We recorded 2 complications (4.6%): one small pleural opening, that required no drain and one recurrence (2.3%), re-operated in laparoscopy, with no further recurrence.

**Conclusions** Laparoscopic CMDH repair is well standardized: the full-thickness anterior abdominal wall repair using non-resorbable suture with interrupted stitches is the technique of choice. Post-operative outcome was excellent. Recurrence rate was very low, about 2% in our series. We believe that children with CMDH should be always treated in laparoscopy following these technical details.

**Keywords** Morgagni diaphragmatic hernia, surgical technique, children, laparoscopy

### S IV.5: WHICH FACTORS EFFECT THE RECURRENCE RATE IN PAEDIATRIC LAPAROSCOPIC HERNIA REPAIR. A REVIEW

Abdullah Yıldız\*<sup>1</sup>, Akgün Oral<sup>2</sup>, Nihat Sever<sup>1</sup>, Mesut Demir<sup>1</sup>, Meltem Kaba<sup>1</sup> and Ali İhsan Dokucu<sup>1</sup>

E-mail: [Abdullah Yıldız — nihon@superonline.com](mailto:abduyildiz@superonline.com)

<sup>1</sup>Health Science University, Şişli hamidiye Etfal Training and Research Hospital, Department of Paediatric Surgery, Istanbul, Turkey; <sup>2</sup>Health Science University, Behçet Uz Training and Research Hospital, Department of Paediatric Surgery, Izmir, Turkey

**Background** The open approach has been the standard treatment for inguinal exploration for years. Laparoscopic inguinal hernia repair has recently become an alternative as a treatment in pediatric patients. But high recurrence rate is still the main concern. Many different laparoscopic techniques or tricks have been developed for laparoscopic inguinal hernia repair to decrease the recurrence rates. This article presents a review focused to compare the recurrence rates of all series of laparoscopic hernia repairs.

**Materials and methods** All published studies on laparoscopic paediatric hernia repair until December 30, 2015, were searched with the terms of pediatric laparoscopy inguinal hernia repair from Medline (using PubMed as the search engine), with

2000, which the date first male series was reported, as lower date limit. All the abstracts of these studies were investigated whether the manuscript was eligible. Other eligible studies found in reference lists of full text manuscripts were also searched in PubMed. All abstracts, and full text of relevant studies were independently evaluated by two reviewers (AY, AO). Any disagreements were solved with consensus by two authors. During the abstract research no language restrictions were imposed but the fulltext research was restricted to studies published in the English language. Data regarding the following factors were considered by two reviewers independently: first author, publication date, laparoscopic technique, sutures used, technique used to close the ring, recurrence rates. Recurrence rates reported in authors' manuscripts were used to compare. If it was reported as numbers, recurrence rates were calculated as a percentage.

Eligibility criteria included laparoscopic paediatric hernia repair with quantitative data on outcome of recurrence rates/numbers. The pediatric population was described as cases younger than 18 years. In case of possible overlap of the different publications, only the most recent study was used. Recurrences occur mainly in male cases therefore, studies including solely female cases were excluded. Series focusing solely on specific conditions such as recurrences or atypical hernias, were also excluded.

**Results** All results of the manuscripts were evaluated in terms of changes in recurrence rates over the years. No statistical differences in recurrence rates over the years in favour of decrease or increase was found ( $P=0.861$ ). But range of the data seems very wide, it is not obvious. Comparing the intra and extracorporeal laparoscopic approaches showed that the recurrence rates was less in extracorporeal approaches than intracorporeal one with statistical differences ( $P=0.012$ ). There was a strong correlation with complete ring closure when comparing complete and incomplete ring closure groups ( $P=0.001$ ).

Comparing of the groups according to type of the sutures revealed that in manuscripts using of the nonresorbable suture materials declared less recurrence rates than resorbable suture materials ( $P=0.001$ ). Recurrence rate difference between the manuscripts used peritoneal incision with manuscripts without peritoneal incision was not observed. No significant statistical difference between these two groups existed ( $P=0.073$ ).

**Conclusions** As a conclusion, although the experience of the surgeon can decrease their own recurrence rates over time, we state that paying attention to some certain important points has also great importance.

**Keywords** hernia, laparoscopy, recurrence

#### S IV.6: PIRS TECHNIQUE IN TREATMENT OF INGUINAL HERNIA IN CHILDREN

Sylwester Gerus<sup>\*1</sup>, Piotr Kaczmarek<sup>1</sup>, Marcin Rasiewicz<sup>1</sup>, Maciej Bałtaj<sup>1</sup> and Dariusz Patkowski<sup>1</sup>

E-mail: Sylwester Gerus — sylwestergerus@gazeta.pl

<sup>1</sup>Department of Pediatric Surgery and Urology, Wrocław Medical University, Poland

**Background** Laparoscopic approach to inguinal hernia treatment in children is becoming more commonly used in everyday practice. Percutaneous internal ring suturing (PIRS) is one of minimally invasive one-port techniques which involves closure of internal inguinal ring under visual control using thread introduced through the skin.

**Materials and methods** Retrospective analysis of cases treated with laparoscopic approach for inguinal hernia in our department from 2014 till the end of April 2017.

**Results** From 2014 till the end of April 2017, in Department of Pediatric Surgery and Urology, there were 140 children treated (100 boys and 40 girls), 143 surgeries performed and 181 internal inguinal rings closed. 47 children were diagnosed with left-sided hernia, 55 with right-sided hernia and 38 with bilateral hernia. 123 children were operated using laparoscopic technique (medium age: 53,6 months) and 17 children by open approach (medium age 65,14 months). Bilateral hernias were most common among children under the age of 1 regardless of sex (50% of hernias among both boys and girls younger than 1 year old were bilateral). In the time covered by this study 5 intraoperative complications in the form of blood vessel puncture were observed (in one case conversion was required). Additionally 2 cases of recurrent hernia after laparoscopic approach were diagnosed. It is vital to notice that 22 patients with preoperative diagnosis of unilateral hernia had intraoperative discovery of open contralateral canal. In 1 patient after open surgery contralateral hernia was later discovered. Additionally, while closing inguinal ring, some other procedures were performed: removal of hydrocele (4 patients), closure of umbilical ring hernia (11 patients).

**Conclusions** Percutaneous internal ring suturing is an effective and safe procedure providing excellent cosmetic result and allowing to avoid future surgery due to contralateral hernia.

**Keywords** inguinal hernia, Percutaneous Internal Ring Suturing (PIRS)

#### S IV.7: MODIFICATION OF LAPAROSCOPIC INGUINAL HERNIA REPAIR ACCORDING TO PIRS METHOD IN CHILDREN BY USE OF AN ADDITIONAL PORT AND LAPAROSCOPIC INSTRUMENT

Przemysław Wolak<sup>\*1,2</sup>, Wojciech Niedziela<sup>1</sup> and Jakub Matuszczyk<sup>1,2</sup>

E-mail: Przemyslaw Wolak — przemyslaw.wolak@gmail.com

<sup>1</sup>Department of Pediatric Surgery, Urology and Traumatology, Jan Kochanowski University of Kielce (Institute of Nursing and Midwifery), Kielce, Poland;

<sup>2</sup>Faculty of Medicine and Health Sciences, Jan Kochanowski University of Kielce (Institute of Nursing and Midwifery), Kielce, Poland

**Background** Inguinal hernia repair is the most common operation performed by pediatric surgeons. Recently minimal invasive access surgery has challenged this conventional surge-

ry. One of the popular method is PIRS described by Patkowski in 2006. We present a modification of PIRS method including an additional port and working instrument that decreased the rate of conversions.

**Materials and methods** There were 276 laparoscopically treated children using the PIRS method for inguinal hernia in 2008–16. In all, we got abdominal access through the umbilicus using open technique. Under the control of 3,5–5 mm optics and abdominal pressure of 8–12 mmHg the inguinal internal ring was closed percutaneously with braided, non-absorbable suture. Since 2014 the additional 3.5 mm port with instrument was used. In cases of difficulty with hernia sac closure, difficulty of vas deferens visualization and for visualizing the pelvic organs to detect Complete Androgen Insensitivity Syndrome (CAIS) in girls.

**Results** At the beginning of our series 24 primary laparoscopic children were converted to classic open surgery. In 10 boys, despite the PIRS suture placed large gas leakage to the scrotum was maintained. In 8 boys and one girl, we observed the presence of different forms of hydrocele. At two children, distended bowels have made PIRS surgery impossible. Two ovaries were present in the inguinal canal. One hematoma occurred because of iliac vessels puncture, which made it impossible to identify structures of the inguinal canal. In 14 cases (7 boys and 7 girls), we inserted another 3.5 mm port with instrument in the right lower abdomen that improved the proper placement of the percutaneous suture thanks to retracting peritoneum and securing testicular vessels with vas deferens in boys and improved visualization of pelvic organs in girls with bilateral inguinal hernia. Since then, we had no conversion.

**Conclusions** It seems that use of additional port with laparoscopic instrument may prevent conversion to classical surgery procedures in the case of PIRS.

**Keywords** inguinal hernia, PIRS, children, laparoscopy

#### S IV.8: TREATMENT OF INGUINAL HERNIA IN CHILDREN BY PERCUTANEOUS INTERNAL RING SUTURING (P.I.R.S.) — 12 YEARS OF OWN EXPERIENCE

Michał Szostawicki<sup>\*1</sup>, Michał Puliński<sup>1</sup>, Wojciech Choiński<sup>1</sup> and Jakub Matuszczyk<sup>2</sup>

E-mail: Michał Szostawicki — mszostawicki@wp.pl

<sup>1</sup>Oddział Kliniczny Chirurgii i Urologii Dziecięcej — Wojewódzki Specjalistyczny Szpital Dziecięcy w Olsztynie, Poland; <sup>2</sup>Klinika Chirurgii Dziecięcej, Urologii i Traumatologii — Wojewódzki Szpital Zespolony w Kielcach, Poland

**Background** Inguinal hernia is one of the most common causes of surgical intervention in children. The last decade has brought the popularity of minimally invasive techniques in Pediatric Surgery. They find here more uses every year. The method of percutaneous suturing of the internal inguinal ring is one such technique.

**Materials and methods** In the Department of Pediatric Surgery of the Provincial Specialist Children's Hospital in Olsztyn, be-

tween 2005 and 2017 695 patients were treated for inguinal hernia.

**Results** In the Department of Pediatric Surgery of the Provincial Specialist Children's Hospital in Olsztyn, between 2005 and 2017 695 patients were treated for inguinal hernia.

**Conclusions** PIRS is a very simple, effective and safe procedure, with a very good cosmetic effect.

**Keywords** inguinal hernia, PIRS

#### S IV.9: LAPAROSCOPIC HERNIOTOMY AND PROCESSUS VAGINALIS CLOSURE: SAFE AND EFFICIENT IN CHILDREN LESS THAN ONE YEAR. A COMPARISON WITH THE INGUINAL APPROACH

Diana Potop<sup>\*1</sup>, Sylvie Martus<sup>1</sup>, Ana-Maria Chiforeanu<sup>1</sup>, Jerry Kieffer<sup>1</sup>, Cindy Gomes<sup>1</sup> and Paul Philippe<sup>1</sup>

E-mail: Diana Potop — diana.potop@gmail.com

<sup>1</sup>Service de Chirurgie Pédiatrique, Centre Hospitalier de Luxembourg, Kanner-Klinik, Luxembourg

**Background** Laparoscopy for inguinal hernia repair in children is gaining acceptance. Though, concerns remain in infants, where longer operation time and increased technical difficulties could be problematic. Using a complete division and closure of the Patent Processus Vaginalis (PPV), we report our experience in children less than a year and compare it with children in the same age group that were operated through an inguinal incision.

**Materials and methods** We reviewed the charts of all children less than one year of age operated in our department between January 1st, 2013 and March 31st, 2017.

We collected the demographic data, the anaesthetic data as well as the early follow-up at 4 to 6 weeks.

53 children were operated openly (group O) and 89 by laparoscopy (group L). There were 109 boys, 33 girls, from 7 days to 11 months (mean: 60 days), with a mean weight of 4.410 g (O: 3288 g; L: 4699 g). No children in the Group O was older than three months. 77 were premature (O: 36; L: 31), with 15 (L:1) operated before discharge from NICU. Nine were clinically bilateral (L: 3). 31 had a history of incarceration (L: 24). Open bilateral exploration is our routine in NICU infants. In the L groups (89 pts), 38 contralateral PPV were closed. All Group L patients were operated under general endotracheal anaesthesia, whereas 32/51 Group O patients had caudal anaesthesia only.

**Results** Operating time was 33,4 minutes in the O group, 32,6 (of which, 23,4 of pneumoperitoneum) in group L. 58 Patients were discharged on the day of surgery (24 admitted before for incarceration) (Group O: 14%; Group L: 44%). Overnight stay was indicated in 23 for prematurity, in 19 because of incarceration. Eleven were kept overnight for apneas (1: O), stridor (4: L) or incomplete pain control or feeding (O:1; L: 5). There were no intraoperative complications. One patient had a umbilical wound infection (group L). At early follow-up, one child (group L) presented with photographic suggestion of recurrence: a redo

laparoscopy showed no recurrence. Thus, no early recurrences were diagnosed. One testicular atrophy was present (Group O) and 2 O and 1 L patients have incompletely descended testis, noted preoperatively in all.

**Conclusions** Because demographic data's ( age, weight, prematurity) are markedly different, a direct comparison between the two groups is senseless. Group O patients were more commonly hospitalised beforehand and had planned overnight stays and monitoring because of prematurity.

Our study shows that both approach are feasible, safe and efficient.

In our institution, the choice of a technique is based on the choice of the type of anaesthesia. Pending the results on ongoing studies on the possible benefits of locoregional anaesthesia on both the safety and the long term brain development of the smallest patients, we offer laparoscopy only to infants that will be offered general anaesthesia, and exclude those for which a caudal is felt to be safer. Nonetheless, over the time, more children in the borderline zone were offered GA and Laparoscopy once the efficiency and safety of the approach was confirmed.

Nowadays, in our Department, laparoscopy is offered to all children presenting with inguinal hernias, irrespective of age or weight, if there are no contraindication to general anesthesia.

**Keywords** laparoscopic hernia repair, laparoscopy in infants, herniotomy

#### S IV.10: LAPAROSCOPIC HERNIA REPAIR IS SAFE TO PERFORM ON PREMATURE BABIES WITH ASSOCIATED CO-MORBIDITIES

Mus Alabdullah\*<sup>1</sup>, and Max Pachi<sup>2</sup>

E-mail: Mus Alabdullah — dralabdullah@doctors.org.uk

<sup>1</sup>Senior clinical fellow in paediatric surgery, Birmingham Children's hospital, Birmingham, United Kingdom; <sup>2</sup>Consultant paediatric surgeon, Birmingham Children's hospital, Birmingham, United Kingdom

**Background** Laparoscopic hernia repair is an evolving technique with many benefits. It can be undertaken in premature infants and facilitates repair of bilateral indirect and/or direct herniae. The aim of this study was to assess the safety of the procedure in premature infants operated on within the first year of life and those with co-morbidities such as chronic lung and cardiac disease.

**Materials and methods** Retrospective review of prospectively collected single surgeon data between April 2016 and January 2017

Data collected included demographics, weight, gestational age, co-morbidities, pre and post operative hernia laterality and follow up.

**Results** N=10 M:F 9:1 The median gestation age at birth (range) was 28(25-38) weeks. Median corrected age at surgery was 42 (40-72) weeks. Median weight was 3.6(2.3-5) kg.

Eighty percent of the patients required an urgent repair and 80% had associated respiratory and / or cardiac co-

morbidities including one patient who had had a truncus repair and one patient who was on home oxygen.

Thirty percent had a preoperative diagnosis of bilateral herniae and 50% had this diagnosis post-operatively. In one patient a direct hernia was repaired along with a contralateral indirect hernia.

There were no immediate intra-operative or anaesthetic complications noticed. There were no conversions to open. One patient had a planned overnight stay post-operatively and there were no incidences of postoperative apnoea.

Median follow up was 12.5(1-40) weeks. There was one recurrence in the early post-operative period.

**Conclusions** Based on our early results laparoscopic hernia repair in preterm infants and low birth weight babies with associated co-morbidities, is a safe and feasible procedure. Moreover it has some procedural benefits compared to the standard open technique.

**Keywords** hernia, laparoscopic repair

#### S IV.11: PERCUTANEOUS INTERNAL RING SUTURING IN PEDIATRIC INCARCERATED INGUINAL HERNIA

Ruben Lamas Pinheiro\*<sup>1</sup>, Catarina Barroso<sup>1</sup>, Peter Etlinger<sup>1</sup>, Angélica Osório<sup>1</sup> and Jorge Correia-Pinto<sup>1</sup>

E-mail: Ruben Lamas Pinheiro — rubenlms@gmail.com

<sup>1</sup>Hospital de Braga, School of Medicine of University of Minho, Braga, Portugal

**Background** Laparoscopy provides an alternative approach to the management of inguinal hernia in children. Different laparoscopic techniques for inguinal hernia repair have been described, including the percutaneous internal ring suturing (PIRS). Herein the role of PIRS in the repair of pediatric incarcerated inguinal hernia is analyzed.

**Materials and methods** A retrospective review was conducted including all children presenting with incarcerated inguinal hernia and submitted to laparoscopic hernia repair by percutaneous internal ring suturing between 2012 and 2016.

**Results** Of 58.4 ± 58.5 days (range, 24 to 237 days). In 9 patients (75%) the hernia content was the ovary and in 3 patients (25%) the hernia content was the bowel. One case of bowel incarceration occurred immediately after failed open repair. In all patients, a 3 mm instrument was introduced through the same umbilical incision used for the endoscope in a single-port fashion. The hernia content was reduced using a combined manual and laparoscopic-assisted approach. Laparoscopic inspection allowed assessing the viability of the incarcerated content. Moreover, Percutaneous internal ring suturing was performed after the reduction in all cases. The mean operative time was 55.5 ± 17.9 minutes. There were no intra- or post-operative complications. The median hospital stay was 1 day. At a mean follow-up of 27.3 ± 12.5 months, there was only one patient with an umbilical granuloma and there were no recurrences or testicular atrophies.

**Conclusions** The percutaneous internal ring suturing is safe and feasible, even FOR reduction of pediatric incarcerated hernias and has a consistently good outcome in the midterm follow-up.

**Keywords** laparoscopy, percutaneous, inguinal hernia, incarcerated hernia

#### S IV.12: OUTCOME OF THE OPEN AND LAPAROSCOPIC INGUINAL HERNIA REPAIR IN INFANTS

Andriy Dvorakevych<sup>1</sup>, and Andriy Pereyaslov\*<sup>2</sup>

E-mail: Andriy Dvorakevych — [dvor.andr@gmail.com](mailto:dvor.andr@gmail.com)

<sup>1</sup>Lviv Regional Children's Clinical Hospital OXMATDYT, Lviv, Ukraine; <sup>2</sup>Medical University, Department of Pediatric Surgery, Lviv, Ukraine

**Background** Inguinal hernia repair is one of the most common surgical procedures performed by pediatric surgeons. However, in infants this can be a hazardous procedure, due to the fragile hernia sac, limited anatomic region, and presence of comorbidities in some patients. Laparoscopic surgery for congenital inguinal hernia as an alternative for the open surgery remains a point of controversy. The aim of the study was to evaluate the outcome of the laparoscopic (PIRS method) and open procedures in infants with inguinal hernia.

**Materials and methods** During 2010-2015 years 117 infants (of the one year and less) were operated. Among these patients, in 56 infants the open procedure and in 71 – the laparoscopic repair was applied. The bilateral hernia was noted in 22 (39.3%) patients of the open group and in 25 (35.2%) – of the laparoscopic group. In cases of bilateral hernia, the simultaneous repair of both sides was applied in laparoscopic group, but in the open group the repair performed on the one side with the need for the postponed surgery. Routine investigation of the contralateral processus vaginalis during open repair did not performed.

**Results** At the follow-up the recurrent hernia was diagnosed in 8 (14.3%) infants of the open group and in 6 (8.5%) – of the PIRS group. The metachronous inguinal hernia developed in 7 (12.5%) infant of the open group and all of them were operated. The testicular disorders (transitory hydrocele, testicular retraction or hypotrophy) were noted in 13 (23.2%) patients after open repair and in 7 (9.9%) – after PIRS procedure.

**Conclusions** Thus, in infants with the inguinal hernia the laparoscopic repair is the more suitable procedure compared with the open surgery.

**Keywords** inguinal hernia, infants, laparoscopy, outcome

#### S IV.13: STAFF LEARNING CURVE OF A MINIMALLY INVASIVE TECHNIQUE TO REPAIR INGUINAL HERNIA AND COMMUNICATING HYDROCELE

Catarina Barroso\*<sup>1</sup>, Patrício Costa<sup>1</sup>, José Luís Carvalho<sup>2</sup>, Angélica Osório<sup>2</sup>, Ana Raquel Silva<sup>2</sup>, Ruben Lamas-Pinheiro<sup>1</sup> and Jorge Correia-Pinto<sup>1</sup>

E-mail: Catarina Barroso — [catabarroso@gmail.com](mailto:catabarroso@gmail.com)

<sup>1</sup>Life and Health Sciences Research Institute, School of Medicine, University of Minho; ICVS/3B's – PT; Government Associate Laboratory; Department of Pediatric Surgery, Hospital de Braga, Portugal; <sup>2</sup>Department of Pediatric Surgery, Hospital de Braga, Portugal

**Background** Five years ago, we started a minimally invasive program to repair inguinal hernia and communicating hydrocele. Based on the experience of all the staff members including residents, we aimed to draw the learning-curve for the used technique (Percutaneous Internal Ring Suturing).

**Materials and methods** All children with the diagnosis of inguinal hernia were included, as well as those with communicating hydrocele older than 2 yo (n=341 patients). We assessed the learning curve of the team using a individual cumulative sum methodology. The studied indices included clinical variables to evaluate the expertise (surgical time, per- and post-operative complications, ipsilateral recurrence) and the confidence (rate of offering laparoscopy to all patients) of the surgical team.

**Results** The surgical time declined slightly with cumulative experience, namely in bilateral hernias. Per-operative complications (vascular puncture and other causes for conversion) reached its nadir after each surgeon completed at least 35 cases, whereas the post-operative complications rate (umbilical and/or inguinal infections/granulomas) did not vary with the experience. The occurrence of ipsilateral recurrence disappeared after each surgeon completed 33 cases. The rate of offering laparoscopy to all patients in the department got close to 100% after each surgeon performed approximately 30 cases.

**Conclusions** This study suggests that the expertise of the staff learning curve is achieved when each surgeon in the department completed at least 35 cases. The staff maximal confidence in the technique was attained almost simultaneously.

**Keywords** learning curve, PIRS, inguinal hernia, communicating hydrocele

## Session V, Miscellaneous II

#### S V.1: FEMORAL HERNIA IN PEDIATRIC PATIENTS: A DIAGNOSTIC CHALLENGE

Belén Aneiros Castro\*<sup>1</sup>, Indalecio Cano Novillo<sup>1</sup>, Araceli García Vázquez<sup>1</sup>, Leonor Melero Guardia<sup>1</sup>, Isabel Carrillo Arroyo<sup>1</sup>, Jesús Vicente Redondo Sedano<sup>1</sup>, María López Díaz<sup>1</sup>, Raquel Tejedor Sánchez<sup>1</sup>, María Isabel Benavent Gordo<sup>1</sup> and Andrés Gómez Fraile<sup>1</sup>

E-mail: Belén Aneiros Castro — [belenaneiros-castro@gmail.com](mailto:belenaneiros-castro@gmail.com)

<sup>1</sup>Hospital 12 de Octubre, Madrid, Spain

**Background** Femoral hernias in children are very uncommon. Although its incidence is not known definitely, it is estimated to be lower than 1% of all inguinal hernias. Because of its rarity, preoperative misdiagnosis ranges from 40 to 75%, which can lead to an increased morbidity. The aim of this study is to

evaluate the results of the laparoscopic approach for the treatment of these hernias.

**Materials and methods** Between January 2000 to December 2015, 687 pediatric patients underwent laparoscopic inguinal hernia repair in our center. We retrospectively analyzed patient demographics, clinical data, surgical records and postoperative outcomes.

**Results** We laparoscopically repaired 18 femoral hernias in 16 patients (9 right, 5 left and 2 bilateral). The mean age of the patients was 8.06 years. There were 7 males and 9 females. Six cases (33.3%) were recurrences of previous open herniotomies and four patients were diagnosed preoperatively as indirect inguinal hernia (25%). The mean operative time was 59.16 minutes. No conversion was performed. There were not intraoperative complications. The mean length of stay was 0.6 days. There was no recurrence in any case.

**Conclusions** Laparoscopic technique is safe and effective for the treatment of femoral hernias in children. Additionally, it is an excellent diagnostic tool and it offers the possibility to perform simultaneous inguinal hernia repair. Therefore, we consider that it must be the treatment of choice for these defects to avoid misdiagnosis and unnecessary surgeries.

**Keywords** femoral hernia, pediatric hernia, laparoscopic surgery

**S V.2: SYSTEMATIC REVIEW ON SURGICAL TREATMENT OF ANNULAR PANCREAS**

Catarina Barroso\*<sup>1</sup>, Ruben Lamas-Pinheiro<sup>1</sup>, Ana Raquel Silva<sup>2</sup>, José Luís Carvalho<sup>2</sup> and Jorge Correia-Pinto<sup>1</sup>  
E-mail: Catarina Barroso — catabarroso@gmail.com

<sup>1</sup>Life and Health Sciences Research Institute, School of Medicine, University of Minho; ICVS/3B's – PT; Government Associate Laboratory; Department of Pediatric Surgery, Hospital de Braga, Portugal; <sup>2</sup>Department of Pediatric Surgery, Hospital de Braga, Portugal

**Background** Annular pancreas presents as duodenal obstruction in neonates (atresia) and children (stenosis). Laparoscopic treatment, first described by Nikolaas Bax in 2001, generally involves a Kimura duodeno-duodenal diamond-shaped anastomosis. Aiming to appraisal the advantages of laparoscopy, we analysed our and other series published worldwide.

**Materials and methods** We gathered clinical information of all children with the diagnosis of annular pancreas proposed for laparoscopy at our department, between June 2011 and June 2016. We compared this data with studies published in English since the year 2000, selected upon a systematic review, using the key-words: annular pancreas, duodenal atresia and congenital duodenal obstruction. Focus was given to age at presentation, surgical technique, time to first feeding, length of stay and survival rate.

**Results** We present patients characteristics and results obtained in our series and others published in the literature, in the table.

Articles	SURGICAL TECHNIQUE	n	Age at presentation	Average time to first feeding (days)	Average time of length of stay (days)	Survival rate (%)
Our series. 2016	Laparoscopy	5	1 day–3 yo	6.6	11	100
Li et al. China 2014	Laparoscopy	11	1–13 days	5	10.6	91
Yigiter et al. Turkey 2010	Open	22	1 day–2 months	15.4	24.1	63.6
Mustafawi et al. United Arab Emirates 2008	Open	30	3 day–3 months	-	22.5	100
Jimenez et al. California 2003	Open	16	1 day–2 yo	8.4	24	100

yo — years old

**Conclusions** Laparoscopic treatment of annular pancreas is not only safe and feasible, but improved outcomes concerning time to first feeding and length of stay.

**Keywords** annular pancreas, congenital duodenal obstruction, laparoscopy

**S V.3: LAPAROSCOPIC ADRENALECTOMY IN THE DEPARTMENT OF PEDIATRIC SURGERY, TRAUMATOLOGY AND UROLOGY IN POZNAN**

Patrycja Sosnowska\*<sup>1</sup>, Sebastian Moryciński<sup>1</sup>, Danuta Januszkiewicz-Lewadowska<sup>1</sup>, Aleksandra Rybczyńska<sup>1</sup> and Przemysław Mańkowski<sup>1</sup>

E-mail: Patrycja Sosnowska — patrycja.sosnowska@outlook.com

<sup>1</sup>Department of Pediatric Surgery, Traumatology and Urology, University of Medical Sciences Poznan, Poland

**Background** Laparoscopic adrenalectomy has been an incre-

asingly used surgical procedure to treat disorders of adrenal gland in children. The aim of the study was to assess the course of treatment, its effectiveness and the final effects in children with adrenal tumors treated with laparoscopic adrenalectomy in the Department of Surgery, Traumatology and Urology in Poznan.

**Materials and methods** Analysis of hospitalizations included diagnosis, surgical treatment and postoperative period in 19 patients treated for adrenal tumors using classical laparoscopy. The age of patients undergoing surgery, stage of tumor, histopathological diagnosis, length and course of operation, abdominal tumor removal, perioperative and postoperative complications, hospitalization, chemotherapy, necessity of analgesia and cosmetic effect of surgery were analyzed. The data were evaluated using descriptive statistics methods.

**Results** 19 children were operated in the Department of Pediatric Surgery, Traumatology and Urology in Poznan for adrenal tumors using classical laparoscopy. In none of the analyzed cases were there perioperative or postoperative complications. Neuroblastoma lesion was diagnosed in 15, pheochromocytoma in 2, adrenal adenoma in 2 cases. One child required chemotherapy. The average hospital stay after surgery was 5 days. The obtained cosmetic effect has been evaluated by the parents as very good and good.

**Conclusions** Laparoscopy provides a good insight into the operating field.

Minimal invasive surgery allows for shorter hospitalization time and leads to better cosmetic effects than classical surgery. The ability to perform laparoscopic surgery depends on the clinical condition of the patient.

Using this method does not release the surgeon from preserving the basic principles of oncological cleanliness.

**Keywords** adrenalectomy, child, laparoscopy, neuroblastoma, pediatric surgery

#### S V.4: LAPAROSCOPY IN THE TREATMENT OF ADRENAL TUMORS IN CHILDREN

Andriy Pereyaslov\*<sup>1</sup>, Andriy Dvorakevych<sup>2</sup> and Olesya Nykyforuk<sup>1</sup>

E-mail: Andriy Pereyaslov — andrew\_perejaslov@yahoo.com

<sup>1</sup>Medical University, Department of Pediatric Surgery, Lviv, Ukraine; <sup>2</sup>Lviv Regional Children's Clinical Hospital OHMATDYT, Lviv, Ukraine

**Background** Adrenal glands are ideally suitable for laparoscopic surgery due to its small size and relatively infrequent malignancy. For today, laparoscopy is now being recognized as the standard approach for the treatment of adrenal lesions. However, the route of laparoscopic approach may differ, depending on the pathology, tumor's size, and surgeon's preference. The aim of the study was summarize own experience of laparoscopic adrenalectomy in children.

**Materials and methods** During 1997–2017 years laparoscopic adrenalectomy was performed in 16 patients due to the different types of adrenal lesions. Laparoscopic removing of adrenal tumors was performed in 6 children with pheochromocytoma, in 4 — with Cushing's syndrome, in 4 — with adrenal cyst, in 1 — with myelolipoma, and in 1 — with cystic mature teratoma. The transperitoneal approach was applied in 10 patients and in 6 — the lateral retroperitoneal approach was used.

**Results** Mean duration of laparoscopic adrenalectomy was 97.5±8.7 min (range, 70–154 min) with the blood loss ranged from 40 to 90 mL (74.3 ±8.9 mL). The longest operative time was in patients with Cushing's syndrome (107.2 ±9.8 min). The tumors size ranged from 35 to 70 mm (44.2 ±3.6 mm).

Indication for laparoscopic surgery was a well-encapsulated tumor with no evidence of tumor invasion into surrounding tissues or signs of lymphadenopathy. The main advantage of transperitoneal approach is familiar anatomy, large working space, and possibility of early ligation of the main

adrenal vein coming directly from the vena cava. Retroperitoneal approach provides a direct access to the adrenal gland and avoids abdominal adhesions in children who have had previous abdominal surgery. A disadvantage of retroperitoneal approach is the relatively small space to work in, so preparing the vascular pedicle may be difficult, when the lesion is more than 5 cm in size, and it does not permit full abdominal exploration for concomitant pathology.

**Conclusions** Our data suggest that lesions without involvement of surrounding structures can be approached laparoscopically regardless of the size of the lesion and its functional activity.

**Keywords** children, adrenal tumor, laparoscopy

#### S V.5: LAPAROSCOPIC ADRENALECTOMY IN UNDETERMINED ADRENAL MASSES

Laszlo Sasi Szabo\*<sup>1</sup> and Levente Szabo<sup>1</sup>

E-mail: Laszlo Sasi Szabo — sasi.szabo.laszlo@med.unideb.hu

<sup>1</sup>University of Debrecen, Institute of Pediatrics, Department of Pediatric Surgery, Debrecen, Hungary

**Background** Adrenal masses in children are relatively common, with neuroblastoma being the most frequent extracranial tumor of infancy. Although the age of the patient, biochemical characteristics and imaging features usually allow diagnosis without surgery, still there are cases where the exact disease can only be determined by operative meanings. Laparoscopic adrenalectomy provides an excellent choice for both diagnosis and definitive treatment of adrenal pathologies.

**Materials and methods** In a five-year period between 2012–2016, we encountered four cases of an undetermined right adrenal mass,

Patient 1 was a 3 months old boy with a 2 cm lesion without any increase in tumor markers and catecholamins, patient 2 was a 3 years old boy with an accidentally diagnosed 25 mm mass without any other alterations, patient 3 was a 12 years old girls with a large adrenal mass who had a slight increase in catecholamine levels, patient 4 was a 13 years old girl with a known, rapidly enlarging lesion in the right suprarenal lesion.

Malignancy could not be excluded in any of the cases so we performed laparoscopic right adrenalectomy.

**Results** We encountered no intra- or postoperative complication. The operative time was 38 and 45 minutes in the first two cases, 110 minutes for the 3rd patient, and 165 minutes for the last one, where the resection of the upper pole of the right kidney was performed because of a suspected infiltration. The histology proved Stage I neuroblastoma in the 1st, ganglioneurinoma in the 2nd, ganglioneuroblastoma in the 3rd, and adrenal myelolipoma with haemorrhage in the 4th case. After a mean follow-up of 17 months, all patients are well and free of any recurrences.

**Conclusions** In cases where despite of adequate diagnostic

methods, the origin of an adrenal mass is unclear laparoscopy provides a safe way for both histologic diagnosis and definitive treatment.

**Keywords** adrenal mass, laparoscopy

### S V.6: THORACIC AND ABDOMINAL ENDOSCOPIC APPROACH IN PEDIATRIC SOLID ONCOLOGY

Sergey Talypov<sup>\*1</sup>, Evgeniy Andreev<sup>1</sup>, Svetlana Varfolomeeva<sup>1</sup>, Natalya Ivanova<sup>1</sup>, Denis Kachanov<sup>1</sup>, Elena Kazantseva<sup>1</sup>, Nikolay Merkulov<sup>1</sup>, Natalya Uskova<sup>1</sup> and Raisa Oganessian<sup>1</sup>

E-mail: Sergey Talypov — riumych@yandex.ru

<sup>1</sup>National Research Center of Pediatric Hematology, Oncology and Immunology, Moscow, Russian Federation

**Background** At the end of the last century, endoscopic operations have become the gold standard in the treatment of surgical pathology in children. Currently, they are increasingly being used in pediatric Oncology, both at the diagnostic stage and surgical management.

**Materials and methods** Since February 2012 in National Research Center of Pediatric Hematology, Oncology and Immunology in Surgery Department 163 endoscopic operations was performed to remove the solid tumor. From the specified number of operations, 91 were by laparoscopic and 72 — thoracoscopic approach. Laparoscopic excision of tumors were performed in children with neurogenic tumors (60), benign tumors and cysts of the ovaries (9), hematoma with calcification of the adrenal gland (3), kidney tumors (3), pseudopapillary tumor of the pancreas (2) and others (9). Thoracoscopic incision of tumors was carried out with neurogenic tumors (49), lung tumors (12), bronchial cysts (3), esophagus cysts (3), tumors of thymus (2) and others solid tumors (5). Minimal age of patient was 1 month, maximal — 19 years. The ratio of boys to girls stood at 1:1.2. A three or four trocars access was used. The tumor stood out with the use of bipolar or ultrasound coagulation. After removal of the tumor, it was placed in the endoscope container and removed from the cavity through an enlarged trocar hole.

**Results** The surgical part of the operation ranged from 20 minutes to 4.5 hours and depended on the size of the tumor and surgical risks (involving of large vessels, nerves end so on).

The biggest volume of intraoperative bleeding was 300 ml in patient weight 20 kg (18% of blood volume), the same child had a biggest tumor, that we have ever removed by endoscopic approach — 76x57x130 mm (275 ml).

In 19 cases resorted to conversions (6 — a large amount of tumor, 6 — profuse bleeding, 5 — adhesive process, 2 — not founded metastases in lungs). In the postoperative period in 7 children was chylothorax/hemoperitoneum — needed additional therapy and with positive dynamic.

At dynamic observation revealed 2 recurrence and open reoperations were performed.

**Conclusions** Endoscopic surgery in the treatment of children with solid tumors, has a number of advantages over open sur-

gery, allows achieving good results and is an integral part of complex therapy.

**Keywords** endoscopic approach, thoracoscopy in children, laparoscopy in children, pediatric solid oncology

### S V.7: SELF-ASSESSMENT OF PERFORMANCE AMONG SURGICAL TRAINEES DURING LAPAROSCOPIC PEDIATRIC COURSE

Blanca Fernández Tomé<sup>\*1</sup>, Laura Correa<sup>1</sup>, Idoia Díaz-Güemes<sup>1</sup>, María del Mar Pérez<sup>1</sup>, Araceli García-Vázquez<sup>2</sup>, Indalecio Cano<sup>2</sup>, Francisco Berchi<sup>2</sup>, and Francisco Miguel Sánchez-Margallo<sup>1</sup>

E-mail: Blanca Fernández Tomé — bfernandez@ccmijesususon.com

<sup>1</sup>Minimally Invasive Surgery Centre Jesús Usón, Cáceres, Spain; <sup>2</sup>Hospital Universitario 12 de Octubre. Madrid, Spain

**Background** The ability of pediatric surgeons to assess their own performance is essential for training and self-regulation in specific techniques. The latter is based on the premise that they recognize their weaknesses and seek remedial action accordingly.

**Materials and methods** Forty surgical trainees performed a laparoscopic pediatric course, performing the gastrectomy, Pyloromyotomy, Nissen fundoplication and nephrectomy. The performance assessment gastroscopy of rating of technical skills by an expert's team in the following procedures: introduction of the first trocar, introduction of the rest of trocars, dissection, ligatures, intracorporeal suture and complications. Subjects also were asked to assess their own performance using the same methods. Spearman's rho was used for data analysis.

**Results** There was a strong correlation between the experts rating of technical skills and self-assessment (rho = .72).

**Conclusions** The evaluation carried out by the experts is similar to the self-evaluation carried out by pediatric assistants for the same procedures.

**Keywords** self-assessment, pediatric surgery, laparoscopy

### S V.8: LAPAROSCOPIC INTRACORPOREAL SUTURING SKILLS ACQUISITION DURING A PEDIATRIC LAPAROSCOPIC COURSE

Blanca Fernández Tomé<sup>\*1</sup>, Laura Correa<sup>1</sup>, Idoia Díaz-Güemes<sup>1</sup>, Araceli García-Vázquez<sup>2</sup>, Indalecio Cano<sup>2</sup>, Francisco Berchi<sup>2</sup>, and Francisco Miguel Sánchez-Margallo<sup>1</sup>

E-mail: Blanca Fernández Tomé — bfernandez@ccmijesususon.com

<sup>1</sup>Minimally Invasive Surgery Centre Jesús Usón, Cáceres, Spain; <sup>2</sup>Hospital Universitario 12 de Octubre. Madrid, Spain

**Background** This study focused on the acquired abilities during a basic laparoscopic course for pediatric surgeons. In this surgical specialty one of the most essential skills is intracorporeal suturing, which is needed for most of the procedures performed on the digestive tract. The aim is assessment the learning curve in laparoscopic intracorporeal suture of novices pediatric surgeons.

**Materials and methods** In this course participated 14 pediatric surgeons with no previous experience in laparoscopy. The course has a total duration of 21 hours. The activity is constituted by hands-on sessions completed on simulator during the first day and on animal model during the subsequent days. After a brief expert demonstration of the knotting technique, attendants performed one simple suture on inorganic tissue at the start of the hands-on simulator session. At the end of the course, each surgeon carried out one simple seromuscular suture in the gastric wall on porcine animal model. The assessment parameters were: total completion time with each suture (limited to a maximum of 7 minutes), performance quality, tears on inorganic tissue, end knot quality and precision errors.

**Results** Average suture completion time significantly decreased at the end of the training activity. 6 of the 14 attendants were not able to complete the first suture in the established time limit. On the first day we observed 44.4% total errors, with a majority of precision errors (27.8%), followed by end knot quality (16.7%) and presence of tissue tears (5.6%). At the end of the course, total errors were significantly reduced to 22.2%, the most predominant being end knot quality (11.1%).

**Conclusions** The results obtained in this study show a significant improvement in intracorporeal suturing skills in novice pediatric surgeons, reflected by a significant decrease in performance times and an increase in simple suture quality.

Attendance to regulated hands-on courses in laparoscopic surgery at the beginning of the pediatric surgeons' learning curve lightens and possibly accelerates the acquisition of skills in laparoscopy.

**Keywords** laparoscopic skills, intracorporeal suturing, pediatric, training

## S V.9: VENTRICULOPERITONEAL SHUNTS: LAPAROSCOPIC-ASSISTED APPROACH

Laura Righetti<sup>1</sup>, Susanna Milianti<sup>1</sup>, Giovanni Boroni<sup>1</sup>, Fabio Torri<sup>1</sup>, Silvia Pecorelli<sup>1</sup>, Claudio Cereda<sup>1</sup>, and Daniele Alberti<sup>1</sup>  
E-mail: Laura Righetti — laurairighetti@alice.it

<sup>1</sup>Department of Pediatric Surgery, Spedali Civili Hospital, Brescia, Italy

**Background** The surgical treatment of hypertensive hydrocephalus involves the shunt of the cerebrospinal fluid (CSF) in excess in another cavity, in order to alleviate the symptoms due to the increase of intracranial pressure. The catheter is most commonly placed in the peritoneal cavity, in the pleural cavity or in the right atrium of the heart. In the last decade, the laparoscopic-assisted technique has been utilized to facilitate the placement of the abdominal portion of the shunt.

**Materials and methods** From February 2011 to February 2017, a total of 45 patients (age range: 1mo and 13 yrs old; median age: 6mo old) were submitted to ventriculoperitoneal shunt (VPS) placement: 28 patients (62%) were treated with the laparoscopic-assisted technique (LVPS).

A ventricular catheter is placed by the neurosurgeon through a small cranial incision and it is connected to a Codman

Hakim Programmable Valve system. Then, using a tunneler, the VPS is brought subcutaneously from the insertion point to the right or left hypochondrium. A 3-mm skin incision is made exactly at the end of the subcutaneous tunnel. An umbilical 5-mm optical trocar along with a 3-mm trocar in the right/left flank used to introduce a grasper, are placed in younger patients, while a single 10-mm Hasson trocar is preferred in bigger patients. After the pneumoperitoneum is established, the catheter is inserted using a peel-away introducer and its distal tip is carried down into the pelvis.

**Results** There were no intraoperative complications and no laparoscopic assisted procedure had to be converted in open surgery.

Six patients (21%) required repeat VPS revision for malfunctioning of catheter valve.

At a mean follow-up time of 18 months (range: 1 to 57 months), one case of catheter infection and 1 case of shunt failure were assessed. Two patients died for progression of their malignant disease.

**Conclusions** Other studies showed that the LVPS does not cause a significant increase of intracranial pressure since the valve of the VPS prevents the transmission of the abdominal pressure cranially.

In patients treated with LVPS we assessed a low rate of catheter distal obstruction (4.8%).

Furthermore, the LVPS allows a safe placement of the abdominal portion of the VPS and it is important to assess (and eventually treat) the presence of peritoneal adhesions. Moreover, the VPS function can be confirmed under direct visualization.

In conclusion, the laparoscopic-assisted ventriculoperitoneal shunt (LVPS) is a safe procedure that reduces the probability of catheter distal obstruction.

**Keywords** Ventriculoperitoneal shunt (VPS), laparoscopic placement, catheter, obstruction

## S V.10: OVARIAN CYSTS IN INFANTS

Inna Bachynska<sup>1</sup>, Irina Gavriliva<sup>1</sup>, Roman Zhezhera<sup>1</sup>, and Ludmila Yanovich<sup>1</sup>

E-mail: Inna Bachynska — inna.bachynska@gmail.com

<sup>1</sup>The National Children's Specialized Hospital «Ochmatdyt», Kyiv, Ukraine

**Background** Majority of simple ovarian cysts diagnosed during pregnancy undergo reverse development during the first 3–6 months of life. In symptomatic cases, signs of prenatal cyst torsion, laparoscopic surgery is indicated.

**Materials and methods** We observed 72 girls with ovarian cysts at 1–18 months. Group One — 57 cysts developed in reverse; Group Two — Cysts in 15 girls were operated (12 via laparoscopy, 3 via laparotomy).

**Results** Girls in both groups underwent full clinical examination, blood hormone levels were analyzed, Ultrasound w/ Color Doppler; the girls in Group Two were also tested for CA-125, AFP, HCG.

Criteria for conservative treatment were the absence of clinical symptoms, small cyst size, structure under ultrasound (unicameral liquid lesion) and presence of blood circulation under Doppler.

Where reverse development of the lesion was absent, at large dimensions, circulatory disruptions under Color Doppler, echo-positive sediment in a liquid cyst or hyperechogenic septums, surgical treatment was indicated.

**Conclusions** Laparoscopy is the gold standard for adnexal surgery.

A differentiated approach to treating girls with congenital ovarian cysts allows us to avoid unnecessary surgery at the presence of follicular ovarian cysts, which, as a rule, undergo reverse development.

**Keywords** ovarian cysts, antenatal ovation cysts, antenatal ovation torsion, ovarian cysts in infants

### S V.11: IS LAPAROSCOPY ALWAYS SAFE AND USEFUL IN PEDIATRIC OVARIAN TORSION?

Luigi Avolio<sup>\*1</sup>, Veronica Carlini<sup>1</sup>, Ilaria Brambilla<sup>2</sup>, Fabrizio Vatta<sup>1</sup>, and Piero Romano<sup>1</sup>

E-mail: Luigi Avolio — l.avolio@smatteo.pv.it

<sup>1</sup>Department of Pediatric Surgery, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy; <sup>2</sup>Department of Pediatrics, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy

**Background** Ovarian torsion (OT) can be difficult to diagnose because of aspecific symptoms, lack of radiological or laboratory markers and challenging differential diagnosis with many other conditions. Laparoscopy is considered the gold standard in OT treatment, but it is contraindicated in case of malignancy. We evaluate our series of OT managed by laparoscopy.

**Materials and methods** We selected retrospectively all cases of OT from January 2010 to December 2016. Demographic data, preoperative exams, surgical procedure and sonographic follow-up were collected. Of 12 patients (median 9.5 years), 8 were prepubertal girls (67%); in 8 cases the OT was caused by the presence of a mass and in 4 there was a normal ovary. Tumoral serum marker CA 19.9 was elevated in a patient; in 9 girls preoperative ultrasound presented at least two signs of suspected malignancy (5 lesions > 5 cm, 3 complex images).

**Results** We performed ovarian conservative surgery in 7 girls (64%) (2 detorsion, 4 enucleation of adnexal cysts, and 1 salpingectomy); 2 oophorectomy and 3 salpingo-oophorectomy were needed. Controlateral recurrence occurred in a girl. Laparoscopy was preferred in all cases. Histological exams of 8 OT due to mass revealed 100% benign adnexal pathology (4 mature cystic teratomas, 3 ovarian cysts and one paramesonephric cyst with Walthard nest). Ultrasound follow-up demonstrated regular adnexal function in all cases.

**Conclusions** In consideration of the rarity of neoplastic ovarian pathology, without specific signs of malignancy, minimally

invasive surgery should be considered the first approach for pediatric OT.

**Keywords** ovarian torsion, ovarian torsion, laparoscopy, pediatrics

### S V.12: ROLE OF LAPAROSCOPY IN DISORDERS OF SEX DEVELOPMENT

Francesca Destro<sup>\*1</sup>, Claudio Vella<sup>1</sup>, Claudia Filisetti<sup>1</sup>, Federica Marinoni<sup>1</sup>, Giorgio Selvaggio<sup>1</sup>, Giovanni Di Iorio<sup>1</sup> and Giovanna Riccipettoni<sup>1</sup>

E-mail: Francesca Destro — francesca\_destro@hotmail.com

<sup>1</sup>Buzzi Children's Hospital, Milano, Italy

**Background** Disorders of sex development (DSD) include a wide spectrum of chromosomal, hormonal and metabolic abnormalities that modify genital development. The multidisciplinary approach providing patient-centered care is critical to obtain long-term physical, psychological and sexual well-being. In this scenario the role of the surgeon is twofold: diagnostic and therapeutic. The aim of this analysis was to evaluate the usefulness of laparoscopy in DSD patients.

**Materials and methods** Laparoscopy was performed in 16 DSD patients over the last 8 years in a single paediatric surgical centre. We collected patients' demographic data, karyotype, hormonal test and radiological results, surgical details, histological results and post-operative complications.

**Results** 8/16 testicular dysgenesis DSD (6 46XY; 2 45X/46XY) with persistence of Mullerian remnants (absence of MIF), 4/16 Complete Androgen Insensitivity (CAI), 3/16 Rokitsansky syndrome and 1 21OH-adrenogenital syndrome raised as a male were submitted to laparoscopy in order to precisely define the diagnosis and to plan the surgical treatment. 7/8 testicular dysgenesis had bilateral intrabdominal testis, 1 had ovotestis DSD diagnosed after testicular torsion. Diagnostic laparoscopy included: gonadal biopsies in 7/8 cases of testicular dysgenesis and laparoscopic inspections in the remaining 9 cases. 24 therapeutic laparoscopic procedures were performed in 16 cases: 4 gonadectomies (CAI), 3 Mullerian remnants removals, 7 bilateral orchiopexies and 3 laparo-assisted sigmoid neo-vagina.

**Conclusions** Paediatric surgeons have responsibilities to DSD patients in terms of diagnosis, treatment, management of urological complications, provision of surgical services when requested. In this peculiar field laparoscopy has the highest accuracy and efficacy improving exposure of gonads and Müllerian remnants. The detailed anatomical definition gave elements for the diagnosis and subsequent therapeutic planning. Laparoscopy is recommended for gonadal biopsy, orchidopexy and gonadectomy in case of ovotesticular DSD. Laparoscopic removal of Müllerian remnants and gonadectomy is performed to avoid infective and bladder outlet symptoms and the risk of malignant transformation. Prevention of germ cell tumour is one of the main concerns in DSD patients, given the incidence of gonadal tumours between 10 and 33%.

The role of laparoscopy in DSD patients is both diagnostic

and therapeutic. Moreover it helps to devise a therapeutic strategy in complex cases. Beside the well-known advantages of minimally invasive approaches, multiple laparoscopic procedures can be performed in the same patient reducing the surgical invasiveness allowing a genital reconstruction in agreement with the patient-centered care.

**Keywords** disorders of sex development, laparoscopy

### S V.13: CHANGING STRATEGY IN MINIMALLY INVASIVE SPLEEN SURGERY

Radoica Jokic\*<sup>1</sup>, Jelena Antic<sup>1</sup>, Svetlana Bukarica<sup>1</sup>, Dragan Sarac<sup>1</sup> and Nenad Zakula<sup>1</sup>

E-mail: Radoica Jokic — jokic.rs@gmail.com

<sup>1</sup>Clinic of Pediatric Surgery, Novi Sad, Serbia

**Background** In recent years there has been increasing interest in the therapeutic treatment of the splenic pathology. Laparoscopic splenectomy has become an established standard in the management of splenic trauma and surgical diseases of the spleen. Postsplenectomy sepsis is the most serious complication of splenectomy.

The purpose of this study is to describe the changes that have been made over the past decades and underlines the efficacy and safety of new concept in children, the preservation of the spleen function. Also, to present and analyse practical use of minimally invasive spleen surgery in children.

**Materials and methods** We analyzed 71 patients with splenic trauma who were treated at the Clinic of Pediatric Surgery in Novi Sad during the period of 1990–2002. A control group of 32 patients was formed as retrospective, and a study group of 39 patients as prospective study. Separated key criteria for the therapeutic decision and treatment algorithm for the splenic trauma were proposed.

Then we analyzed the data of 16 consecutive children who underwent the minimally invasive spleen surgery for haematological and other splenic disorders in our Unit, between January 2011 and January 2017. The patients were 6 girls and 10 boys aged between 6 and 18 years. The indications for surgery were cysts (9 cases), hereditary spherocytosis (5 cases), idiopathic thrombocytopenic purpura (1 case), and sarcoidosis (1 case). Laparoscopic splenectomy in 7 patients, laparoscopic partial splenectomy in 5 patients, and unroofing in 3 patients were performed. All five children with hereditary spherocytosis presented with an associated cholelithiasis and were cholecystectomized by laparoscopy during the same anaesthesia.

**Results** Non-operative treatment in the control group was applied in 7 patients, operative preservation of the spleen in 11, and splenectomy in 14 patients. In the study group, non-operative treatment was applied in 28 patients, operative spleen preservation in 8, and splenectomy only in 3 patients. Non-operative treatment was administered to 71.79% of patients in the study group and to 21.88% of patients of the control group. The new concept of preserving the spleen's function has enabled in saving the organ in 92.18% of cases.

In the last years, no major complications were recorded du-

ring application of minimally invasive spleen surgery. Conversion was performed in 5 cases. The alternative spleen vascularisation, the short gastric vessels and ascending branch of the left gastroepiploic artery are useful in the partial splenectomy. Post-operative analgesia and hospital stay was significantly diminished.

**Conclusions** The priority in preserving the function of the spleen is possible by applying nonoperative treatments and/or operative preservation of the spleen. The introduction of minimally invasive surgery opened a new field within the surgical methods. Based on our experience, we believe that the minimally invasive spleen surgery is a safe and effective procedure. Bearing in mind that the risk of fatal postsplenectomy sepsis is lifelong, it is necessary to overcome splenectomy as the dominant procedure in the management of splenic pathology.

**Keywords** spleen pathology, non-operative management, laparoscopic splenectomy, laparoscopic partial splenectomy, unroofing, children

### S V.14: POST-LAPAROSCOPIC SPLENECTOMY SPLENOSIS: WHAT DO PEER-REVIEW REPORTING TRENDS INDICATE?

Amulya Saxena\*<sup>1</sup>, Simone Maechler<sup>1</sup> and Mario Mendoza-Sagon<sup>2</sup>

E-mail: Amulya Saxena — Amulya.Saxena@chelwest.nhs.uk

<sup>1</sup>Department of Pediatric Surgery, Chelsea Children's hospital, Chelsea and Westminster Healthcare NHS Fdn Trust, Imperial College London, United Kingdom; <sup>2</sup>Department of Pediatric Surgery, Ospedale Regionale Bellinzona e Valli, Bellinzona, Switzerland

**Background** Splenosis after laparoscopic splenectomy/partial-splenectomy and after conservative management of splenic trauma with spills of splenic pulp is still poorly understood. The aim of this study was to analyze peer-reviewed reports on post-laparoscopic splenectomy splenosis (from the raw-dissected surface in partial splenectomy or breach of endobag in total splenectomy) with regards to demographics in reporting, outcomes and management.

**Materials and methods** Electronic Pubmed was searched for terms „laparoscopic splenectomy” and „splenosis”. Data was collected with regards to the number of publications, origin of the publication, population size and age, etiology and outcomes. Inclusion criteria included publications with age range 0-19, with review articles excluded for this analysis. Articles were selected by 2 Reviewers to minimize bias.

**Results** The literature search identified 44 articles of which 32 articles between 1994–2016 met the inclusion criteria. With regards to reporting, 17 reports originate from Europe, 8- Australasia, 6-US, 1-South Africa. With regards to the etiology: 16-post-traumatic splenectomy, 7-post-laparoscopic splenectomy, 3- conventional splenectomy, 1-congenital (intra-gastric), 1-recurrent hemolysis, 1-Multiple Endocrine Neoplasia Syndrome-1, and 2-unknown. With regards to localization: 7-peritoneum/omentum, 7-pelvis, 5-liver, 2-colon, 1-pancreas, 1-

ovary, 1-stomach, 1-port site and 6-unknown. Associated conditions were reported only in 13 patients: 4-immune thrombocytopenic purpura, 3-Heatitis (A, B and C), 1-autoimmune hemolytic anemia, 1-testicular teratoma, 1-Multiple Endocrine Neoplasia Syndrome-1, 1-cervical cancer, 1-polycystic ovarian syndrome and 1-Burkitts lymphoma. The splenosis excision was performed in 22-reports laparoscopically, 1- robotic assisted and 9-no surgical management information. It was interesting to note the lag time between surgery-to-splenosis diagnosis was mean 26.1-years (range 12-46 years) in 14 reports-post-traumatic splenectomies vs mean 4-years (range 2 months-13 years) in 7 reports-laparoscopic splenectomy. There were no further morbidities or mortalities in reported series.

**Conclusions** Post-traumatic splenectomy is the most common cause of splenosis, however post-laparoscopic splenectomy has been found to be the 2nd major cause. Once a splenosis has been localized, laparoscopic management to remove the tissue within the abdominal cavity is feasible. It should be noted that the lag time to diagnosis is more in post-traumatic splenectomies versus laparoscopic splenectomy; however the reason for this still remains unclear. Our question, „the incidence of splenosis post-laparoscopic splenectomy after partial-splenectomy or breach of endobag?“ however remained unanswered!

**Keywords** laparoscopic splenectomy, splenectomy, splenosis, laparoscopy, post-laparoscopic, partial splenectomy, post-traumatic splenectomy

#### S V.15: TECHNICAL DIFFICULTIES IN ELECTIVE LAPAROSCOPIC SPLENECTOMY

Paweł Wawrzaszek<sup>1</sup>, Magdalena Frankowicz<sup>\*1</sup>, Natalia Retkowska-Tomaszewska<sup>1</sup>, Nawal Matar<sup>1</sup> and Jan Wendland<sup>1</sup>  
E-mail: Paweł Wawrzaszek — pawel.wawrzaszek@gmail.com

<sup>1</sup>SZOZ nad Matką i Dzieckiem, Oddział Chirurgii Dziecięcej i Leczenia Oparzeń, Poznań, Poland

**Background** Elective splenectomy in pediatric population is mainly performed in patients with hematological disorders. The most common indications are: hereditary hemolytic spherocytosis and idiopathic thrombocytopenic purpura. For an experienced minimal access surgeon laparoscopic splenectomy (LS) has become a standard procedure in children. This study reports our experience with this technique.

**Materials and methods** Twenty-one laparoscopic splenectomies were performed in our departement since September, 2014. These were 15 cases of hereditary hemolytic spherocytosis and 6 cases of idiopathic thrombocytopenic purpura. The indications for operative treatment were set in cooperation with hematological team. The procedure was typically performed using 4 laparoscopic ports with patient lying on the right side. Bipolar coagulation was used in all of the cases (instrumentation — Caiman, Aesculap 5 mm)

**Results** Thirteen boys and eight girls were operated in the study period. Mean age at operation was 11.1 (6–18 years). The si-

ze of the excised spleen reached maximally 22cm in hereditary hemolytic spherocytosis. In idiopathic thrombocytopenic purpura it was normal in relation to age. In most of the patients the size of the organ was radiologically underestimated compared with the intraoperative findings. There were two conversions to open procedures. Both occurred in older children suffering from hereditary hemolytic spherocytosis and were caused by anatomical difficulties. Apart from one relaparotomy caused by intra-peritoneal bleeding no postoperative complications were observed. Children who underwent laparoscopic splenectomy returned to full physical activity quicker than after an open operation. Additional analysis of the data was performed in order to search for correlation of chosen parameters (type of pathology, age of the patient, vascular pedicle division strategy, spleen extraction) with operative time, operative bleeding and complications concerning other organs.

**Conclusions** In children with hematological disorders (including splenomegaly) laparoscopic splenectomy is a safe and effective technique. Intraoperative difficulties' risk increases in older children (what correlates with the disorder duration) and with the spleen size.

**Keywords** laparoscopic splenectomy, hematological disorders

#### S V.16: THE RESULTS OF MINIMALLY INVASIVE SURGERY IN CHILDREN WITH ABDOMINAL NEUROBLASTOMA

Evgeny Andreev<sup>\*1</sup>, Sergey Talypov<sup>1</sup>, Tatyana Shamanskaya<sup>1</sup>, Maxim Sukhov<sup>1</sup>, Nikolay Grachev<sup>1</sup>, Natalya Uskova<sup>1</sup>, Raisa Oganesyan<sup>1</sup>, Galina Tereschenko<sup>1</sup> and Svetlana Varfolomeeva<sup>1</sup>  
E-mail: Evgeny Andreev — andreev.doctor@gmail.com

<sup>1</sup>Dmitry Rogachev National Research Center of Pediatric Hematology Oncology and Immunology, Moscow, Russian Federation

**Background** One of the promising areas in pediatric oncology and pediatric surgery is MIS in children with abdominal neuroblastoma. We investigated and comparing the results of laparoscopy and laparotomy treatment.

**Materials and methods** Radical surgical treatment was performed in 224 patients with thoracoabdominal neuroblastoma (01.2012–10.2016). Laparoscopic tumorectomy was performed in 39(17.4%). Patients were treated according to NB2004 protocol. Image-defined risk factors (IDRF) and size of the tumor were used to select patients. To compare the effects of laparotomy with those of laparoscopy in patients with neuroblastomas without IDRFs, the following items were retrospectively compared: largest tumor dimension, volume of blood loss, time required to initiate postoperative feeding, locoregional recurrence rate, survival, etc.

**Results** 31 patients without IDRFs (20 at low-medium risk and 11 at high risk) underwent laparotomy, and 39 patients without IDRFs (31 low-medium risk and 8 at high risk) underwent laparoscopy. Median age was 14 months (1 – 69) after laparotomy and 11 months (3–62) after laparoscopy (p=0.68). Median duration of surgery was 120 (70–200) and 135 (50–300) min in

the laparotomy and laparoscopy groups ( $p=0.15$ ). Median postoperative time required for resuming meal consumption was significantly longer in the laparotomy (2 days; 1–4) group than that in the laparoscopy group (0 days; 0–10;  $p=0.000005$ ). Median blood loss was significantly higher in the laparotomy group (20 ml; 0–200) than in the laparoscopy group (0 ml; 0–100;  $p=0.01$ ). Median time of drainage removal was higher in the laparotomy group (4 ml; 0–8) than in the laparoscopy group (2 days; 0–13;  $p=0.001$ ). Median time of analgesia was higher in the laparotomy group (4 days; 2–6) than in the laparoscopy group (2 days; 1–5;  $p=0.000002$ ). Median time of antibacterial therapy was higher in the laparotomy group (6 days; 3–11) than in the laparoscopy group (5 days; 1–10;  $p=0.000002$ ). We have not differences in intraoperative and postoperative complications, local recurrence and mortality in postoperative period. Median follow-up time was 36 months.

**Conclusions** MIS in children with abdominal neuroblastoma is an effective technique which enables to carry out radical surgery in the absence of contraindications and IDRF and provides minimally invasiveness and good cosmetic effect without worsening oncological prognosis.

**Keywords** neuroblastoma, children, laparoscopy, minimally invasive, surgery

## Session VI, Urology I

### S VI.1: LAPAROSCOPIC BLADDER NECK SUSPENSION IN CHILDREN WITH REFRACTORY URINARY INCONTINENCE BASED ON BLADDER NECK INSUFFICIENCY

Rafał Chrzan<sup>\*1</sup>, Luitzen A. Groen<sup>2</sup> and Tom PVM de Jong<sup>2</sup>  
E-mail: Rafał Chrzan — r\_chrzan@wp.pl

<sup>1</sup>Jagiellonian University Medical College UCHC, Department of Pediatric Urology, Krakow, Poland; <sup>2</sup>Academic Medical Center EKZ Amsterdam, the Netherlands. Medical Center WKZ Utrecht, the Netherlands

**Background** The aim of this study is assess the results of laparoscopic colposuspension in children with urinary incontinence.

**Materials and methods** 18 laparoscopic consecutive procedures with a follow up > 1 year were analysed. The mean age was 13.5 years (9–17 years). All patients had urinary incontinence (UI). In one third constipation was treated. Six patients had history of recurrent UTI's. All patients failed urotherapy for at least 3 years. In 7 patients antimuscarinics were used because of urge without success. Bladder neck insufficiency was proven by repeated perineal ultrasound and video-urodynamic study. The laparoscopic procedure was performed preperitoneally by means of three 5-mm ports. The anterior wall of the vagina, lateral to the bladder neck, was mobilized and bilaterally sutured to Cooper's ligament. A catheter was left for 3–5 days after surgery.

**Results** The mean operation time was 90 min (range 56–150

min). Intraperitoneal CO<sub>2</sub> leakage occurred in 1 patient without need for conversion. One patient needed temporary CIC due to urinary retention. Full success (dryness) was achieved in 6 and in partial response in 6 after 6 months. After 12 months 8 were dry and 5 showed improvement. Four out of 6 were free of UTI's and antibiotic prophylaxis was ceased.

**Conclusions** Laparoscopic colposuspension can be used to treat refractory UI in a very selective group with bladder neck insufficiency when non-invasive methods fail.

**Keywords** colposuspension, urinary incontinence, laparoscopy, children

### S VI.2: COMBINATION THERAPY OF URINARY INCONTINENCE BY INJECTION OF BULTICA SUBSTANCE IN THE BLADDER NECK WITH BOTULINUM TOXIN

Julio Justo Báez<sup>\*1</sup>, Marta Bazan<sup>2</sup> and Sebastián Ciuffo<sup>2</sup>  
E-mail: Julio Justo Báez — jjnbaez@hotmail.com

<sup>1</sup>Hospital Pediátrico del Niño Jesús, Cátedra de Cirugía Pediátrica, Universidad Nacional de Córdoba, República Argentina; <sup>2</sup>Hospital Pediátrico del Niño Jesús, Córdoba, República Argentina

**Background** Once the renal function has been preserved, incontinence represents the most important problem to solve in patients with neurogenic bladder. To assess the effectiveness in quality and time of the combination therapy treatment for persistent low pressure urinary incontinence in neurogenic bladder of a bulking agent in the bladder neck and the insertion of botulinum toxin at the level of the detrusor.

**Materials and methods** From 1st May 2012 until 30th November 2016, 15 consecutive patients with structural urinary incontinence or intrinsic sphincter deficiency were included in this study according to protocol inclusion. The patients showed up spontaneously to the clinic and others were derived from the Pediatric Urology Service: 11 female patients, 11 patients with neurogenic bladder, 1 female patient with epispadias, 1 with anorectal malformation, neurogenic bladder and grade 5.1 bilateral vesicoureteral reflux (Devec Disease) and 1 with spinal trauma.

The age of the patients ranged from 6 to 18 years of age; 12 of them had previously had continent ostomy surgery (10 with appendix and 2 with ureter); 3 had bladder enlargement, 1 with colon and 2 with ureter. They had an aponeurosis „patch” sling, 1 with a bilateral ureteral re-implant and bilateral pyelostomy and 1 with an artificial sling. All the patients had a real bladder capacity between 75% and 80% of the ideal bladder capacity, a bladder or detrusor pressure inferior to 40 cm of H<sub>2</sub>O, a compliance inferior to 20 cm de H<sub>2</sub>O, a loss point inferior to 30 cm de H<sub>2</sub>O, and low pressure incontinence (inferior to 30 cm of H<sub>2</sub>O).

**Surgical technique:** The 17 patients were injected with botulinum toxin at 10 U per kg to a maximum of 300 U when the patient was over 30 kg followed by retrogradely injection of botulinum substance in 14 patients (mitroffanoff procedure in 12 and suprapubic puncture procedure in 2 male patients)

and 1 through anterograde line (female epispadias). Two types of bultic substances were used: in the first 12 patients a commercial drug compound of copolymer-polyacrylate-polyalcohol and in the last 3 patients autologous grafting platelet rich plasma (PRP). A follow up treatment was made of a minimum of six months. All patients had a 4 hour intermittent catheterization and anticholinergic medication.

**Results** All cases were assessed with a patient questionnaire or a family questionnaire (subjective) and with an urodynamic study at 30, 60 and 180 days. Of the total, 86.6% of the patients improved their incontinence ostensibly. 83.4% of the cases treated with a non-autologous substance (10 out of 12) improved their incontinence and remained dry for a period of 4 hours. In some cases, there were minor sporadic incontinence events which did not affect the final results. 100% of the patient injected with PRP (3 out of 3) remained completely dry for periods of 4 hours. The comparative urodynamic parameters improved in 53.3% of patients (8 out of 15) highlighting that the last 3 cases with an autologous grafting are within this percentage of cystometric improvement.

**Conclusions** We consider this minimally invasive technique is a viable, secure and efficient method that requires a low demanding learning curve. In relation to the use of the autologous grafting (PPR) as an alternative substance to the commercial one, we suggest performing prospective studies with a larger number of cases to be able to show its clinical effectiveness irrefutably, although the initial trials show acceptable results.

**Keywords** neurogenic bladder, incontinence, prp

### S VI.3: HOW FAR CAN ONE STAGE LAPAROSCOPIC FOWLER STEPHENS ORCHIOPEXY BE IMPLEMENTED IN INTRAABDOMINAL TESTES WITH SHORT SPERMATIC VESSELS?

Wael Elzeneini\*<sup>1</sup>

E-mail: Wael Elzeneini — wael.elzeneini@gmail.com

<sup>1</sup>Ain Shams University Children's Hospital, Cairo, Egypt

**Background** There is conflicting evidence whether one or two stage laparoscopic Fowler Stephens orchiopexy (LFSO) is better. In this prospective cohort of patients whom all underwent one stage LFSO, we compare our results with our previous prospective cohort of patients whom underwent a two stage LFSO.

**Materials and methods** The current study included all patients between 6 months of age and preschool age with an impalpable undescended testis from 2012 till 2014. Diagnostic laparoscopy was done to confirm an intraabdominal testis (IAT) and classify those with short spermatic vessels. One stage LFSO was done to all patients. Bilateral cases were operated 6–8 weeks apart. Follow up (F/P) was done at 1 and 6 months. Testicular atrophy and position were noted at each visit. Both conventional and doppler ultrasound were done at 6 months.

Previous prospective cohort had 25 IAT same inclusion criteria, done over a longer period (8 versus 2 years) and longer follow up (4 versus 1.9 years).

**Results** Our current study included 13 patients with 16 IAT with a mean of 1.94 years. 10 patients had unilateral IAT while 3 were bilateral. Testicular atrophy was noted clinically in 1/16 of the IAT at 1 month. This increased to 4/16 at 6 months. At 6 months F/P, only 25% maintained their low scrotal position. Conventional and Doppler U/S at 6 months confirmed testicular atrophy in the 4 atrophic IAT.

**Conclusions** One stage laparoscopic FSO holds a higher rate of testicular atrophy which is not justified. Expected postoperative testicular position is the same. There is no increased complication rate with either. There is an important yet limited role for ultrasound in confirming testicular viability.

**Keywords** fowler stephens, orchiopexy, intrabdominal testes

### S VI.4: THE USEFULNESS OF LAPAROSCOPY IN NON-PALPABLE TESTES

Klaudia Korecka\*<sup>1</sup>, Tomasz Koszutski<sup>1</sup> and Grzegorz Kudela<sup>1</sup>

E-mail: Klaudia Korecka — kkorecka@poczta.onet.pl

<sup>1</sup>Department of Paediatric Surgery and Urology, Silesian Medical University, Katowice, Poland

**Background** Non-palpable testes (NPT) constitute an excellent example of using both diagnostic and therapeutic possibilities of laparoscopy. Aims of the study: To determine diagnostic and therapeutic possibilities of laparoscopy in the population of boys with NPT and the characteristics of patients with unilateral non-palpable testes (U-NPT) and bilateral non-palpable testes (B-NPT). To assess the survival of descended NPT depending on the unilateral and bilateral pathology and the type of orchidopexy.

**Materials and methods** One hundred and thirty boys with 152 NPT were enrolled in the study. The long-term follow-up after laparoscopic procedure was minimum 2 years. We analysed surgical procedure records, patient medical history, out-patient records and the results of histological examinations. The obtained results were statistically analysed with the level of statistical significance at  $p < 0.05$ . Patients were divided into two groups: a group with U-NPT comprising 108 patients and NPT, and a group with B-NPT comprising 22 boys and 44 non-palpable gonads.

**Results** Boys from U-NPT and B-NPT constituted two different groups of patients. Absence of the testis, defined as an isolated abnormality, was more often observed in patients from the U-NPT group ( $p < 0.05$ ). Bilateral absence of palpable gonads was related to a higher percentage of intra-abdominal testes ( $p < 0.05$ ) and a higher percentage of co-existing abnormalities ( $p < 0.05$ ), which demonstrates that NPT constitute a component of other syndromes in this group of patients.

Qualification for exploratory laparoscopy in the case of NPT should be particularly detailed in the group of patients with B-NPT. Ultrasound of the scrotum and inguinal canals is recommended.

The proportion of the intra-abdominal and canal location of the diagnoses of the non-palpable testis in both groups was

comparable and was 64% in U-NPT and 61% in B-NPT for intra-abdominal location of NPT and 36% and 39%, respectively for the location in the inguinal canal ( $p > 0.05$ ).

The role of diagnostic laparoscopy in U-NPT and B-NPT was comparable. Laparoscopy provided clear diagnosis in the intra-abdominal location of the non-palpable testis. Diagnosis was extended by additional exploration of the inguinal canal when vas deferens structures penetrated the inguinal canal. Laparoscopic exploration of the inguinal canal was performed in 8.55% of NPT and the classic method was used in 28.28% of non-palpable gonads. Considering the location site of the non-palpable testis the following were most frequently reported: abdominal aplasia/agenesis of the testis (31%), intra-abdominal testis (24%) and a hypoplastic gonad in the inguinal canal (19%). The testis, aplasia and agenesis of the testis were most often detected in the abdominal cavity whereas a hypoplastic testis was statistically significantly more often detected in the inguinal canal ( $p < 0.05$ ).

Therapeutic laparoscopic procedures (i.e. descent of the intra-abdominal testis, the removal of hypoplastic intra-abdominal gonad, excision of blind-ending vas deferens from the abdominal cavity and laparoscopic exploration of the inguinal canal) in the study population were done in 73% of cases in the group with U-NPT and 67% in the group with B-NPT. The therapeutic role of laparoscopy in U-NPT and B-NPT was comparable and it was applied in more than 2/3 of cases of non-palpable gonads in both groups. In addition, laparoscopic exploration of the inguinal canal increases the rate of effectiveness of therapeutic laparoscopy. Laparoscopic exploration of the inguinal canal in our study population and the abandonment of classic inguinal exploration would allow to determine the efficacy of therapeutic laparoscopy at 96.3% in the group of patients with U-NPT and 81.82% in the group of B-NPT.

Long-term treatment results (i.e. the survival of the descended intra-abdominal testes) were not different between the groups ( $p > 0.05$ ). Effectiveness of video-assisted Petrivsky/Schoemaker orchidopexy and one-stage Fowler-Stephens approach in the case of intra-abdominal testes was comparable ( $p > 0.05$ ).

**Conclusions** 1. Laparoscopy is an excellent tool in the diagnosis and therapy of U-NPT and B-NPT and it allows the determination of the full spectrum of abnormality and the application of a definitive surgical procedure.

2. Intra-abdominal testes occur more frequently in the group of patients with B-NPT and often constitute a component of co-existing abnormalities.

3. Survival of descended testes is comparable in groups with U-NPT and B-NPT and it is not different depending on the type of orchidopexy.

4. On the basis of the obtained results, the developed and implemented algorithm of the procedure proved effective. U-NPT and B-NPT require a different approach related to qualification for diagnostic laparoscopy, however the mode of treatment and long-term results are comparable.

**Keywords** laparoscopy, non-palpable testes, abdominal testes, testicle units

### S VI.5: ENDOSCOPIC BALLOON DILATATION OF PRIMARY OBSTRUCTIVE MEGAURETER: PREDICTIVE PARAMETERS IN THE OPERATIVE ENDOSCOPY

Cosimo Bleve<sup>\*1</sup>, Valeria Bucci<sup>1</sup>, Maria Luisa Conighi<sup>1</sup>, Francesco Battaglino<sup>1</sup>, Elisa Zolpi<sup>1</sup>, Lorella Fasoli<sup>1</sup> and Salvatore Fabio Chiarenza<sup>1</sup>

E-mail: Cosimo Bleve — [cosimo.bleve@auls8.veneto.it](mailto:cosimo.bleve@auls8.veneto.it)

<sup>1</sup>Department of Pediatric Surgery and Pediatric Minimally Invasive Surgery and New Technologies, San Bortolo Hospital, Vicenza, Italy

**Background** Usually the management of primary obstructive megaureter (POM) is conservative, especially in the first year of life. In the last years whit the improvement of endoscopic instruments, there is a growing interest in minimally invasive treatment of POM in children. The absence of long-term follow-up data, makes difficult to establish the correct indication for an endoscopic approach. In our study we want to analyze and define the prognostic factors in endoscopic treatment of POM.

**Materials and methods** We retrospectively reviewed the clinical records of patients studied for POM between 2005–2016 in our Department. We have followed 25 patients with primitive obstructive worsening megaureter. The disease was assessed by ultrasonography, cystography and MAG3-lasix (furosemide) dynamic scintigraphy. We have performed 25 cystoscopies to evaluate the characteristics and morphology of ureteral orifice (UO) to measure the length and the diameter of the stenotic tract (retrograde pyelography) in order to select correctly the patients for a balloon pneumatic dilatation. Endourologic dilation of the vesicoureteral junction (VUJ) was performed with a semicompliant high-pressure balloon with a minimum balloon size of 2 mm, followed by placement of a Double-J stent.

**Results** We have treated 25 children with a diagnosis of POM within this period. In 5 patients the ureteral orifice(UO) was not patent for his point-like morphology and/or for its position within the bladder diverticulum. All have required open vesicoureteral reimplantation.

In 19 patients, the UO was patent: 6 patients showed no stenosis at the passage of ureteral catheter. 4 of them evolved to complete resolution, while 2 cases for associated VUR, were treated with vesicoureteral reimplantation.

In 14 patients, the distal ureter was stenotic: 5 patients have the stenotic tract in length  $< 5$  mm; in 4 patients, a single pneumatic dilatation has allowed significant improvement without the need for further procedures while in one case it was necessary to repeat the dilatation.

In 5 patients, the stenotic tract length was between 5–10 mm: 3 required 2–3 pneumatic dilations before resolution, 1 required open ureter reimplatation after balloon dilatation, 1 patient showed improvement without requiring other interventions after 8 months follow-up.

4 patients presented a stenotic tract  $> 10$ mm and despite pneumatic dilations it was necessary to proceed to vesicoure-

teral reimplantation in a short time (in one case was necessary a temporary ureterocutaneostomy).

**Conclusions** Endoscopic evaluation with pneumatic dilation when possible represents a valid diagnostic and therapeutic solution for the treatment of POM especially in the first year of life. On our preliminary experience, it seems possible to identify characteristics associated with a poor prognosis: punctiform ureteral orifice and/or its location site inside a bladder diverticulum, stenotic tract with length greater than 1 cm. According our experience endoscopic dilatation is more effective if performed earlier (between the 1–5 months of life) and in the short stenotic sections. It can be performed and/or repeated with good results even in the intermediate portions (5 mm–1 cm).

**Keywords** primitive obstructive megaureter, endoscopic balloon dilatation

### S VI.6: LAPAROSCOPIC NEPHRECTOMY FOR RENAL TUMOR IN CHILDREN. INDICATIONS AND RESULTS AFTER 10 YEARS OF EXPERIENCE IN A SINGLE CENTRE

Maria Grazia Scuderi\*<sup>1</sup>, Andrea Di Cataldo<sup>2</sup>, Silvia Marino<sup>2</sup> and Vincenzo Di Benedetto<sup>1</sup>

E-mail: Maria Grazia Scuderi — mgscuderi@gmail.com

<sup>1</sup>Pediatric Surgery and NICU department Policlinico Vittorio Emanuele Hospital University of Catania, Italy; <sup>2</sup>Pediatric oncohematology Unit; University of Catania, Italy

**Background** Despite Laparoscopy in children is considered safe and it's routinely used for several procedures even in neonates and in pediatric oncology, its role in the treatment of pediatric renal tumors is still controversial. This study analyzes the results of laparoscopic nephrectomy for Wilms tumor in pediatric age after 10 year of experience.

**Materials and methods** From 2007 to 2017 in our center of reference for pediatric oncology 30 patients with Wilm's Tumor have been treated. We performed 21 open nephrectomy and 9 laparoscopic nephrectomy. The median weight of tumors resected in open surgery was 375 gr vs 242.5 gr for the others. Median surgical time was 190 minutes for the laparoscopy group and 185 minutes for the open surgery group.

**Results** In the patients who underwent laparoscopy the median time of intestinal channeling was 2 days with discharged median on the seventh postoperative day, while in the other group channeling occurred at a median time of 3.5 days and the discharged median time was 7 days after surgery. In the open surgery group two patients relapsed in the lung while in the other group there was one local relapse. These three children obtained and maintained a second complete remission with chemotherapy. Open surgery complications were a tumor rupture in two cases, one case of tumor in the resection margin and an episode of pancreatitis 10 days after surgery. In the laparoscopic group there were three cases of tumor in the resection margin and two conversions to open surgery.

**Conclusions** As far as complications and oncologic outcomes are concerned, both techniques showed similar results. In experienced hands laparoscopy proves to be an attractive alternative to open surgery in selected cases of pediatric renal tumors. We have formulated recommendations for the best choice between the laparoscopic approach and traditional surgery.

**Keywords** oncology, wilms tumor, laparoscopic nephrectomy

### S VI.7: TWO DECADES EXPERIENCE WITH LAPAROSCOPIC VARICOCELE REPAIR IN CHILDREN: STANDARDIZING THE TECHNIQUE

Ciro Esposito<sup>1</sup>, Maria Escolino\*<sup>1</sup>, Marco Castagnetti<sup>2</sup>, Mariapina Cerulo<sup>1</sup>, Giuseppe Cortese<sup>1</sup>, Francesco Turrà<sup>1</sup>, Serena Izzo<sup>1</sup>, Simone Vaccaro<sup>1</sup>, Giovanni Severino<sup>1</sup> and Alessandro Settimi<sup>1</sup>  
E-mail: Maria Escolino — x.escolino@libero.it

<sup>1</sup>Federico II University of Naples, Italy; <sup>2</sup>Medical University of Padua, Italy

**Background** The authors reported their 23-years experience in laparoscopic varicocele repair in pediatric population.

**Materials and methods** We retrospectively evaluated the data of 345 patients who underwent laparoscopic left varicocelectomy from January 1993 to December 2015. Average patients' age was 12.5 years (range 8–17). Seven out of 345 patients (2%) had a recurrent varicocele, and 5 out of 345 patients (1.4%) had a varicocele on a single testis. In 335 patients (97.1%) we performed a Palomo procedure, in 10 patients (2.9%) an Ivanissevich procedure. After 2010 in 105/345 patients (30.4%) we performed a lymphatic sparing procedure using isosulfan blue injection pre-operatively.

**Results** We had no conversion to open surgery. Average length of surgery was 17 minutes (range 4–45). The majority of procedures was performed in a day surgery setting. In 45/345 patients (13%) we performed additional procedures. We recorded 4/345 (1.3%) recurrences/persistences requiring re-intervention in patients underwent Palomo procedure while we recorded 1/10 (10%) recurrence/persistence requiring redo-surgery after Ivanissevich procedure. As for the hydrocele formation, in pre isosulfan blue era on 230 Palomo we had 25 cases of hydrocele (10.8%), 13 of them treated with scrotal puncture and 12 which needed a surgical operation. In the last 105 patients using isosulfan blue we had no post-operative hydrocele. We reported also 10 minor complications such as umbilical granuloma or instrumental problems.

**Conclusions** On the basis of our 23-years experience with varicocele repair, we clearly think that laparoscopic Palomo lymphatic sparing varicocelectomy using isosulfan blue can represent the standard of care for the treatment of pediatric patients with left varicocele. Laparoscopic varicocelectomy is technically easy and fast to perform, painless, scarless with a recurrence rate of about 1%. The use of a pre-operative injection of isosulfan blue permits to eliminate completely the hydrocele formation post-operatively.

**Keywords** Palomo, laparoscopy, isosulfan blue, hydrocele, paediatric

### S VI.8: PAEDIATRIC VARICOCELE: COMPARISON OF DIFFERENT TECHNIQUES AT A MEDIUM TERM FOLLOW-UP

Dalia Gobbi\*<sup>1</sup>, Marco Castagnetti<sup>2</sup>, Stefano Doratiotto<sup>3</sup>, Enrico La Pergola<sup>2</sup>, Elisa Zolpi<sup>4</sup>, Maria Escolino<sup>5</sup>, Amelia Lupi<sup>6</sup> and Fabio Chiarenza<sup>4</sup>

E-mail: Dalia Gobbi — [daliahg@yahoo.com](mailto:daliahg@yahoo.com)

<sup>1</sup>Paediatric Surgery, Cà Foncello Regional Hospital, Treviso, Italy; <sup>2</sup>Section of Paediatric Urology, University of Padua, Italy; <sup>3</sup>Department of Radiology, Cà Foncello Regional Hospital, Treviso, Italy; <sup>4</sup>Paediatric Surgery, San Bortolo Regional Hospital, Vicenza, Italy; <sup>5</sup>Paediatric Surgery - Federico II University, Naples, Italy; <sup>6</sup>Department of Radiology, University of Padua, Italy

**Background** Indications and techniques of treatment of varicocele is still a matter of debate also in paediatric and adolescent population. The experience of different centers is herein reported.

**Materials and methods** A retrospective study was conducted in order to assess the results of different surgical approaches to paediatric and adolescent varicocele among 5 paediatric surgery units. Data of patients treated between Jan 2012 and Sept 2016 were collected based on a common protocol.

**Results** 286 patients, 8-17 years, treated for varicocele were enrolled. Depending on centers, mode of treatment was: a) laparoscopic Palomo (57 patients); b) laparoscopic Palomo with intraoperative lymphatic sparing technique (166 patients, two centers); c) retrograde scleroembolization (33 patients); d) antegrade sclerotherapy (Tauber technique) (30 patients). Pre-operatively Doppler ultrasound (Sarteschi classification) and clinical examinations (Dubin classification) were performed for diagnosis and patients' selection in 258 cases (90.2%). Indications for surgery were testicular hypotrophy (94%), progression of disease (8,3%), high grade varicocele associated with prepubertal onset (6,6%), bilaterality (0,6%), and symptoms (0,34%). Only one case of spermatic vein rupture during retrograde embolization occurred. All patients were discharged the day after the procedure.

Recurrence after laparoscopic Palomo, lymphatic sparing Palomo, retrograde and antegrade scleroembolization was 3.5%, 0.6%, 30% and 20%, respectively. Incidence of ipsilateral hydrocele was 21%, 1,4%, 0%, and 0%, respectively. Six patients were lost at follow-up.

**Conclusions** Paediatric and adolescent varicocele is treated in order to preserve testicular function even though almost 20% will experiment fertility problems. No standard treatment is recommended. Scleroembolization techniques have a significantly higher recurrence rate compared to laparoscopic Palomo. Conversely, ipsilateral hydrocele is significantly higher after laparoscopic Palomo, without lymphatic sparing technique, and may require correction.

**Keywords** laparoscopic Palomo, different techniques

### S VI.9: FEASIBILITY AND BENEFITS OF THE RETROPERITONEAL LAPAROSCOPY IN THE TREATMENT OF URETEROPELVIC JUNCTION OBSTRUCTION IN CHILDREN UNDER TWELVE MONTHS OF AGE

Anthony Kallas-Chemaly\*<sup>1</sup>, Matthieu Peycelon<sup>1</sup>, Liza Ali<sup>1</sup>, Christine Grapin-Dagorno<sup>1</sup>, Elisabeth Carricaburu<sup>1</sup>, Pascale Philippe-Chomette<sup>1</sup>, Goharig Enezian<sup>1</sup>, Annabel Paye-Jaouen<sup>1</sup> and Alaa El-Ghoneimi<sup>1</sup>

E-mail: Anthony Kallas-Chemaly — [anthony\\_chemaly@yahoo.com](mailto:anthony_chemaly@yahoo.com)

<sup>1</sup>Department of Paediatric Surgery and Urology, Robert-Debré University Hospital, Assistance Publique Hôpitaux de Paris (APHP); Paris Diderot University, Sorbonne Paris Cité, Paris, France

**Background** The advantage of laparoscopy in the treatment of ureteropelvic junction obstruction (UJPO) remains controversial in children under twelve months of age. The aim of this study was to evaluate the feasibility and benefits of retroperitoneal laparoscopy (RL) in this age group in order to standardize management in our institution.

**Materials and methods** Between 2012 and 2016, we performed 209 pyeloplasties: 138 by laparoscopy and 71 by open access. From 2012, the choice of the operating technique was decided according to the laparoscopic experience of the surgeon; two surgeons operated by laparoscopy all children less than twelve months of age while others operated them by posterior lumbotomy (PL). The RL is standardized and performed by 3 trocars (5, 3, 3). Intra- and postoperative parameters have been analyzed retrospectively. Statistical tests: Pearson, Student and Mann-Whitney.

**Results** During this 5-year period, 18 RL and 50 PL were included with a median follow-up of 9.5 months (3–26). In the RL group, postoperative drainage was performed by double-J stent (10 patients) or external transanastomotic stent (8 patients). No conversion or redo pyeloplasty have been listed in this group. A redo surgery was recorded for the PL group (UPJ stenosis). Hospital stay and consumption of paracetamol and nalbuphine were significantly lower in the RL group (2.2 days vs. 1.6,  $p = 0.017$ ; 2.2 vs. 1.4,  $p = 0.004$ , 1.4 vs. 1.1,  $p = 0.028$  respectively) while operative time was significantly longer (171.8 min vs 85.3,  $p = 0.001$ ).

**Conclusions** In the hands of experienced laparoscopic surgeons, RL is feasible in children less than one year of age without added morbidity. Subject to the retrospective character of our study, hospital stay is longer in the PL group.

**Keywords** ureteropelvic junction obstruction, retroperitoneal laparoscopy, children, feasibility, benefits

## Session VII, Urology II

### S VII.1: IS LAPAROSCOPIC APPROACH FOR UPJ OBSTRUCTION IN CHILDREN LESS THAN 1 YEAR OF AGE A GOOD OPTION?

Corina Zamfir\*<sup>1</sup>, Elea de Plaen<sup>1</sup>, Sophie Vermersch<sup>2</sup>, Manuel Lopez<sup>2</sup>, Francois Varlet<sup>2</sup>, Khelif Khelif<sup>1</sup>, Stephane Luyckx<sup>1</sup>, Paul Philippe<sup>3</sup> and Henri Steyaert<sup>1</sup>

E-mail: Corina Zamfir — corinazamfir@yahoo.com

<sup>1</sup>Hôpital Universitaire Des Enfants Reine Fabiola, Brussels, Belgium; <sup>2</sup>CHU Hôpital Nord, Saint-Etienne, France; <sup>3</sup>Centre Hospitalier de Luxembourg, Luxembourg

**Background** Laparoscopy in children less than 1 year of age is still difficult and demands special skills. Recently several teams decided to stop this approach for pyeloplasty due to the technical difficulties and less good results than open surgery. We reviewed our cases in 3 hospitals in order to assess this conclusion.

**Materials and methods** We conducted a retrospective study in HUDERF (Brussels), CHU Saint Etienne and CH Luxembourg, based on patients' charts less than 1 year of age, operated on for UPJ obstruction, between 2007 and 2016. We focused on indication, peri-operative complications and kidney function at long term follow up.

**Results** Thirty-nine cases were operated on during this time period (31 boys, 8 girls). Mean age at operation was 6 months. Most patients presented with pyelonephritis. Only 2 of them had never had antibiotics before the surgery. All patients underwent laparoscopically transperitoneal pyeloplasty. Mean operating time was 142 min. There was no conversion in this group. All cases were stented (JJ or more often Blue stent). Seven cases had also a suction drain in the operated area (beginning experience). There were 4 complications: 1 hematoma, 1 ascitis with prolonged ileus, 1 epiploic evisceration (reoperated), 1 hypertension. Ten patients presented a new episode of pyelonephritis in the post-operative evolution. Long term follow-up showed that surgery had improved mean pyelic dilatation from 32 mm preoperatively to 14 mm postoperatively and kidney function didn't worsen except in 1 case where the kidney was lost.

**Conclusions** Authors confirm that transperitoneal pyeloplasty is feasible and safe. Results are similar as in open surgery. During the last years laparoscopic approach become more and more standardized making this surgery feasible, easier and simpler. Laparoscopic pyeloplasty is one of the operations that are actually most suitable for „fast track surgery” leading to a shorter hospital stay, less post-operative pain and better cosmetic results.

**Keywords** UPJ obstruction, children less than 1 year, laparoscopy

### S VII.2: THE MANAGEMENT OF CROSSING VESSELS

### IN CHILDREN: LAPAROSCOPIC DISMEMBERED PYELOPLASTY WITH VASCULAR BUNDLE TRANSPOSITION

Rafał Chrzan\*<sup>1</sup>, Caroline F. Kuijper<sup>2</sup>, Aart J. Klijn<sup>2</sup> and Tom PVM de Jong<sup>2</sup>

E-mail: Rafał Chrzan — r\_chrzan@wp.pl

<sup>1</sup>Department of Pediatric Urology, Krakow, Poland; <sup>2</sup>Department of Pediatric Urology, Utrecht, Netherlands

**Background** No gold standard exists on how to deal with crossing vessels (CVs) in patients operated on due to uretero-pelvic junction (UPJ) obstruction. The aim of the study is to assess the outcomes of laparoscopic dismembered pyeloplasty with dorsal transposition of the CVs.

**Materials and methods** Prospectively collected data from 2 departments were reviewed. Inclusion criteria were: 1) transperitoneal laparoscopic approach, 2) dismembered pyeloplasty, 3) the same operating paediatric urologist and perioperative protocols, and 4) follow up > 1 year. In the case of CVs, pyeloplasty with the vessel transposition was performed. The anastomosis was done by means of interruptive sutures (polyamide 5.0) and a double-J catheter was left in all cases. Forty eight children (mean age 9.9 years) met the criteria. Patients were divided into 2 groups: group 1 with CVs and group 2 without CVs. Any surgical re-intervention at the uretero-pelvic junction was defined as failure. Fisher's exact test was used for the statistical analysis.

**Results** The overall re-intervention rate was 3/48 (6.25%). Endopyelotomy was done in 3 patients and in 1 re-do pyeloplasty was needed afterwards. CVs were identified in 28/48 (58%). The mean operation time was 152 min in group 1 vs. 161 min in group 2 (p>0.5). Re-intervention was needed in 2/28 (7.1%) in group 1 and 1/20 (5%) patient in group 2. (p>0.05).

**Conclusions** Crossing vessels should be meticulously looked for during pyeloplasty in older children. Dismembered laparoscopic pyeloplasty with dorsal transposition of the CVs is a successful method in those patients.

**Keywords** pyeloplasty, crossing vessels, hydronephrosis, laparoscopy, children

### S VII.3: CONTRAST-ENHANCED UROSONOGRAPHY EVALUATING RESULTS OF VANTRIS INJECTION IN CHILDREN WITH VESICoureTERAL REFLUX. IS VANTRIS STILL A REALLY SAFE BULKING AGENT?

Paweł Osemlak\*<sup>1</sup>, Magdalena Woźniak<sup>2</sup>, Agata Pawelec<sup>2</sup>, Agnieszka Polska<sup>2</sup>, Agnieszka Brodzisz<sup>2</sup>, Paweł Nachulewicz<sup>1</sup> and Paweł Wieczorek<sup>2</sup>

E-mail: Paweł Osemlak — posem1@poczta.onet.pl

<sup>1</sup>The Chair and Clinical Department of Pediatric Surgery and Traumatology, Lublin, Poland; <sup>2</sup>The Department of Pediatric Radiology, Lublin, Poland

**Background** Endoscopic injection of bulking agent in children with vesicoureteral reflux (VUR) is a commonly used method,

alternative to long-lasting antibiotic prophylaxis of urinary tract infections (UTI) and anti-reflux operations. This treatment is constantly upgraded with use of newer substances in order to improve its efficiency. The last one is polyacrylate polyalcohol copolymer (Vantris®), considered in the new literature as the most effective. The aim of the report was to evaluate usefulness of intra- and post-operative contrast-enhanced urosonography (ce-US with SonoVue®) in determining early and long-term results of treatment with Vantris of children with VUR.

**Materials and methods** Study group comprised 92 children (70 girls and 22 boys, mean age 3 years) who underwent endoscopic treatment of VUR with Vantris from 2013 to 2016. Among of them 45 had bilateral reflux, so we treated 137 renal units in general. Criteria for endoscopic treatment were: primary, passive VUR grade II – V (non-responsive to 12-months lasting observation), recurrent UTI and nephropathic scarring in radionuclide scans (RSCT). During cystoscopy Vantris was injected under mucosa of ureteral orifice with ce-US control. When reflux was still present we introduced second bolus of Vantris and controlled with ce-US. Post-operative diagnostics consisted of: ultrasound evaluation of upper urinary tract in 24 hrs after cystoscopy, regular urinalysis, ce-US in 3 and 12 months after cystoscopy, RSCT in 12 months after cystoscopy. Control group comprised 40 children (74 renal units) treated previously in our Department with other bulking agent.

**Results** Study group. Good long-term result (100% efficiency after 12 months) was achieved in 90% of cases. In 3 children (3,2% of cases) we noted severe complications in form of chronic distal ureteral stenosis. In 2 of them it evoked oliguria and life-threatening urosepsis. In 1 child it led to big deterioration of renal function. All those children needed open surgery with ureteral reimplantation.

Control group. Good long-term results (100% efficiency after 12 months) was achieved in 64% of cases. No child suffered from chronic distal ureteral stenosis.

**Conclusions** 1. Intra- and post-operative contrast-enhanced urosonography allows to increase efficiency of endoscopic treatment of children with VUR and to limit the use or completely eliminate x-ray studies.

2. Vantris is characterized by significantly higher efficacy in treatment of children with VUR than other bulking agents, but you must always have in mind the possible side effects.

**Keywords** vesicoureteral reflux, vantris, urosonography, children

#### **S VII.4: SIMULTANEOUS LAPAROSCOPIC EXCISION OF NON-ADRENAL RETROPERITONEAL TUMOR AND NON-FUNCTIONING UPPER POLE OF SINGLE COLLECTING SYSTEM KIDNEY**

Andrzej Gołębiewski<sup>1</sup>, Stefan Anzelewicz\*<sup>1</sup>, Maciej Murawski<sup>1</sup> and Piotr Czauderna<sup>1</sup>

E-mail: Andrzej Gołębiewski — angol@gumed.edu.pl

<sup>1</sup>Department of Surgery and Urology for Children and Adolescents, Medical University of Gdansk, Poland

**Background** We present a case of a 16-year-old girl with retroperitoneal tumor encasing the renal multiple arteries which caused arterial occlusion and consequently hypertension and loss of renal function in the upper part of kidney. The patient underwent simultaneous laparoscopic transperitoneal resection of retroperitoneal tumor and partial nephrectomy.

**Materials and methods** Case history: An otherwise fit and well 16 year old female presented to the emergency department after fainting. She had hypertension of 170/110 mm Hg. An abdominal ultrasound revealed a smaller right kidney (102 versus 136 mm) and pathological mass 38x20x29 mm between the upper pole of the kidney and inferior vena cava. There was no history of headache, sweating and palpitations which is suggestive of pheochromocytoma. Clinical evaluations and relevant investigations were undertaken to determine the cause of hypertension. Twenty four hours urinary total metanephrine, plasma metanephrine and 24-hours urinary vanillylmandelic acid level were within normal ranges. Computer tomography angiography showed three renal arteries, of which upper 2 were encased by the pathological mass at the right renal hilum causing vascular obstruction. The decreased perfusion compromises renal function, which was confirmed by renal scan. DMSA renal scintigraphy showed a markedly decreased uptake at the upper half of the right kidney with functioning lower pole (GFR=16%)

A subsequent gadolinium-enhanced MRI confirmed a solid pararenal 39x31x18 mm mass encasing two upper renal arteries. Lower renal artery of normal size. Right kidney smaller with hypoperfusion of the upper lobe. It was decided to perform laparoscopic tumor resection and partial nephrectomy to eliminate the source of the hypertension. Procedure: Using a transperitoneal approach the kidney was exposed. We found a highly vascular tumor being unrelated to the adrenal gland and kidney. It was located in the retroperitoneum in narrow space flanked by renal hilum, renal vessels to the lower pole inferiorly, inferior vena cava on the left side. With gentle dissection using monopolar diathermy and vessel sealing device intact tumor was extirpated without injury to adjacent vital structures. The arterial supply to the tumour was then clipped and divided, which resulted in devascularization of 1/2 of the kidney. The artery and vein to the lower lobe were preserved. Using the vessel seal device, the devascularized portion of the kidney was then removed. The cut surface was then covered with hemostatic patch. The patient made an uneventful recovery, her blood pressure returned to normal levels without need for antihypertensive medication.

**Results** The tumour was successfully removed laparoscopically, without the need for total nephrectomy.

**Conclusions** This case highlights the feasibility of laparoscopic partial nephrectomy and excision of retroperitoneal mass, even in the hazardous area of renal hilum.

**Keywords** child, laparoscopic surgery, urology

### S VII.5: DOUBLE J STENT DISLODGED IN THE DISTAL URETER IN INFANTS. HOW TO RETRIEVE IT?

Simona Gerocarni Nappo<sup>\*1</sup>, Giuseppe Collura<sup>1</sup>, Ermelinda Mele<sup>1</sup>, Michele Innocenzi<sup>1</sup>, Paolo Caione<sup>1</sup> and Nicola Capozza<sup>1</sup>  
E-mail: Simona Gerocarni Nappo — simona.gerocarni@opbg.net

<sup>1</sup>Div of Pediatric Urology, Bambino Gesù Children's Hospital, IRCCS, Rome, Italy

**Background** Double J stents are frequently left in place as temporary internal drainage after several urological minimally invasive procedures, varying from laparoscopic pyeloplasty, to endoscopic treatment of stones or obstructive megaureter. Dislodgement of the distal end of the JJ stent from the bladder into the distal ureter is an infrequent but bothersome complication, especially in infants where the small ureteric diameter makes retrieval more difficult. Urgent uretero-neocystostomy was for long the only solution available for such instance. Recently nephroscopy has also been suggested. From 2010 a cystoscopic approach was adopted in our Division.

**Materials and methods** The technique adopted was as follows: in all cases of dislodged double J stent, cystoscopy was performed with 8–9.8 wolf cystoscope. The VUJ was negotiated with a 0.018' guidewire, taking care in not pushing further upward the dislodged stent. the VUJ was then dilated at 8–10 atm with a 3 or 4 Fr Paseo-18 Ballon catheter (Biotronik, Lake Oswego, OR, US). After VUJ dilatation, the cystoscope was gently introduced in the distal ureter and the JJ stent retrieved under vision with a grasper.

**Results** Dislodgement of the JJ stent occurred in 7 patients (5M, 2F) aged 4–27 months (mean 14 months), after laparoscopic pyeloplasty (4), RIRS for stone (1) or treatment for megaureter (2). 3 patients were symptomatic (abdominal pain, vomiting). Double J retrieval took place from 3 days to 4 weeks after the initial surgery. The procedure was always quick and uneventful. Healing from the surgical procedure was not impeded by the complication occurred. No case of postoperative symptomatic VUR was detected after the VUJ dilatation

**Conclusions** In cases of symptomatic or unexpected dislodgement of the JJ stent at the moment of retrieval, this technique allows even in infants easy and quick retrieval of the stent without changes in the approach (no need of open surgery or nephroscopy) and without further complications.

**Keywords** double J stent, dislodgement, retrieval

### S VII.6: RETROPERITONEOSCOPIC HEMINEPHRECTOMY: OUR EXPERIENCE AND DESCRIPTION OF SOME CHALLENGING CASES

Cosimo Bleve<sup>\*1</sup>, Valeria Bucci<sup>1</sup>, Maria Luisa Conighi<sup>1</sup>, Francesco Battaglino<sup>1</sup>, Lorella Fasoli<sup>1</sup>, Lorenzo Costa<sup>1</sup> and Salvatore Fabio Chiarenza<sup>1</sup>

E-mail: Cosimo Bleve — cosimo.bleve@aulss8.veneto.it

<sup>1</sup>Department of Pediatric Surgery and Pediatric Minimally Invasive Surgery and New Technologies, San Bortolo Hospital, Vicenza, Italy

**Background** Nephrectomy and Heminephrectomy represent nowadays the most common urological indications for minimally invasive surgery (MIS) in children. Laparoscopic retroperitoneal partial nephrectomy in children remains a complex technique with no great diffusion among pediatric surgical centers. We analyzed our experience with retroperitoneal laparoscopic nephrectomy describing some complex cases treated

**Materials and methods** We retrospectively reviewed the clinical records of patients studied for kidney disease between 2005-2016 in our department who've required surgical treatment. 312 (181m, 131f) patients were studied for congenital anomalies and urologic diseases of upper urinary tract: 69 (29M,40F) underwent heminephrectomy: 30 open, 39 retroperitoneoscopic(RP). Analyzing the retroperitoneoscopic group, the indication for surgery were: dysplastic kidney (29 pts), vesico-ureteral reflux nephropathy (4 pts), ectopic ureter (5pts) cystic disease of the kidney (2pts). three cases presented an horseshoe kidney, 1 a renal triplicities and 1 case an imposing hydroureteronephrosis associated to a giant ureterocele

**Results** We analyzed the data of 39 patients underwent retroperitoneoscopic partial nephrectomy. Thirty underwent upper pole nephrectomies, 9 to lower pole heminephrectomies; 19 on the left side, 20 on the right.

Age at surgery ranges from 3months to 5 years. Median operative time was 120'. Conversion was not needed in any patient. no significant blood loss was observed. Postoperative course was uneventful except for three cases. We recorded an urinoma treated conservatively and 2 symptomatic ureteral stumps, one of this required a laparoscopic treatment. We recorded very good esthetical results, less need of analgesia, faster recovery, lower length of stays. Median hospital stay was of 4 days; shorter compared to 7 day of open approach.

**Conclusions** MIS now represents the gold standard technique to perform partial nephrectomy in children with duplex kidney. Retroperitoneoscopy remains a technically challenging procedure requiring a correct learning curve. There is no agreement about what is the best technique between laparoscopic or retroperitoneoscopic approach. According our experience comparing laparoscopy with retroperitoneoscopy the last one is more difficult (above all in the first cases) but more convenient in case of conversion and to treat potential complications (urinoma, bleeding etc.).

**Keywords** partial nephrectomy, duplex kidney, vesico-ureteral reflux

### S VII.7: LAPAROSCOPIC URETERAL MITROFANOFF AND MALONE APPENDIX ANTEGRADE COLONIC ENEMA PROCEDURES IN A PATIENT WITH DEFORMITIES OF SPINE AND EXTREMITIES

Umut Alıcı<sup>1</sup>, Akin Karagozolu<sup>1</sup> and Baran Tokar<sup>\*1</sup>

E-mail: Baran Tokar — btokar@ogu.edu.tr

<sup>1</sup>Eskisehir Osmangazi University, Faculty Of Medicine, Department Of Pediatric Surgery, Division Of Pediatric Urology, Eskisehir, Turkey

**Background** In children with neurologic disorders, Mitrofanoff procedure for clean intermittent catheterization and antegrade colonic enema (ACE) known as Malone procedure might be needed at the same time. Both procedures could be performed by laparoscopy. In non-functioning kidney, ureter could be used for Mitrofanoff while appendix is reserved for Malone procedure.

**Materials and methods** Methods: This video shows laparoscopic Mitrofanoff and Malone procedures done in patient who have cerebral palsy and severe form scoliosis and deformities of extremities.

**Results** Simultaneous laparoscopic ureteral Mitrofanoff and appendix Malone procedures were planned in 17 years old male patient with cerebral palsy, severe form deformities of spine and extremities, neurogenic bladder, bilateral vesicoureteral reflux and right nonfunctioning kidney. Distal end right ureterostomy was performed for Mitrofanoff and then appendix was used for Malone procedure. Cecal collar around the appendix for continence was done with interrupted nonabsorbable sutures. This video specifically highlights the challenges caused by un-ergonomic patient position and narrow surgical space caused by scoliosis and deformities of extremities. Both procedures were completed uneventfully by laparoscopy. Postoperatively, subureteric injection was applied to the bladder orifice of Mitrofanoff for incontinence.

**Conclusions** Mitrofanoff and Malone procedures could be performed simultaneously by laparoscopy. Surgeon should be ready for ergonomic challenges and orientation difficulties for surgical anatomy in patients having deformities of spine and extremities.

**Keywords** mitrofanoff, malone, laparoscopy, antegrade colonic enema, cerebral palsy

### S VII.8: LAPAROSCOPIC REPAIR OF A IATROGENIC URETERAL PERFORATION

Ana-Maria Chiforeanu<sup>\*1</sup>, Diana Potop<sup>1</sup>, Fruzsina Konder<sup>1</sup>, Cindy Gomes<sup>1</sup>, Jerry Kieffer<sup>1</sup> and Paul Philippe<sup>1</sup>

E-mail: Ana-Maria Chiforeanu — anamaria.chiforeanu@gmail.com

<sup>1</sup>Pediatric Surgery Service, Kannerklinik, Centre Hospitalier de Luxembourg

**Background** Ureteral perforation is a rare yet severe complication of the use of Dormia baskets to retrieve ureteral stones. Its management is unclear and include stenting of the ureter or direct repair by laparotomy. We report a case that we could repair primarily by laparoscopy.

**Materials and methods** We present the case of a 11 years old boy who sought medical attention for renal colic symptoms, with left ureterohydronephrosis and two 3 and 4 mm stones in the distal ureter on ultrasonography. There were no signs of complications so the patient received a conservative treatment with symptomatic improvement. Four weeks later, recurrent painful crisis and an increased dilation of the renal pelvis appeared. We decided to take out the 2 distal ureteral stones using a

Dormia basket, with the plan to insert a JJ stent if impossible. If the most distal stone was easily retrieved, the second one could not be caught. An attempt at passing a guide wire toward the renal pelvis failed. Thus, a retrograde pyelography was performed and confirmed a contrast product extravasation. Because no stent could be advanced, immediate repair was decided.

**Results** By using a transperitoneal laparoscopic approach assisted by cystoscopy, we identified the perforation site, retrieved the residual stone impacted within a very inflamed ureter and performed a circular end to end complete ureteral anastomosis protected by a double J stent inserted by cystoscopy under direct visualization.

The patient was discharged on the second postoperative day. The stent was removed at 6 weeks, and the follow-up shows complete recovery.

**Conclusions** Unremitting nephritic colic's are uncommon in children, but require active treatment. Stone retrieval using a Dormia basket is a time honoured method, but complications are not rare and include stripping and perforation of the ureter. Most can be treated conservatively if a stent can be inserted, with secondary lithotripsy.

If not possible, immediate repair is indicated upon diagnosis.

Rapid diagnosis and repair appears to be the key to effective management of iatrogenic ureteric perforation.

In our case, a complete anastomosis was required, due to the chronic inflammation of the ureter around an impacted stone. Laparoscopy is an elegant alternative to laparotomy.

It allows the management of this complication in a minimally invasive fashion.

**Keywords** ureteral stones, ureteral perforation, ureteral anastomosis

### S VII.9: COMBINED LAPAROSCOPIC AND CYSTOSCOPIC APPROACH FOR THE TREATMENT OF BLADDER DIVERTICULA

Francesca Destro<sup>\*1</sup>, Claudio Vella<sup>1</sup>, Claudia Filisetti<sup>1</sup>, Federica Marinoni<sup>1</sup>, Giorgio Selvaggio<sup>1</sup>, Giovanni Di Iorio<sup>1</sup> and Giovanna Riccipetroni<sup>1</sup>

E-mail: Francesca Destro — francesca\_destro@hotmail.com

<sup>1</sup>Buzzi Children's Hospital, Milano, Italy

**Background** Vesical diverticula are permanent hernias of the mucosa through a muscular layer defect of the bladder wall. The definition includes a spectrum of anomalies: congenital, urachal, Hutch-para ureteral and acquired diverticula (iatrogenic or related to obstructive high bladder and bladder-neck pressures).

**Materials and methods** We report two cases of patients with vesical diverticulum treated by a combined laparoscopic and cystoscopic approach.

**Results Case 1:** 4-year old boy with acquired diverticulum, identified on MCUG performed for dysfunctional voiding and infection. The diverticulum was on the right side, far from the

ureter. A 4 trocars laparoscopic approach was carried out: the diverticulum was isolated, its neck freed from the muscular layer, closed with 2 Endoloops and resected. The detrusor defect was closed with interrupted suture. Post-operative and follow-up period were uneventful under medical treatment with alfuzosin hydrochloride.

**Case 2:** 12-year old boy referred after US identification of symptomatic bladder diverticulum. He underwent to MCUG that confirmed the presence of a huge left paraureteral diverticulum without vesico-ureteral reflux. Laparoscopy was performed with 4 trocars: one 10 mm trocar in the umbilicus for the optic and three 3-5 mm operative trocars. The bladder was suspended by an abdominal stitch, the diverticulum dissected under cystoscopic surveillance avoiding damage to the vas and the left ureter. The diverticulum was excised after transfixion suture of its origin, a Lich-Gregoir procedure was performed to avoid post-operative reflux. No complications occurred.

**Conclusions** Vesical diverticula have a prevalence of 1-10% and male preponderance. Urothelial tumor may arise in adulthood in up to 36% of cases. Surgery is indicated in symptomatic cases and consists of diverticula removal and vesical wall reconstruction. Hutch diverticulum requires the management of pathologies related (reflux, megaureter), as well. The combination of laparoscopic and cystoscopic techniques allows a safe and effective resection with all the advantages of the minimally invasive surgery. The identification of the surrounding structures seems optimal and the dissection can be easily extended to the vesico-ureteral junction without damaging the ureter. The safety of the manoeuvre is further increased by the „guidance” of the cystoscope light.

Laparoscopy is a safe and effective procedure for the treatment of vesical diverticula and associated anomalies. The combined use of cystoscopy is helpful to carry out properly the procedure. Surgery should be planned after accurate evaluation of the low urinary tract of the patient in order to establish the best surgical approach.

**Keywords** bladder diverticula, laparoscopy

### S VII.10: URSL GOOD OR BAD CHOICE FOR SMALL CHILDREN? — SINGLE INSTITUTION EXPERIENCE

Joanna Samotyjek\*<sup>1</sup>, Beata Jurkiewicz<sup>1</sup>, Ewa Wajszczuk<sup>1</sup>, Katarzyna Załęska-Oracka<sup>1</sup>, Janina Małowiecka<sup>1</sup> and Grzegorz Gut<sup>1</sup>  
E-mail: Joanna Samotyjek — asiamed@poczta.onet.pl

<sup>1</sup>Szpital Dzieciątęcy im. Dzieci Warszawy, Dziekanów Leśny, Poland

**Background** In developed countries, children with urolithiasis account for approximately 1–3% of all the people suffering from this disease. The incidence and prevalence of urinary stone disease in the pediatric population is on the rise. However the choice of the most appropriate way of treatment especially with small children is still a challenging problem for a pediatric surgeons. This work presents single institution experiences in children 4 years old and younger.

**Materials and methods** Between January 2013 and May 2016

we treated 25 children from 6 to 48 months age. 11 females and 14 males. The weight of the smallest patient was 6 kg. Stones were located in distal ureter in 69,69%, middle 3,03% and proximal in 27,27%. The size of stones ranged from 4 to 12 mm in greatest diameter. All patients underwent imaging examinations. The level of microelements in urine was determined in order to define the type of lithiasis. Pneumatic (ballistic) and laser (Ho:YAG – pulsed laser) lithotriptors were used under general anaesthesia, in operating theatre conditions.

**Results** For 25 patients 33 URSL procedures were required. 3 patients needed bilateral procedures. 4 patients underwent more than one URSL. For 31 URSL in 29 cases ureters were rendered stone-free after 1 procedure and 1 was stone-free after 2 procedures. In one case we did not manage to enter ureter and in one case no stone was found. No active dilatation was done and no guide wire was used. In 3 cases also RIRS was proceeded. After one URSL procedure JJ catheter was left.

Overall in 31 procedures performed the efficiency is 93,55%. In one case fluid under renal capsula appeared and after 2 weeks of conservative treatment it was absorbed. There were no other complications observed.

**Conclusions** The presented results show that even in small children the URSL procedure is possible, effective and safe. It is important to remember that the level of difficulty in presented patient group is very high, that is why URSL procedures should be carried out by experienced surgeon.

**Keywords** URSL, stones, ureterolithiasis, small children

### S VII.11: 10-YEARS EXPERIENCE OF THE LAPAROSCOPIC PARTIAL NEPHRECTOMY IN CHILDREN

Agata Dzielendziak\*<sup>1</sup>, Dariusz Patkowski<sup>1</sup> and Marcin Polok<sup>1</sup>  
E-mail: Agata Dzielendziak — agata.dzielendziak@gmail.com

<sup>1</sup>Department and Clinic of Paediatric Surgery and Urology, Wrocław, Poland

**Background** The aim of the study was to assess the effectiveness and safety of laparoscopic partial nephrectomy.

**Materials and methods** The retrospective review of medical history of 32 children was made. The group consist of 26 girls and 7 boys who underwent laparoscopic partial heminephrectomy between 2008 and 2017, due to duplication of the renal system. The average age was 2.1 years (from 3 months to 16 years). Left side was affected in 21 cases and right in 12 cases. The indications for surgery were: recurrent urinary tract infections (UTI-21), ectopic ureter (3) and vesico-ureteric reflux (8). The trans peritoneal approach was used in all cases.

**Results** Median duration of the surgery was 140 minutes (from 85 to 185). No conversion to the open surgery was made. Average hospitalization time was 4 days (from 2 to 14 days). We recorded complications in the form of prolonged urinary leakage treated conservatively (4 patients), the cyst in the lower pole of the kidney and UTI (2 patients). 31 surgeries were evaluated as effective. In 2 other cases in which UTI appeared, after

confirmation of ureter reflux the ureter stump was removed laparoscopically.

**Conclusions** Laparoscopic partial nephrectomy may be an effective and safe minimally invasive method and could be considered as a method of choice in children. Long term observation is necessary to ensure safety and monitoring of distant complications.

**Keywords** laparoscopy, partial nephrectomy, children, heminephrectomy

### S VII.12: LAPAROSCOPIC URETEROTOMIES FOR URETERAL STONES IN CASES WITH DIFFICULT INSERTION OF URETERORENOSCOPY AND STENT

Akin Karagozlu<sup>1</sup>, Cigdem Arslan Alici\*<sup>1</sup> and Baran Tokar<sup>1</sup>  
E-mail: Baran Tokar — btokar@ogu.edu.tr

<sup>1</sup>Eskisehir Osmangazi University, Faculty Of Medicine, Department Of Pediatric Surgery, Division Of Pediatric Urology, Eskisehir, Turkey

**Background** In children, especially in younger ages, laparoscopic stone extraction could be performed in ureteral stones obstructing the ureter where ureterorenoscopy and stent could not be introduced.

**Materials and methods** This video shows laparoscopic simultaneous proximal and distal ureterotomies done for extraction of stones.

**Results** 16 months old patient having hematuria followed by difficulty in micturition was admitted. Ultrasound showed bilateral non-opaque multiple renal and ureteral stones. Cystoscopy and ureterorenoscopy were performed. JJ stent could be inserted into the right side. Guide-wire, stent could not be inserted and ureterorenoscopy could not be introduced into the left ureteral orifice. Laparoscopic exploration was decided following a failure of guide-wire and stent insertion. Both proximal and distal ureterotomies were needed to extirpate the stones in proximal and distal left ureter. Stones lodged in proximal and distal ureter were removed, irrigation from proximal ureterotomy helped cleaning microcalculi located between the ureterotomies. JJ stent was inserted. In follow up, laparoscopic stone extraction from the right ureteropelvic junction (UPJ) was also performed.

**Conclusions** Laparoscopic ureterotomy and extraction of stone in ureter from UPJ to distal ureter is a good option in patients who have non-opaque stones, if especially guidewire, stent and ureterorenoscopy could not be introduced.

**Keywords** laparoscopy, ureterotomy, ureteral stone, ureterorenoscopy

### S VII.13: SYSTEMATIC REVIEW ON MINI PERCUTANEOUS NEPHROLITHOTOMY FOR STAGHORN CALCULI IN TODDLERS AND INFANTS

Ruben Lamas Pinheiro\*<sup>1</sup>, Peter Etlinger<sup>1</sup>, Catarina Barroso<sup>1</sup>, Emanuel Dias<sup>1</sup> and Jorge Correia-Pinto<sup>1</sup>  
E-mail: Ruben Lamas Pinheiro — rubenlms@gmail.com

<sup>1</sup>Hospital de Braga, School of Medicine of University of Minho, Braga, Portugal

**Background** Extracorporeal shock wave lithotripsy is usually not recommended in patients with staghorn renal calculi, in these cases the best approach might be the mini percutaneous nephrolithotomy. Aiming to appraisal the results of this technique in staghorn calculi in infants and toddlers we report our clinical case and analyse worldwide published series.

**Materials and methods** We report and compared our case with data of studies published in English since the year 2000, selected upon a systematic review, using the key-words: staghorn stone mini percutaneous nephrolithotomy. Only pediatric case series were included. Focus was given to age at surgery, technical details, operative time, haemoglobin drop, complications and number of stages/reinterventions.

**Results** We report a case of a two years old male toddler referred to the pediatric urology outpatient clinic with a left staghorn renal stone associated with urinary tract infection by *Proteus Mirabilis*. The patient was submitted to mini percutaneous nephrolithotomy performed using a 14 Fr renal access (mid calix), an 8.5 Fr cystoscope and 272 µm laser fiber. There were no complications and a hemoglobin drop of 1.9 g/dL was observed. A nephrostomy was left in place and clamped before discharge. Two months after, the patient was reintervened using the previous access to eliminate lower calix stones with a minimal hemoglobin drop of 0.4 f/dL. In the literature there were 22 articles including adult series and 7 filled the inclusion criteria. The treatment of a total of 149 renal units was documented and there was a small experience in treating less than 2-years old children. The previously reported case series are summarized on table 1.

**Conclusions** There is still a reduced experience in the treatment of staghorn calculi in infants and toddlers. However, Mini-PERC seems to be safe and effective even in this younger population.

**Keywords** staghorn renal calculi, percutaneous nephrolithotomy, Mini-PERC, systematic review

	Renal Units with						Mean	
	Staghorn stones (percentage of reported cases)	Scope Size (Fr)	Access Size (Fr)	At surgery (years)	2nd stage mini-PCNL	Complications	Hemoglobin drop (g/L)	Mean Operative time (min)
Bujons et al. Spain, 2016	- (-)*	9,5	18	7	-	2	0.78	150
Xiao et al China, 2016	6 (9%)	9,8	14	2	-	0	0.87	36.8
Brodie et al United Kingdom, 2015	- (-)*	11	16	7.3	5	1	-	-
Taguchi et al Japan, 2015	1 (100%)	12	18	2	0	0	-	83
Wah et al United Kingdom, 2013	11(48%)	14	16	4.76	2	3	-	109.4
Romanowsky et al Israel 2008	7(70%)	-	-	10.1	0	0	-	88
Manohar et al India 2006	12(33%)	14-24	16-26	2.34	21	-	2.2	72.1

\* complex cases with no distinction between multiple stones and staghorn

## Session VIII, Thorax I

### S VIII.1: CLOSURE OF THE THORACIC DUCT FROM THE LEFT SIDE ACCESS: A CASE REPORT- VIDEO PRESENTATION

Paweł Nachulewicz<sup>\*1</sup>, Paweł Osemlak<sup>1</sup>, Anna Golonka<sup>1</sup> and Anita Kalińska<sup>1</sup>

E-mail: Paweł Nachulewicz — nachulewicz@msn.com

<sup>1</sup>Clinic of Pediatric Surgery and Traumatology, Lublin, Poland

**Background** Chylothorax is associated with high morbidity and mortality due to drainage of a large amount of lymphatic fluid. Accumulation of chyle in the pleural cavity may be either a congenital condition or the result of acquired diseases. Conservative management associated with withdrawal of enteral nutrition or administration of analogs of sandostatin requires a long treatment duration, and in many cases, it is non-effective. Surgical management, like clipping the thoracic duct or pleurodesis of the pleural cavity, is a good option, especially when performed thoracoscopically. Minimally invasive surgical access is well tolerated by patients and produces effective results with a quick resolution of symptoms. Right thoracoscopy, in almost all reported cases, is the procedure of choice because of direct access to the thoracic duct. However, in the case of a left sided chylothorax, there is a connection with the opening of the contralateral pleural space. We present access to the thoracic duct via left thoracoscopy, which, in our opinion, may be a good alternative in the case of a left side chylothorax.

**Materials and methods** We report a 16-year-old patient with a massive left sided chylothorax after chemotherapy due to mixed germinal tumour of the testis with massive metastases located in the retroperitoneal space and posterior mediastinum. Chemotherapy resolved the metastases in the mediastinum but evoked a huge pleural effusion in the left pleural cavity, requiring surgical intervention. Left sided access was used. The 5 mm camera and three 5 mm working ports were inser-

ted. The parietal pleura was incised and the oesophagus located and protected. Behind the oesophagus, the thoracic duct and concomitant tissue were clipped with titanium clips, and additionally, thrombin glue was used. Stopping of the lymph leakage was observed during surgery. A local argon pleurodesis was used to finish the procedure. The thoracic tube was removed on the third postoperative day.

**Results** The patient finished treatment three years ago and is now in a good general condition without any signs of recurrent disease, both in the abdomen and in the chest.

**Conclusions** Left side access may be a good alternative in the left sided chylothorax, but the crucial points are location and protection of the oesophagus during the procedure, which is also the landmark that allows for locating the thoracic duct.

**Keywords** chylothorax, thoracoscopy, left sided access

### S VIII.2: SAFE AND EFFECTIVE PLEURODESIS IN NEONATES. HAVE WE FOUND THE IDEAL AGENT?

Juan Carlos de Agustín Asensio<sup>\*1</sup>, María Antonia García-Casillas<sup>1</sup> and David Peláez Mata<sup>1</sup>

E-mail: Juan Carlos de Agustín Asensio — juandeagustin@mac.com

<sup>1</sup>Hospital Infantil Universitario Gregorio Marañón, Madrid, Spain

**Background** Chylothorax is infrequently seen in neonates. Pleurodesis is the first line surgical technique when medical treatment fails, but the ideal agent is not found yet. We evaluate starch (a polysaccharide of amylose and amylopectin) effectiveness and safety as adhesion promoting agent.

**Materials and methods** In the last 3 years we used thoracoscopic pleurodesis with a starch compound to obtained pleurodesis. Demographic data and postoperative course are studied in all consecutive patients treated with this method. Thoracoscopy was performed using 2 or 3 ports of 3mm, 30 degree lens and 5 mmHg CO2 controlled pneumothorax. The lung is fre-

ed from all pleural adhesions followed by visceral and parietal pleural gentle sponge friction. Finally starch is sprayed over the lung surface and thoracic tube inserted using the lowest port orifice.

**Results** Surgical technique was refined after our previous experience in older children and used in 11 pleurodesis performed in 6 neonates (11–77 days old) weighing between 2,360–3,650 gr. Chylothorax was congenital in 3, one associated with a congenital pulmonary malformation in 1 patient, or secondary to surgery: aortic arc reconstruction and arterial switch in 2 patients, and aortic arc interruption surgery in another. Three were unilateral (2 right and 1 left side) and 3 bilateral chylothorax. Complete drainage cessation time was 13 days (2–28 days) with total parenteral nutrition time of 54 days (28–109 days). There was only 1 recurrence occurred in one patient in which a different commercial starch product was used. There were only 3 complications related with the surgical technique: one contralateral chylothorax and 2 chylous ascites. One prognostic associated condition observed in 3 patients were superior vena cava and subclavian vein thrombosis, which preclude adequate thoracic duct drainage. In chylous ascites a peritoneal-jugular drainage were used. Two patients finally died of multiorgan failure non related with their pleural chylothorax and technique.

**Conclusions** Massive chylothorax in neonates can be successfully treated by gentle mechanical pleural friction followed by starch spraying. This technique definitely promotes pleural adhesion. Chylous ascites and contralateral chylothorax are the only complications observed.

**Keywords** chylothorax, pleurodesis

### S VIII.3: APPLICATION OF THE HYDROSURGERY SYSTEM AND PLASMAJET FOR THORACOSCOPIC DEBRIDEMENT OF PLEURAL CAVITY IN CHILDREN WITH FIBRINOTHORAX

Saidkhassan Bataev<sup>\*1</sup>, Vladimir Rozinov<sup>1</sup>, Roman Ignatiev<sup>1</sup>, Nodar Zurbaev<sup>1</sup>, Alexander Fedorov<sup>1</sup>, Ruslan Molotov<sup>1</sup>, Murat Afaunov<sup>1</sup>, Svetlana Karpovich<sup>2</sup> and Svetlana Smirnova<sup>2</sup>  
E-mail: Saidkhassan Bataev — Khassan-2@yandex.ru

<sup>1</sup>Research Institute of pediatric surgery of the Russian State Medical University, 2 Speransky Childrens Hospital, Moscow, Russian Federation; <sup>2</sup>Speransky Childrens Hospital, Moscow, Russian Federation

**Background** Thoracoscopy became a favored modality in pediatric pleural empyema treatment. However, the factors affecting on outcome of thoracoscopic management remain unclear. Purpose of the study Demonstration of hydrosurgery system „Versajet” and the plasma unit „Plasmajet” during thoracoscopic treatment of children with pleural complications destructive pneumonia.

**Materials and methods** 377 patients with a pneumonia was treated at the Speransky Children’s Hospital in Moscow for the last 1 year. 62 patients (16.45%) from 377 required drainage of the pleural cavity. 14 patients from 1.6 to 15 years of

age (mean, 3.2 ± 3.8) with pleural empyema were operated - Thoracoscopic pleural cavity sanitation with hydrosurgery system (Versajet-2) Hydrosurgery system is a surgical instrument based on the impact of high-speed jet of water on necrotic and inflamed tissues, combining the advantages of acute cleansing tissue and processing them by pulsating water jet. The design of the evacuation tube and its close proximity to the liquid jet creates a local vacuum, which effectively removes fibrin and liquid contents by Bernulli effect. Informed consent was obtained from parents, and the procedure received approval from the local ethics committee.

**Results** Recovery and rehabilitation was uneventful in 13 cases.

1 patient with empyema of the right pleural cavity and severe organic lesion of the central nervous system was treated in our hospital by thoracoscopic adhesiolysis. However, postoperative period was complicated by recurrence of pleural empyema and cortication of right lung. Rethoracoscopy was performed six days later after initial operation - thoracoscopic debridement of pleural cavity, decortications of the right lung by hydrosurgery system with good results after surgery.

Mean operative time was 90 minutes (± 15 minutes). Drainage of the pleural cavity was removed 3–4 days after surgery. The childrens were discharged from the hospital on day 10 (± 1.2 days). After application of argon plasma coagulation has been achieved complete aerostasis in 2 patients, hemostasis — in 1 patient.

Ultrasound and X-rays examination 4 months after surgery confirmed the absence of inflammation in the lung parenchyma and full lung reexpansion in all patients.

**Conclusions** Application Hydrosurgical system during thoracoscopy, provide effective debridement of pleural cavity, decortications of the lung without damaging the lung parenchyma and create conditions for early rehabilitation of the compromised lung.

**Keywords** hydrosurgery, plasmajet, thoracoscopic debridement, children, fibrinothorax

### S VIII.4: EMPYEMA IN 33 CHILDREN: ADVANTAGES OF VATS

Francesca Destro<sup>\*1</sup>, Claudio Vella<sup>1</sup>, Andrea Pansini<sup>1</sup>, Giovanni Di Iorio<sup>1</sup>, Claudia Filisetti<sup>1</sup>, Federica Marinoni<sup>1</sup> and Giovanna Riccipetoni<sup>1</sup>

E-mail: Francesca Destro — francesca\_destro@hotmail.com

<sup>1</sup>Buzzi Children’s Hospital, Milano, Italy

**Background** Empyema is a complication of pneumonia in children. The natural process of organization provides for three consecutive stages: exudative (stage 1), fibrinopurulent (stage 2) and organized (stage 3). In the last few years, an increase in the number and severity of pleural effusions has been observed but there is still lack of consensus on the best approach and surgical timing. We present our series of patients with empyema treated by Video Assisted Thoracoscopic Surgery (VATS).

**Materials and methods** Between January 2008 and January 2017 we performed VATS in 33 patients with pleural empyema, aged between 18 months and 13 years. We collected the following data: demographic, empyema stage, microbiological results, imaging, medical therapy, surgical details, post-operative complications and follow-up. All patients were referred from other Institutions; they were submitted to standard Chest X Rays; pulmonary US and CT scan. According to the imaging the empyema was classified : stage 2 in 4 cases and stage 3 in 29. A fibrinolytic therapy was initially performed in stage 2, primary VATS in stage 3.

**Results** All the 31 patients require VATS, also those previously unsuccessfully treated with Urokinase for 48–72 hours. Six out of 31 presented a tremendous pattern of necrotizing pneumonias involving 1 or 2 pulmonary lobes with parenchymal cavitation. The VATS was performed as a second therapy in 10/33 cases.

VATS was realized with an operative one-trocar in 31 and with 2 trocars in 1 and 3 trocars in another one. The procedure was completed thoracoscopically in all cases without conversion, no intraoperative complications occurred, no parenchymal resections were performed. The surgery was without bleeding, but 15 cases required blood transfusion due to the infection and anemia. One or 2 chest drains (CT) were left in place for a mean time of 7 days (range 4-15 days). CT remained in place for a longer period in the 6 patients who presented pulmonary cavitation, nevertheless none of them required a secondary surgical resection. At a mean follow-up period of 3 months all the patients presented a complete recovery of their lung at US and chest X Rays.

**Conclusions** Historically surgical treatment of empyema consisted of open thoracotomy with decortications. Nowadays the gold standard remained undefined; the possibilities include medical therapy and the insertion of CT with or without fibrinolytics or VATS.

It seems that 4-day limit between diagnosis and surgery is a significant prognostic factor. Moreover the success of VATS versus CT insertion depends on the stage of the disease. In particular stage 1 empyema with respiratory symptoms and some cases of stage 2, would require chest drain and fibrinolysis for 48 hours. Stage 3 empyema and stage 2 with a 3-4 days long illness should be treated by primary VATS.

The early thoracoscopy decreases the length of hospital stay and the duration of post-operative fever and permits to preserve the parenchyma.

VATS yields excellent results in case of stage 2 and 3 pleural empyema. The procedure is safe and effective with few complication rate. When promptly and properly performed, it avoids invasive procedures such as wide parenchymal resections. However it should be performed by experienced surgeons in order to obtain the best results.

**Keywords** VATS, empyema

**S VIII.5: PARAPNEUMONIC EMPYEMA: RESULTS OF**

## **SIMPLE DRAINAGE AND THORACOSCOPIC APPROACH. 10 YEARS OF SINGLE CENTRE EXPERIENCE**

Maria Luisa Conighi<sup>\*1</sup>, Cosimo Bleve<sup>1</sup>, Elisa Zolpi<sup>1</sup>, Valeria Bucci<sup>1</sup>, Lorella Fasoli<sup>1</sup>, Lorenzo Costa<sup>1</sup> and Salvatore Fabio Chiarenza<sup>1</sup>

E-mail: Maria Luisa Conighi — marialuisa.conighi@gmail.com

<sup>1</sup>Departement of Pediatric Surgery and Pediatric Minimally Invasive Surgery and New Technologies. San Bortolo Hospital, Vicenza, Italy

**Background** In literature there is a lack of consensus regarding the optimal management of pediatric parapneumonic empyema (PPE). In clinical practice approaches differ about duration of antibiotics therapy, indications for drainage, first-line methods of drainage (pleural puncture, pleural drainage, fibrinolytic agents and surgical debridement by open thoracotomy or VATS). We present our experience on surgical management and how practice modified during years our approach to these patients.

**Materials and methods** We retrospectively analyzed case-records of patients who presented to our attention during last ten years because of a PPE not respondent to conservative therapy with antibiotics. We considered age, duration of intravenous antibiotic therapy, imaging (chest radiograph, ultrasound, TC) and systemic conditions before surgery; then we analyzed surgical approaches, results and length of hospital stay.

**Results** In last ten years 40 patients were referred to our service because of PPE greater than 3 cm and/or with loculations on imaging (ultrasound or CT) and with deterioration of general conditions (fever, pain, compromised respiratory function). The age ranged from 3 months to 17 years (mean age 5.3 years). Choice of first line surgical approach was made on PPE imaging features: in 24 patients we positioned a pleural drainage and instilled fibrinolytic agents; in remaining 16 patients according history symptoms and imaging study we preferred a direct surgical debridement performed by thoracoscopy (6 with one operative trocar). After chest tube placement, 7/24 patients (29%) failed fibrinolysis and required a thoracoscopic surgical debridement. After surgical thoracoscopic debridement, 3/16 patients (19%) (3 treated with one operative trocar) needed a second look, with success.

**Conclusions** According to recent literature, in our experience thoracoscopic treatment of parapneumonic empyema is safe and effective in the majority of patients, leading to a faster PPE resolution. However a careful selection of patients based on clinical signs and imaging (chest X-ray, ultrasound, CT) is mandatory before surgery. In fact pleural drainage and fibrinolytic agents remain the first line approach for simple PPE. We also agree with literature stressing the need of multicenter prospective clinical trials to determinate a consensus on diagnosis and treatment of PPE.

**Keywords** parapneumonic empyema, pleural drainage, fibrinolytic agent, thoracoscopy, thoracoscopic debridement

**S VIII.6: THORACOSCOPIC REPAIR OF DIAPHRAG-**

## MATIC EVENTRATION IN CHILDREN: IS EARLY SURGICAL INTERVENTION USEFUL?

Zafer Dokumcu\*<sup>1</sup>, Ulgen Celtik<sup>1</sup>, Emre Divarci<sup>1</sup>, Coskun Ozcan<sup>1</sup> and Ata Erdener<sup>1</sup>

E-mail: Zafer Dokumcu — zdokumcu@gmail.com

<sup>1</sup>Ege University Faculty of Medicine Department of Pediatric Surgery, Izmir, Turkey

**Background** Diaphragmatic eventration (DE) is the elevation of a hemidiaphragm without defects of continuity. Asymptomatic DE may be amenable to conservative treatment whereas symptomatic DE in children may require surgical treatment. The purpose of this report is to review the results of our algorithm and emphasize the benefit of the early thoracoscopic diaphragmatic plication (TDP) in children.

**Materials and methods** After approval of the ethical committee, hospital records of children who were admitted for DE (n=30) at a tertiary center between 2006-2017 were reviewed. All patients were evaluated according to level of diaphragmatic elevation on X-ray. Patients with diaphragmatic elevation more than 3 vertebrae constituted Severe DE group (SDE, n=10). Moderate DE group (MDE, n=20) included the patients with diaphragmatic elevation less than 3 vertebrae. Patients with recurrent pneumonia, respiratory distress, and atelectasis on CT scan switched from MDE group to SDE group. Thoracoscopic diaphragmatic plication was performed for SDE group whereas MDE group was managed conservatively. Groups were compared regarding demographics, preoperative findings, indications, and outcome.

**Results** There were 30 DE cases (16 boys, 14 girls) with a mean age of 29.3±41.2 months. The most common clinical manifestations of these patients were recurrent pneumonia (n=14), pneumonia (n=7) and respiratory distress (n=5 cases). DE was due to prior cardiac surgery in 5 patients. The right side was the dominant side (21/30). Six patients with recurrent pneumonia and two patients with ongoing respiratory distress switched from MDE to SDE. One patient with a history of cardiac operation switched from SDE to MDE at 3rd month of follow-up. TDP was performed to 17 children. All procedures were completed via three trocars with non-absorbable interrupted sutures (extracorporeal 7, intracorporeal 10). Transient pleural effusion in 2 patients and pneumothorax in 1 developed as minor post-operative complications which were treated conservatively within a few days. Colonic perforation occurred in one patient with the chilaiditi syndrome (second patient of the series) that was repaired laparoscopically. Median postoperative hospital stay was 4 days (3-30 days) for the SDE group. Thirteen patients were managed conservatively in the MDE group, 75% out of which had respiratory symptoms (25% severe) and had a mean respiratory infections of 0.7 per year during a mean follow-up of 30.8±19.9 months. There was immediate remission of symptoms with no postoperative pulmonary infections and recurrence in patients with whom TDP was performed within 36 months of mean follow-up.

**Conclusions** Clinical and radiological assessment and classification is essential in the management of DE. A significant proportion of the moderate group and nearly all severe group require surgical intervention. TDP is feasible and safe and early thoracoscopic plication should be considered for symptomatic children with moderate eventration or severe DE.

**Keywords** thoracoscopy, diaphragmatic eventration, children

### S VIII.7: THORACOSCOPIC REPAIR OF CONGENITAL DIAPHRAGMATIC HERNIA: SELECT CRITERIA TO IMPROVE NEONATAL OUTCOME

Holger Till\*<sup>1</sup>

E-mail: Holger Till — holger.till@medunigraz.at

<sup>1</sup>Department of Paediatric and Adolescent Surgery, Graz, Austria

**Background** Despite the technical feasibility of thoracoscopic repair of congenital diaphragmatic hernia (CDH) in neonates several investigation revealed at least 2 major problems of this procedure being A) the potential impact of CO<sub>2</sub> causing hyperkapnia and acidosis and B) an increased recurrence rate especially after patch repair (Fuishiro J 2016). This study researched the present literature to establish an algorithm selecting the appropriate neonates.

**Materials and methods** A systematic literature review of the medical data bank PubMed was performed using key words like congenital diaphragmatic hernia, CDH, neonate, thoracoscopy, repair, selection, algorithm. Any study describing a algorithm based on patient criteria and/or surgical aspects was retrieved and analyzed for its efficacy to reduce perioperative morbidity.

**Results** Within the last 5 years 8 papers actually recognized selection criteria and established an algorithm for thoracoscopic CDH repair in neonates. Preoperative contraindications included: Hemodynamic instability (Snoek KG 2016), patient on/after ECMO, liver up in the chest (Lacher M 2015). Intraoperative parameters to convert included severe hyperkapnia (PaCO<sub>2</sub>>90mmHg), acidosis (pH<7,1), size C or D defect (Putnam J Am Coll Surg 2017), need for a patch (Putnam LR, JPS 2017), surgeons inability to suture in time. Low (no) flow CO<sub>2</sub> was recommended as well as Near infrared spectrometry (NIRS) to observe cerebral oxygenation (Conforti A JPS 2016). Taking these informations into consideration we designed a joint algorithm (modified according to Costerus S 2016).

**Conclusions** The present data in the literature clearly demonstrate that thoracoscopic repair should not be considered generally for the whole spectrum of neonates with CDH. A preoperative selection process is needed as much as careful intraoperative monitoring to decrease the perioperative morbidity and identify the appropriate candidates.

**Keywords** congenital diaphragmatic hernia, CDH, neonate, thoracoscopy, repair, selection, algorithm

### S VIII.8: RE-DO THORACOSCOPIC PATCH REPAIR IN CONGENITAL DIAPHRAGMATIC HERNIA (CDH)

Laszlo Sasi Szabo\*<sup>1</sup>, Levente Szabo<sup>1</sup>  
 E-mail: Laszlo Sasi Szabo — sasi.szabo.laszlo@med.unideb.hu  
 14032 Debrecen, Nagyerdei krt 98, Hungary<sup>1</sup> University of Debrecen, Institute of Pediatric, Department of Pediatric Surgery

**Background** The defect of the diaphragm in CDH can usually be closed primarily but prosthetic patch repair may be necessary when the defect is large. Thoracoscopy provides an excellent choice for primary diaphragmatic closure although it has a proven higher rate of recurrence. The best method for recurrent CDH treatment is still under debate. We present our single-institute experience with re-do thoracoscopic patch repair.

**Materials and methods** Between 2013 and 2016 we performed thoracoscopic repair in 9 patients with CDH. 8 were left-sided, one defect was on the right side. In 5 patients we used Gore-Tex mesh for prosthesis, in 4 left-sided hernias the defect was small and was easy to close primarily. Despite of the favourable situation, we observed two recurrences in the latter group: one in the 8th postoperative day, and one 3 months following surgery.

**Results** In both recurrent CDH cases we performed a re-do thoracoscopy. The defect developed in the postero-lateral portion of the suture line. In both cases a Gore-Tex mesh with an appropriate extent was placed in the defect and was sutured to the diaphragmatic muscle and to the ribs. Both patients had an uneventful postoperative course and are free of any recurrence after 35 and 28 months following the second surgery.

**Conclusions** Thoracoscopic repair is an accepted method of CDH repair although is considered to have higher incidence rates, especially when placement of a prosthetic patch is needed. The treatment of choice in recurrent CDH is controversial, but we suggest that re-do thoracoscopy provides an excellent option for secondary repair as well. Taking this into consideration we think that the benefits of VATS CDH repair outweigh its known disadvantages and should be used as a first choice for surgery.

**Keywords** CDH, re-do thoracoscopy, prosthetic mesh

### S VIII.9: TITANIUM ENDOCLIPS FOR TRACHEO-ESOPHAGEAL FISTULA CLOSURE IN THORACOSCOPIC CORRECTION OF ESOPHAGEAL ATRESIA: ADVANTAGES OR COMPLICATIONS?

Maria Luisa Conighi\*<sup>1</sup>, Elisa Zolpi<sup>1</sup>, Cosimo Bleve<sup>1</sup>, Valeria Bucci<sup>1</sup>, Lorella Fasoli<sup>1</sup>, Lorenzo Costa<sup>1</sup> and Salvatore Fabio Chiarenza<sup>1</sup>

E-mail: Maria Luisa Conighi — marialuisa.conighi@gmail.com

<sup>1</sup>Department of Pediatric Surgery and Pediatric Minimally Invasive Surgery and New Technologies. San Bortolo Hospital, Vicenza, Italy

**Background** Thoracoscopic correction of esophageal atresia (EA) and tracheo-esophageal fistula (TEF) is considered one of the more advanced pediatric surgical procedures and has a challenging learning curve. Experience in endocorporeal knotting is mandatory to optimize this technique. A series of technical

skills, including the use of titanium endoclips for TEF closure, are useful to reduce operative time that sometimes can be longer than in open procedures.

**Materials and methods** First thoracoscopic correction of EA/TEF was successfully performed at our center in 2008, since then we have treated with this approach 26 neonates. All patients had an esophago-esophageal anastomosis in separate stitches (5-0 pds or vicryl). In all type C EA, TEF was closed with two 5 mm titanium endoclips (length 1 cm). In four patients (initial experience, excessive width of TEF) TEF was sutured by stitches (silk or pds).

**Results** We had only one intraoperative complication: after the positioning of the second clip we noticed a small laceration of the inferior part of TEF, that was precautionally secured by a stitch. All patients underwent chest X-ray during immediate postoperative time, and some of them also for EA/TEF follow up or because of other medical reasons: all radiographs demonstrated that endoclips were still properly positioned, even after 45 months from intervention. We only had a tardive dislocation of a clip (at 1 year standard chest x-ray) without any complication. All patients had an overall success rate after clips TEF closure of 100%.

**Conclusions** Thoracoscopic correction of EA/TEF was first performed in 1999, since then this approach has become more widespread and, in our opinion, is expected to become the standard technique. Limits to a wider application are technical difficulties also due to small operative space and intracorporeal knotting, this increases operative time. On our experience TEF closure by titanium endoclips (above all in the first series) is fast, with immediate benefit of the patient because of reduced operative time, and safe, with no risk of perioperative clips dislocation: overall success rate after clips TEF closure is in our series 100%.

**Keywords** esophageal atresia, tracheo-esophageal fistula, thoracoscopy, endoclips

### S VIII.10: THORACOSCOPIC REPAIR OF OESOPHAGEAL ATRESIA: EXPERIENCE OF 18 PATIENTS FROM TERTIARY REFERRAL CENTRE

Przemyslaw Galazka\*<sup>1</sup>, Adam Wilczynski<sup>1</sup>, Paulina Szymanska<sup>1</sup>, Weronika Bereznicka<sup>1</sup>, Barbara Szukalska<sup>1</sup> and Irena Daniluk-Matras<sup>1</sup>

E-mail: Przemyslaw Galazka — galazkaprzemek@hotmail.com

<sup>1</sup>Department of General and Oncological Surgery for children and Adolescents, 1st University Hospital, Collegium Medicum UMK in Bydgoszcz, Poland

**Background** Thoracoscopic repair of oesophageal atresia has become popular in many centres and indeed nominates high level of neonatal surgery. Here we report our experience as the tertiary referral centre.

**Materials and methods** Thoracoscopic technique was introduced in 2013 and starting with this date all patients diagnosed with oesophageal atresia were qualified to thoracoscopic

repair. Retrospective analysis was carried out. Patient demographics, operative data, complications and associated anomalies were noted.

**Results** A total of eighteen patients were successfully repaired thoracoscopically with standardized operative technique. 7 were female and 11 were male. The mean body weight of the neonates at oesophageal anastomosis was 2300 g (range: 1450 g–3800 g). We found 16 newborns with type C atresia, 1 with type A and 1 type D. There were coexisting born defects in 50% of neonates. In 2 patients due to extreme immaturity or poor general status at first stage operation only the fistula was closed and delayed primary thoracoscopic oesophageal anastomosis was carried out. In case of long gap atresia, internal suture traction allowed for successful anastomosis at the second stage operation. There were no conversions nor perioperative deaths related to the procedure. Four patients had reversible intra-operative instability due to pneumothorax intolerance. In one patient a small tear of the trachea was created which was successfully sewn up endoscopically. The mean operative time was 162 min. There were no substantial anastomotic leaks but in one patient after early accidental G-tube removal, attempt of second tube insertion resulted in anastomosis perforation which healed on conservative management without further consequences. Two patients died in the late post-operative period due to prematurity complications and Gram positive sepsis. Three patients required more than one endoscopic dilatation due to symptoms of anastomotic stricture.

**Conclusions** In experienced hands, thoracoscopic repair of oesophageal atresia results with less surgical trauma and better cosmetic effect. Perfect operative view allow for precise preparation and anastomosis which results with low anastomotic stricture incidence. In our series the degree of prematurity and standard of post-operative care contributes significantly to post-operative outcome.

**Keywords** thoracoscopy, oesophageal atresia, outcome

**S VIII.11: PRESENTATION AND EVALUATION OF TREATMENT RESULTS OF CONGENITAL ATRESIA OF THE ESOPHAGUS FROM THE INTRODUCTION OF THORACOSCOPIC METHOD AT UPPER SILESIA CHILD HEALTH CENTRE IN KATOWICE IN DECEMBER 2012 TO MAY 2017 WITH SPECIAL EMPHASIS PLACED ON LONG GAP ESOPHAGEAL ATRESIA**

Dominika Smyczek<sup>\*1</sup>, Dariusz Basek<sup>1</sup>, Agnieszka Burkacka<sup>1</sup>, Katarzyna Byrka-Owczarek<sup>1</sup>, Grażyna Wojtynek<sup>1</sup>, Agnieszka Pastuszka<sup>1</sup> Tomasz Koszutski<sup>1</sup>

E-mail: Dominika Smyczek — nika\_sm@vp.pl

<sup>1</sup>The Independent Public Clinical Hospital no. 6 of the Medical University of Silesia in Katowice. John Paul II Upper Silesian Child Health Centre, Poland

**Background** Presentation and evaluation of early and late outcomes of treatment patients with congenital atresia of esophagus.

**Materials and methods** There were 19 children who were treated thoracoscopically (from December 2016 to May 2017) and 8 children who were operated on by means of thoracotomy. All of them underwent surgeries in Upper Silesian Child Health Centre in Katowice. The perioperative period time was evaluated on the grounds of retrospective analysis of medical documentation: discharge papers from neonatal wards and Polish Books of Health of each child. The analysed data concerned sex, birth weight, APGAR score, type of esophageal atresia including long gap atresia, as well as concomitant congenital defects or preterm birth. The analysis concerning the surgical procedure was related to the method of treatment, time of performing procedure, the early and late complications. Due to a 5-year observation time of first children operated on with the use of this method, it was possible to evaluate far-distant results of operation. We could also assess the issues concerning food intake, weight gain etc.

**Results** Among 19 neonates who were treated because of esophageal atresia there were 11 boys and 8 girls. Their birth weight amounted to from 1590 g to 3340 g, HBD from 32–40.

In 12 children the surgery was performed during one procedure, and in 7 within two. 4 children had their second stage of surgery via thoracotomy.

16 surgeries were performed by 1 operator. There was 1 patient who has died. The early complications were: lymph exudation and leakage of the anastomosis in 3 patients, which did not require any further surgical intervention. The observation of the above mentioned children lasts from 1 month to 5 years.

**Conclusions** The survival rate amounted to 94.5%. There is a small number of early complications and there is no frequent need for esophageal dilatation. Despite long-term observation we can conclude that food intake does not only depend on the method of surgical treatment. There is need of multidisciplinary team. Children need to be treated in facilities which have an extensive experience in treatment of this specific anomaly.

**Keywords** congenital atresia of esophagus, long gap esophagus atresia, thoracoscopic methods for LGEA, thoracoscopy

## Poster IV, Urology

**IV.1: A RETROSPECTIVE REVIEW OF 46 CHILDREN WITH DUPLEX SYSTEM URETEROCELES TREATED AT A SINGLE INSTITUTION**

Louisa Soukane<sup>1</sup>, Julie Moyson<sup>2</sup>, Stephane Luyckx<sup>1</sup>, Karim Khelif<sup>1</sup> and Henri Steyaert<sup>\*1</sup>

E-mail: Louisa Soukane — louisa.soukane@gmail.com

<sup>1</sup>Université Libre de Bruxelles Queen Fabiola Children's University Hospital Queen Fabiola in Brussels Department of Pediatric Surgery, Belgium; <sup>2</sup>Erasmus - Université Libre de Bruxelles, Brussels, Belgium

**Background** Management of ureterocele in association with duplex collecting system remains controversial. We retrospectively reviewed all children diagnosed with duplex system ure-

terocele in the Queen Fabiola Children's University Hospital in Brussels between January 1997 and December 2016 in order to understand if management evolved over the years and if some algorithm could be proposed.

**Materials and methods** Age at diagnosis, sex, type of ureterocele, method of endoscopic treatment, delay before endoscopic treatment, ultrasonographic follow up, VCUGs, renal function on 99mTc-MAG-3 isotope scan, occurrence of iatrogenic vesicoureteral reflux and number of surgeries needed were documented using the electronic data system of our hospital. All patients with single system ureteroceles were excluded.

**Results** Thirty-six patients were included. One patient had bilateral duplex system ureterocele (37 unities). Twenty-four (65%) of them where intravesical, 13 (35%) were extravesical.

Thirty were diagnosed prenatally, while 6 patients presented with a urinary tract infection. Twenty-four ureteroceles were submitted to an endoscopic incision and an iatrogenic vesicoureteral reflux (VUR) was created in 15 of them. Six patients were submitted to a hemiureteronephrectomy after confirmation on 99mTc-MAG-3 isotope scan that the upper pole was nonfunctional. Two patients underwent vesicoureteral reimplantation of upper and lower pole ureters. Two patients had reimplantation of the ureter from the lower pole and upper pole heminephroureterectomy. The 3 remaining patients received a conservative treatment.

Out of 24 incised ureteroceles, sixteen needed 1 or more additional surgical procedures : 11 in order to correct a persistent vesicoureteral reflux, 8 after upper pole destruction.

Between 1997 and 2010 a VUR occurred in 10 of 12 incised cases. After 2010, VUR occurred in only 4 out of 12 incised cases.

**Conclusions** Endoscopic puncture is a good primary management option for ureterocele in duplex systems. The type of technique used seems to have a main importance in the occurrence of VUR. A more medial incision seems to be the key.

Evolution of the upper pole function in the long term remains a real question because that will finally determine the need to do something in cases diagnosed prenatally.

**Keywords** duplex system ureteroceles, endoscopic puncture, vesicoureteral reflux

**IP IV.2: MINIMALLY INVASIVE SURGERY EVOLUTION IN A SINGLE PEDIATRIC UROLOGIC CENTER. TIMES, TECHNIQUES AND TRENDS**

Cosimo Bleve<sup>\*1</sup>, Maria Luisa Conighi<sup>1</sup>, Valeria Bucci<sup>1</sup>, Elisa Zolpi<sup>1</sup>, Francesco Battagliolo<sup>1</sup> and Salvatore Fabio Chiarenza<sup>1</sup>  
E-mail: Cosimo Bleve — cosimo.bleve@aulss8.veneto.it

<sup>1</sup>Department of Pediatric Surgery and Pediatric Minimally Invasive Surgery and New Technologies, San Bortolo Hospital, Vicenza, Italy

**Background** Minimally invasive surgery (MIS) techniques are reported to be increasingly used, but little data supports this. Our objective was to assess and evaluate the evolution of the surgical MIS approaches in pediatric urology in our Centre. We

focus on techniques and trends in MIS utilization across the various urological procedures comparing operative time, postoperative complication rates and outcome between MIS and Open procedures.

**Materials and methods** We analyzed the 2002–2017 surgical urological procedures (kidney diseases) in our department. We identified children undergoing open and MIS procedures and any in-hospital intra-operative and post-operative complications that occurred during hospitalization. 312 (181M, 131F) patients were studied for congenital anomalies and urologic diseases of upper urinary tract: intrinsic and extrinsic UPJO (hydronephrosis), dysplastic kidney, vesico-ureteral reflux nephropathy, cystic disease of the kidney, dysgenetic kidney. We don't include urinary tract stones disease patients. 182 pts were treated for both extrinsic and intrinsic-UPJO. 41(28M,13F) were studied for a suspected extrinsic obstruction: 36 of them were treated with laparoscopic transposition of CV (modified Hellström Vascular Hitch, LVH). 141(46F,95M) presented an intrinsic obstruction and underwent dismembered pyeloplasty(AHDP): 70 Open (OP), 14 laparoscopic (LP), 57 retroperitoneoscopic (RP). 61 pts (32F,28M) underwent nephroureterectomy: 20 Open, 41 retroperitoneoscopic; 69 pts (29M,40F) underwent heminephrectomy: 30 Open, 39 retroperitoneoscopic.

**Results** We analyzed the data of 312 patients treated for urological upper tract diseases evaluating the transition from Open to MIS procedures. The major group of patients presented with UPJO (182). 141 presented an intrinsic obstruction: 70 of them were treated with open AHDP, with 2 in the last year for a very difficult anatomical condition. 71 underwent MIS procedure: 14LP and 57RP. Retroperitoneoscopic approach was reserved to children under 2 years of age; 4 patients presented a giant hydronephrosis (>5 cm in antero-posterior scan). No significant differences were noted between groups for intraoperative complications. RP and LP had equivalent risks of postoperative complications developing and a lower length of stays vs OP. In mininvasive group (RP+LP) hydronephrosis improved and/or obstructive pattern on diuretic renography disappeared during a median follow-up period of 24 months. JJ stent was positioned in all patients and removed after 30–40 days. We use a perirenal drain usually removed in 2 postoperative days. We recorded only one recurrence for a re-obstruction, in two patients (2–17 years) a urinary-tract-infection (UTI) after 3-week resulting stent removal and 1 patient underwent reoperation after 2 days for pyeloplasty leakage. Since the beginning we improved the operating time reaching a median of 3½.

Of 41 pts with extrinsic obstruction 36 underwent LVH. Median operating time was 95min; mean hospital stay: 4days. At 12–84 months follow-up 40 patients remained symptoms-free, one needed after two years a laparoscopic-AHDP.

The indications for surgery for the two group, nephroureterectomy and heminephrectomy were: dysplastic kidney, vesico-ureteral reflux nephropathy, cystic disease of the kidney, dysgenetic kidney. In the nephrectomy group the median

operative time was of 140' (90–240) with a median age of 4,5 years for RP procedures; in Open group the median age was of 6 year with a median surgical time of 90'.

In heminephrectomy group the median operative time was the same between Open and RP procedures, 120'. The age range was 3months-5years in RP group and 3 months-17 years in Open one. In both RP-groups we have no conversions and intraoperative complications and a lower length of stays vs OP. We recorded an urinoma in RP-heminephrectomy group treated conservatively and 2 symptomatic ureteral stumps which needed a laparoscopic treatment.

The overall rate of complications was lower in patients undergoing MIS compared with open surgery.

**Conclusions** There is increasing use of MIS for pediatric urology procedures, although utilization rates vary among procedures. MIS was associated with a lower postoperative complication rate than for open procedures. Higher-volume MIS centers have a lower complication rate than lower-volume centers. Our study shows as the transition from open surgery to minimally invasive surgery requires in performing certain surgical procedures years of experience, experienced team (surgeons, anesthesiologist, nurses) and an adequate learning curve that allow to dominate MIS as conventional surgery.

In this context, certain procedures in contrast to the literature may be the most appropriate and effective techniques in the treatment of certain pathologies. Our results demonstrate indeed that RP is preferable and suitable in patients younger than 2 years in experts' hands in performing hemi/nephrectomy or AHDP contrasting with literature which describes it as a technically demanding procedure with a significantly higher complications and re-operation rate compared to LP, also in experts' hands.

**Keywords** kidney diseases, nephrectomy, UPJO, retroperitoneoscopy, laparoscopy, MIS

### P IV.3: TRICKS FOR LAPAROSCOPIC EXPLORATION AND EXCISION OF ORTHOTOPIC AND ECTOPIC GIANT MULTICYSTIC DYSPLASTIC KIDNEYS

Umut Alici\*<sup>1</sup>, Akin Karagozoglu<sup>1</sup>, Cigdem Arslan Alici<sup>1</sup> and Baran Tokar<sup>1</sup>

E-mail: Umut Alici — drualici@gmail.com

<sup>1</sup>Eskisehir Ogu Medical School, Department of Pediatric Surgery, Section of Pediatric Urology, Turkey

**Background** Intraabdominal space occupying giant multicystic dysplastic kidneys (MCDK) might need a surgical removal due to characteristics of the lesion and associated findings. Laparoscopic exploration and removal of the mass could be planned with consideration of size of the mass and insufficient working space.

**Materials and methods** In this video, 3 patients having giant MCDK were included. Two had ectopic extensively lobulated MCDK located in the pelvis and one had orthotopic MCDK on the right side. Laparoscopy was performed in all patients.

**Results** The age range was between 6 to 14 years old. Six year old boy had a large lobulated MCDK located ectopically in the pelvis at the left side. Preoperative ultrasound, cystoscopy and laparoscopy showed associated urogenital anomalies. He also had left intraabdominal testis and right distal ureteric stenosis as associated anomalies. Second patient was 10 years old boy having a right side intrapelvic large ectopic MCDK. He also had right side scrotal hernia. MCDK excision and correction of all other pathologies were done laparoscopically in both patients. Third patient was 14 years old girl having a right side orthotopic giant MCDK with 26 cm longitudinal length. Following laparoscopic dissection and excision, surgery was completed with removal of the mass via mini flank incision. In all three cases, two working ports were needed and stay sutures to the abdominal wall and aspiration of the mass helped dissection and excision.

**Conclusions** It is difficult to create an intraabdominal working space for giant MCDK during laparoscopy. Proper patient and port positions, stay sutures and aspiration of cysts help to delineate the border of the large mass, dissection and excision.

**Keywords** multicystic dysplastic kidneys, laparoscopy, ectopic, children

### P IV.4: REPEATED SURGERY FOR RECURRENT VARICOCELE IN CHILDREN

Roman Ignatiev\*<sup>1</sup>, Vladimir Rozinov<sup>1</sup>, Saidkhasan Bataev<sup>1</sup>, Nataliya Guseva<sup>1</sup>, Nodary Zurbaev<sup>1</sup>, Alexey Trusov<sup>1</sup>, Mariya Ludikova<sup>2</sup> and Mariya Sherbakova<sup>1</sup>

E-mail: Roman Ignatiev — khassan-2@yandex.ru

<sup>1</sup>Research Institute of pediatric surgery of the Russian State Medical University, Speransky Children's Hospital, Moscow, Russian Federation; <sup>2</sup>Speransky Childrens Hospital, Moscow, Russian Federation

**Background** The frequency of varicocele recurrences after surgery is an extremely variable quantity (0,5-35%). Most studies show that microsurgical inguinal or subinguinal ligation of veins provides significantly fewer relapses (0,5-3,7%).

**Materials and methods** During the period 2009–2016, we treated 14 patients 12,5-17 years age with recurrent varicocele. At 4 ones previously produced retroperitoneal ligation of testicular veins by open access, 9 — laparoscopic ligation. In 13 cases, laparoscopic ligation of residual testicular vein was performed. In 1 patient relapse was occurred after an open ligation of testicular vein. Based on angiography results with measurement of venous pressure in the left renal vein we had decided to hold subinguinal microsurgical ligation veins.

**Results** 4 months after that operation varicocele grade 3 relapsed again. We performed laparoscopic revision and clipping of the residual veins and simultaneous microsurgical ligation of expanded venous plexus in the scrotum by skrototomy through the Vesling's line.

Follow-up of 14–42 months demonstrate an absence of recurrence. In 2 patients in the development of a hydrocele occurred in the early postoperative period, which disappeared after 4.5 and 8 months spontaneously. Another patient after

repeated laparoscopic procedure suggests decrease of volume of the left testis by 35% relative to the right.

**Conclusions** According our experience we can recommend laparoscopic ligation of residual testicular veins as good choice in children with recurrence of varicocele.

**Keywords** varicocele, children, redo surgery, laparoscopic ligation

#### **P IV.5: LAPAROSCOPIC PYELOPLASTY TOGETHER WITH EXCISION OF URETEROPELVIC POLYP FOLLOWING A DIAGNOSTIC URETERORENOSCOPY**

Cigdem Arslan Alici<sup>\*1</sup>, Akin Karagozlu<sup>1</sup> and Baran Tokar<sup>1</sup>  
E-mail: Cigdem Arslan Alici — lakapies26@gmail.com

<sup>1</sup>Eskisehir Ogu Medical School, Department of Pediatric Surgery, Section of Pediatric Urology, Turkey

**Background** Fibroepithelial polyp on ureteropelvic junction (UPJ) is a rare pathology that causes upper urinary tract obstruction. Preoperative radiological examination may not demonstrate the exact pathology. It might be determined in patients who have operation for UPJ obstruction.

**Materials and methods** In this video, we present a 6 year old boy who was referred to our clinic with a suspicion of a diagnosis of obstructive stone on UPJ. Ureterorenoscopy showed a polypoid lesion on UPJ and laparoscopy was performed for resection and pyeloplasty.

**Results** The patient had a complaint of hematuria and left lumbar pain that was intensified in the last couple of days. Ultrasound showed hydronephrosis and 6 mm stone like appearance on UPJ. Ureterorenoscopy found a broad base Medusa head like polypoid lesion on UPJ with arms protruding into the pelvis and ureter. Following the lateral flank position of the patient, laparoscopic retrocolic exploration of the left kidney was done. UPJ was exposed, ureteropelvic lumen was opened with a vertical incision; the polyp was found and the segment of UPJ with the polyp was resected. Pyeloplasty was performed with a JJ stent insertion. The patient did well at six-month follow-up.

**Conclusions** Fibroepithelial polyp should be considered in differential diagnosis of UPJ obstruction. It may mimic a stone on ultrasound. Endoscopic excision of polyp is possible, but a polyp that has a broad base and atypical macroscopic appearance should be excised surgically as in our case. Laparoscopic approach is a right preference for surgeons who have experience on laparoscopic pyeloplasty.

**Keywords** fibroepithelial polyp, laparoscopy, pyeloplasty, ureteropelvic junction, children

#### **P IV.6: MIS FOR URETERAL PELVIC JUNCTION OBSTRUCTION IN CHILDREN**

Oleg Godik<sup>\*1</sup>, Genady Ustenko<sup>1</sup>, Oles Kalyschuk<sup>1</sup> and Valerie Soroutchan<sup>1</sup>

E-mail: Oleg Godik — ogodik@gmail.com

<sup>1</sup>Clinic Oberig, Kyiv, Ukraine

**Background** Today MIS for UPJ obstruction is the method of choice in the surgical treatment. There is much discussion on the different endoscopic approaches- transperitoneal or retroperitoneal. We present our experience with the transperitoneal approach of the laparoscopic treatment for ureteral pelvic junction (UPJ) obstruction in children.

**Materials and methods** A review of the laparoscopic treatment of ureteral pelvic junction obstruction in children from 11 months – 12 years, from a time period of March 2011 to April 2017 in Clinic „Oberig”. In all the children we performed a cystoscopy and JJ-stenting of the ureter prior to surgery. The position of the patients was on the side opposite to the lesion. In all cases we used a 5mm camera placed transumbilically and 3mm working ports in the triangular fashion. In 7 (25%) cases the cause of PUJ obstruction was an aberrant vessel. In all the cases pyeloplasty was performed by a resection of the PUJ with a longitudinal cut of the distal ureter. Pyeloplasty was performed by intracorporal suturing, with absorbable material size 5.0 or 6.0. A drainage tube was positioned at the paranephral space in all patients. Children were dismissed on the 3rd- 5th post- op day. The average operative time was 115±8 minutes

**Results** In the last 6 years we performed laparoscopic operations in 28 children with UPJ. Out of them 17 (60.7%) were girls and 11 (39.3%) were boys. The mean age was 2 years 8 months. Right-sided obstructions occurred in 12 (42.8%) patients and left sided obstructions were seen in 16 (57.2%) children. Complication occurred in 3 (10.7%) cases, which were leakage of the anastomosis on the 2nd- 3rd post- op day. Recurrences were diagnosed in 2 (7.1%) cases, both of them 2 weeks after removing the ureteral stent. These patients had an open redo; witch was explained by the absence of experience with laparoscopic redo.

**Conclusions** Laparoscopy for the surgical treatment of UPJ obstruction in children is a less traumatizing technique with good clinical and great cosmetic results. We believe it should be the method of choice in the correction of the UPJ obstruction in children.

**Keywords** MIS, laparoscopic ureteral pelvic, junction, obstruction, children

## **Poster V, Thorax**

### **P V.1: MINIMALLY INVASIVE SURGERY FOR THE TREATMENT OF CONGENITAL LUNG MALFORMATIONS - EARLY EXPERIENCE**

Przemyslaw Galazka<sup>\*1</sup>, Krzysztof Dymek<sup>1</sup>, Kacper Kroczek<sup>1</sup>, Krzysztof Redloch<sup>2</sup>, Alicja Rymaszewska<sup>1</sup> and Irena Daniluk-Matras<sup>1</sup>

E-mail: Przemyslaw Galazka — galazkaprzemek@hotmail.com

<sup>1</sup>Department of General and Oncological Surgery for Children and Adolescents, 1st University Hospital, Collegium Medicum UMK in Bydgoszcz, Poland;

<sup>2</sup>Department of Radiology and Diagnostic Imaging, 1st University Hospital, Collegium Medicum UMK in Bydgoszcz, Poland

**Background** The aim of this study is to present our experience with minimally invasive surgery (MIS) for congenital lung lesions.

**Materials and methods** We retrospectively reviewed medical records of infants under 2 years of age who underwent operation for a congenital pulmonary adenomatoid malformation (CPAM), internal lung sequestration (ILS), and external lung sequestration (ELS) from 2013 to 2016.

**Results** MIS was performed for 8 infants (male: female = 2:6): 3 with CPAM, 2 with ILS and 3 with ELS. 2 cases after detailed workup revealed hybrid lesions: ILS+CCAM and CCAM+bronchogenic cyst. In 5 patients pathology was diagnosed prenatally around gestational age of 24.7 weeks. In 3 patients it was incidental finding during diagnostic studies of comorbidities: eventration of the diaphragm after congenital diaphragmatic hernia closure through laparotomy, suspicion of esophageal duplication or pneumonia accompanying systemic infection. The median gestational age was 38 weeks, and the median body weight was 3100 g. Four of them had respiratory distress after birth not directly associated to lung lesion. The median age at the time of operation was 7,4 months (range: 3–13 months). While awaiting operation all patients were closely monitored in outpatient clinic, none developed serious respiratory symptoms and 2 infants had experienced mild pneumonia treated routinely. The mean operative time was 156 minutes (range: 55–235 minutes). Operative time was the shortest for ELS cases (mean 82 minutes) and the longest for hybrid lesions (mean 220 minutes). Apart from ELS cases, there were 2 right lower lobectomies, 1 middle lobectomy and 2 lung sparing procedures (10 and 9,10 segmentectomies). There were one conversion: muscle sparing mini-thoracotomy for segmentectomy. There were no major perioperative complications. The infants were discharged within mean 5 days (range: 3 to 8 days). During the follow-up period, there were no cases of remnant lesions, one patient developed mild upper respiratory tract infection within 3 weeks after operation.

**Conclusions** MIS for congenital lung malformations is safe and feasible, with excellent cosmesis and short hospital stays. Increasing experience with various MIS procedures enable introduction of lung sparing procedures in congenital lung malformations while conserving healthy lung tissue.

**Keywords** congenital lung malformation, extra lobar sequestration, intra lobar sequestration, congenital pulmonary adenomatoid malformation, thoracoscopy, VATS

#### **P V.2: THORACOSCOPIC REPAIR OF RECURRENT CONGENITAL DIAPHRAGMATIC HERNIA - CASE REPORT**

Kacper Krocze<sup>k\*1</sup>, Przemyslaw Galazka<sup>1</sup>, Marika Reszczynska-Domagala<sup>1</sup>, Natalia Sadej<sup>1</sup> and Irena Daniluk-Matras<sup>1</sup>  
E-mail: Kacper Krocze<sup>k</sup> — kacper.krocze<sup>k</sup>@gmail.com

<sup>1</sup>Department of General and Oncological Surgery for Children and Adolescents, 1st University Hospital, Collegium Medicum UMK in Bydgoszcz, Poland

**Background** Congenital diaphragmatic hernia (CDH) is a relatively common anomaly with an estimated incidence of 1 in 2000-3000 newborns. Traditionally, repair of the diaphragmatic defect is performed through a laparotomy. Recently, minimally invasive techniques (MIS), both laparoscopic and thoracoscopic, have been implemented in CDH repair. The role of minimally invasive surgical techniques in recurrent CDH remains undefined. We present a case of correction of recurrent CDH using MIS methods.

**Materials and methods** A 6-months-old infant was referred to emergency unit because of intermittent cry and anxiety during last night. Also periodic discomfort while eating was reported. On history, he was treated prenatally by FETO procedure (fetoscopic endoluminal tracheal occlusion) after diagnose of congenital diaphragmatic hernia. The balloon from airways was removed 16 days before delivery. Patient was born at gestation age of 35 weeks. His APGARs were 5 (1 minute) and 7 (5 and 10 minute). After delivery he was intubated and transported to tertiary care facility for surgical treatment of CDH. Because of giant defect in left side of diaphragm, the synthetic patch was implanted successfully. At 8th postoperative-day, the perforation of stomach was diagnosed and was successfully managed surgically.

**Results** At the admission, his vital signs were stable. Chest X-ray showed an elevated left diaphragm. Further, thoraco-abdominal CT detected herniation of the part of large intestine, upper pole of left kidney and accessory spleen. It was decided to perform thoracoscopic repair of recurrent diaphragmatic hernia. Pulmonary lesions were determined as an evolution of primary lung hypoplasia. Hemithorax was entered and many pleural adhesions were detected and divided. The synthetic patch was dissected and posterolateral defect was visualized. Primary placed sutures at free border of synthetic material were removed. Interrupted sutures were made to posterior verge of diaphragm and defect was successfully closed. Patients' postoperative course was uneventful. He was discharged on the 12th postoperative day. On follow-up visits, he remains asymptomatic.

**Conclusions** Minimally invasive thoracoscopic approach as a therapeutic option can be successfully used in the repair of recurrent CDH. In selected cases it is possible to apply primary-used synthetic material for secondary reconstruction with good long-term outcomes.

**Keywords** recurrent diaphragmatic hernia, thoracoscopic repair, CDH

#### **P V.3: THORACOSCOPIC LOBECTOMY FOR COMPLICATED CONGENITAL CYSTIC ADENOMATOID MALFORMATION: VIDEO PRESENTATION**

Zafer Dokumcu<sup>\*1</sup>, Emre Divarci<sup>1</sup>, Coskun Ozcan<sup>1</sup> and Ata

Erdener<sup>1</sup>

E-mail: Zafer Dokumcu — zdokumcu@gmail.com

<sup>1</sup>Ege University Faculty of Medicine Department of Pediatric Surgery, Izmir, Turkey

**Background** Complications may occur in infants with congenital cystic adenomatoid malformation (CCAM). We report a difficult case with previous misdiagnosis that were treated thoracoscopically.

**Materials and methods** Medical records of a case with a complicated CCAM was reviewed.

**Results** Thoracoscopic lobectomy for CCAM may be performed even in complicated cases.

**Conclusions** A 1-month-old boy without a prenatally diagnosed pathology was brought to our outpatient clinic with a previous history of bronchiolitis treatment due to postnatal respiratory distress and tube thoracostomy. Further evaluation with thoracic CT-scan revealed a 5cm multiloculated cystic lesion at the left lower lobe. The initial physical examination was normal but suddenly respiratory distress and cyanosis developed. Spontaneous tension pneumothorax due to rupture of the cyst was managed with urgent tube-thoracostomy. After stabilization of the patient, thoracoscopic exploration was performed the next day. Severe adhesions were cleared and fibrotic tissues were excised. Lower lobe vessels and segmental bronchi were clipped and cut with Endo clip™ and Hem-o-lok® clips, respectively, as previously mentioned. There was no complication. Tube thoracostomy was ceased on 3rd and he was discharged on 4th postoperative day.

**Keywords** congenital cystic adenomatoid malformation, thoracoscopy, empyema, child

#### P V.4: HEM-O-LOK® VASCULAR CLIPS FOR THORACOSCOPIC TREATMENT OF PULMONARY SEQUESTRATION

Peter Zimmermann\*<sup>1</sup>, Robin Wachowiak<sup>1</sup>, Roland Boehm<sup>1</sup> and Martin Lacher<sup>1</sup>

E-mail: Peter Zimmermann — Peter.Zimmermann@medizin.uni-leipzig.de

<sup>1</sup>Klinik und Poliklinik für Kinderchirurgie Universitätsklinikum Leipzig, Germany

**Background** Video-assisted thoracoscopic surgery (VATS) has been proven to be a feasible and minimally invasive approach for the treatment of intralobar and extralobar pulmonary sequestration (PS). Several methods exist for dividing the systemic vascular supply including suture ligation or stapling. We report on three cases of PS in which the systemic vessels were ligated using Hem-o-Lok® vascular clips.

**Materials and methods** Retrospective analysis of all children operated on for PS from 4/2016 to 4/2017. Feasibility of placement of Hem-o-Lok® clips, OR times and postoperative outcomes were assessed.

**Results** Three children (11+12months; 7 years) underwent

VATS for PS. Postoperative diagnosis was extralobar PS in two cases (left and right side) and intralobar PS in one (left side). In all patients the aberrant vessels were ligated using 5mm Hem-o-Lok® vascular clips (Weck® Teleflex® Medical, Durham, NC, USA). In the child with intralobar PS clipping of the systemic vessels was followed by a thoracoscopic left lower lobe resection including the usage of a 5mm Ligasure® (Covidien®, Mansfield, MA, USA) and a 10mm stapling device (Ethicon®, Cincinnati, Ohio, USA). OR times were 117, 138 and 223 minutes respectively. The postoperative course was unremarkable in all children.

**Conclusions** Hem-o-Lok® vascular clips are very suitable for the division of the systemic vascular supply in PS. The positioning of these clips is easy and safe. Therefore this method has become our standard approach for the ligation of aberrant vessels.

**Keywords** video-assisted thoracoscopic surgery, pulmonary sequestration, vascular clips

#### P V.5: THE ASSOCIATION OF CERVICAL BRONCHOGENIC CYST WITH EXTRALOBAR PULMONARY SEQUESTRATION IN AN INFANT: PREVIOUSLY UNREPORTED ENTITY

Ufuk Ates<sup>1</sup>, Anar Gurbanov<sup>1</sup>, Gulnur Gollu Bahadır<sup>1</sup>, Nil Yasam Tastekin<sup>1</sup>, Suat Fitöz<sup>1</sup>, Seher Yuksel<sup>2</sup> and Meltem Bingol-Kologlu\*<sup>1</sup>

E-mail: Ufuk Ates — drufukates@gmail.com

<sup>1</sup>Department of Pediatric Surgery, Ankara University Medical Faculty, Ankara, Turkey; <sup>2</sup>Department of Pathology, Ankara University Medical Faculty, Ankara, Turkey

**Background** Bronchogenic cyst is a congenital malformation of the embryonic foregut defined by the presence of respiratory-type epithelium lining the cyst. It is usually located in thorax though rarely can be seen in extrathoracic locations such as abdomen and the neck. To the best of our knowledge the association of cervical bronchogenic cyst with mediastinal extralobar pulmonary sequestration has not been reported. We present a 18 month old infant with a mediastinal mass extending to cervical region and underwent both thoracoscopic and cervical excision of the mass which found to have histopathologic findings consistent with cervical bronchogenic cyst and pulmonary sequestration.

**Materials and methods** 18-month-old male infant presented with an intrauterine diagnosis of mediastinal mass extending to the cervical region and respiratory difficulty.

**Results** This case accentuates the previously unreported coexistence of a two rare congenital anomaly, cervical bronchogenic cysts and extralobar pulmonary sequestration and also the benefits of thoracoscopic surgery in management of these complex anomalies.

**Conclusions** The MRI revealed a multicystic lesion with a size of 51x64x56 mm, involving thymus, filling the upper part of the

left hemithorax and extending to the neck, Preoperative radiologic diagnose was thymic cyst

Thoracoscopy showed a 5x6 cm mediastinal mass which was separate from thymus and had a feeding artery originating from arcus aorta and venous drainage to subclavian vein. The mediastinal mass was excised and removed thoroscopically. Cervical mass could not be reached from thorax and neck exploration from a 2 cm cervical incision was done. There were two separate cystic structures with a size of 3.5x2,5cm and filled with white pale mucoid fluid which were densely adherent to trachea. Histopathologic evaluation of the mediastinal mass revealed pulmonary sequestration and cervical mass revealed a cystic structure lined by respiratory-type epithelium and including mucinous glands, mature cartilage and smooth muscle fibers in the cyst wall. These findings were consistent with a bronchogenic cyst.

**Keywords** bronchogenic cyst, extralobar pulmonary sequestration, infant

#### P V.6: TREATMENT OF SPONTANEOUS PNEUMOTHORAX OWN EXPERIENCE

Michał Szostawicki<sup>\*1</sup>, Michał Puliński<sup>1</sup>, Tomasz Janowicz<sup>1</sup> and Wojciech Choiński<sup>1</sup>

E-mail: Michał Szostawicki — mszostawicki@wp.pl

<sup>1</sup>Oddział Kliniczny Chirurgii i Urologii Dziecięcej Wojewódzki Specjalistyczny Szpital Dziecięcy w Olsztynie, Poland

**Background** The spontaneous pneumothorax occurs with a frequency of approximately 3/10000 / year. Among young people it is usually associated with increased physical activity. It is 5 x more common in men than in women. The aim of the study is to present our own experience in the treatment of spontaneous pneumothorax in children in the years 2010–2017.

**Materials and methods** In the past seven years in the Department of Clinical Surgery and Urology WSSD in Olsztyn seventeen patients were treated due to spontaneous pneumothorax. The average age of children is 16 years. Treatments included the conservative treatment of pleural drainage (4 patients) thoracoscopy (12 patients) and a thoracotomy (1 patient).

**Results** The primary treatment of pneumothorax is a suction drainage of the pleural cavity. In the case of anatomical cause of emphysema — bullae or cysts — it is necessary to remove it.

**Conclusions** A thoracoscopy may be a useful method in this case.

**Keywords** spontaneous pneumothorax, thoracoscopy

## Session IX, Thorax II

### S IX.1: THORACOSCOPIC THYMECTOMY IN CHILDREN

Wojciech Korlacki<sup>1</sup>, Andrzej Grabowski<sup>1</sup>, Michał Pasierbek<sup>\*1</sup>

and Roksana Pułtorak<sup>1</sup>

E-mail: Wojciech Korlacki — woko@plusnet.pl

<sup>1</sup>Medical University of Silesia in Katowice, School of Medicine with the Division of Dentistry in Zabrze, Department of Children's Developmental Defects Surgery and Traumatology, Zabrze, Poland

**Background** Indication for thymectomy in children are very rare. The main indication are myasthenia gravis and tumors. Until now open techniques with wide sternotomy were preferred. Recently minimally invasive thoracoscopic approaches have been proposed. The aim of the paper is to present the usefulness of thoracoscopic thymectomy in children.

**Materials and methods** In the years 2011-2016 thoracoscopic thymectomy was done in 7 children (5 girls and 3 boys) aged 6 months to 16 years (average 11.8 years). The indication for surgery was severe form of myasthenia in 5 cases, congenital myasthenic syndrome in 1, and thymic tumour in 1 case. Right thoracoscopic approach with 4 trocars was used in all cases.

**Results** In all children right side thoracoscopic approach was enough for total thymectomy. There were no intraoperative and postoperative complications. There were no conversions. Pleural drain was removed in 24–48 hours after surgery. The average hospital stay in the surgical ward was 4.8 days. In all children with myasthenia good late result was achieved with improvements of neurological status. In case with tumour thymic lymphoma was recognized and chemotherapy introduced with good result.

**Conclusions** Thoracoscopic approach is sufficient for total thymus resection in children. It gives an excellent visualization of the surgical field, which increases intraoperative safety, reduces the risk of complications, and improves the resection efficiency. Avoidance of sternotomy improves postoperative course and decreases time of convalescence.

**Keywords** thoracoscopic thymectomy, children

### S IX.2: THORACOSCOPIC THYMECTOMY FOR MYASTHENIA GRAVIS IN CHILDREN: SHOWING FIRST RESULTS OF FEASIBILITY AND EFFICACY

Oleg Godik<sup>\*1</sup>, Alexander Dubrovin<sup>1</sup>, Vasil Prytula<sup>1</sup>, Valerie Soroutchan<sup>1</sup>, Roman Zhezhera<sup>1</sup> and Alexander Metlenko<sup>1</sup>

E-mail: Oleg Godik — ogodik@gmail.com

<sup>1</sup>National Medical University, Kyiv, Ukraine

**Background** Myasthenia gravis (MG) is a complicated autoimmune neuromuscular disorder that leads to skeletal muscle weakness. For the affected patients such a pathology leads to difficult living and social incompleteness. In the pediatric population with non-thymomatous MG thymectomy is recommended for generalized MG with or without detectable acetylcholine receptor (AChR) anti-bodies. Its value is still unclear but the main goals of the procedure are: to minimize the dosage and duration of immunosuppressive (IS) therapy; to avoid the potential complications of IS therapy; indications for surgery in unsatisfactory conservative treatment.

**Materials and methods** In the last 26 months in our department there were 7 children with MG that underwent a thoracoscopic thymectomy. The average age of patients was 14 years  $\pm$  8 months, most of them were girls n=5 (71,4%). Five (71,4%) patients presented with generalized MG Class IIIa, one (14,3%) child had thymomatous MG Class IIIa and the presence of thymoma was found after clinical presentation of MG, and one (14,3%) patient ocular MG Class III with tendency to generalization. Prior to operation all the patients had immune laboratory testing, a chest X-ray, and a CT of the thorax. Indications for surgical treatment were assigned by a neurologist. In 6 (85,7%) cases we performed thoracoscopy from the left sided, and in 1 (14,3%) case from the right. For the thoracoscopic thymectomy we used a 10mm camera positioned in the 5th intra- costal space at the medial axillary line, and 5 mm trocars set up in the triangular fashion. For the dissection of the thymus we used blunt and sharp dissection with coagulation and Ligasure. The median time of operation was 90  $\pm$ 20 minutes. All patients had a chest tube placed.

**Results** There were no complications. Children started drinking and feeding mesh food the next day after operation. Chest tubes were removed on the 1-2 post- op day after performing a chest X-ray. None of the patients needed narcotic analgesics. The length of hospital stay was 4-5 days. All the patients became Class 1 within an average follow up of 15  $\pm$ 4 months. They all had restoration of muscle activeness with out any weakness, with the minimization of IS therapy dosage. In result surgical treatment improved their quality of life.

**Conclusions** In non-thymomatous MG, thymectomy is carried out as an optional treatment when unsatisfactory results are seen after administering IS therapy. We believe that thoracoscopic thymectomy is a feasible and effective method of surgical treatment.

**Keywords** myasthenia gravis, thoracoscopic thymectomy, children

### S IX.3: STANDARD OR EXTENSIVE THYMECTOMY FOR PEDIATRIC MYASTHENIA: PLACE OF VIDEOTHORACOSCOPY IN 2017

Yohann Robert<sup>1</sup>, Pierre-Yves Rabattu<sup>1</sup>, Romain Faguet<sup>1</sup> and Christian Piolat\*<sup>1</sup>

E-mail: Christian Piolat — cpiolat@chu-grenoble.fr

<sup>1</sup>Service de Chirurgie Pédiatrique, Chu Grenoble Alpes / Université Grenoble Alpes, France

**Background** Thymectomy for myasthenia is rarely performed in pediatric surgical practice. Thymectomy is then indicated in thymic tumors or in autoimmune myasthenia (infantile myasthenia gravis) that did not fully respond to medical treatment or that are complicated by iatrogenic effects. To the best of our knowledge there's no european report in the past 5 years in english littérature.

**Materials and methods** We report 4 cases of total thymectomies performed between 1992 and 2017 in children aged 10 to

15 years old with myasthenia (cortical thymoma = 1, infantile myasthenia gravis = 3). Surgical approach concerned cervico-sternotomy (n=1, thymoma), cervicotomy (n=1), videothoracoscopy (n=2).

**Results** Follow up has always been uneventfull. One complication was reported : left vocal cord paralysis (thymoma). All children improved their symptoms allowing to decrease their medical treatment. A child operated on by videothoracoscopy is doing well with no medical therapy. In myasthenia gravis thymectomy can be of standard type (total thymectomy) or of extensive type (total thymectomy extended to cervical and anterior mediastinal fat). Sternotomy approach was the gold standard until the development of mini invasive surgery.

**Conclusions** Many medical reports have highlighted good results using videothoracoscopic approaches, as well as in adults than in children. We recommend to perform a right videothoracoscopy with left thoracoscopic control to localize the left phrenic nerve and to verify left thymic lobe resection. Indications of thymectomy in infantile myasthenia seem to be more frequent since the last years. Total thoracoscopic thymectomy, even of standard type, seems to have as good results as thymectomy performed by sternotomy in children. Risk of phrenic nerve damage should be kept in mind. Post-operative specific validated scales (De Filippi) allow to standardize the evaluation of postoperative results. Large pediatric studies are needed in order to evaluate the results of thoracoscopic thymectomies.

**Keywords** myasthenia gravis, children, thoracoscopy, thymectomy

### S IX.4: QUALITY OF LIFE AFTER THORACOSCOPIC SYMPATHECTOMY FOR PALMAR PRIMARY HYPERHIDROSIS

Sara Rolim\*<sup>1</sup>, Ruben Lamas-Pinheiro<sup>1</sup>, Catarina Barroso<sup>1</sup>, Angélica Osório<sup>1</sup> and Jorge Correia-Pinto<sup>1</sup>

E-mail: Ruben Lamas-Pinheiro — rubenlms@gmail.com

<sup>1</sup>Hospital de Braga, School of Medicine of University of Minho, Braga, Portugal

**Background** Palmar primary hyperhidrosis (PPH) is characterized by chronic excessive sweating without an identified cause and inflicts significant impact on quality of life. In this study we aim to evaluate the outcome of thoracoscopic sympathectomy by assessing the impact in the quality of life, the degree of patients' satisfaction and the presence of complications, namely compensatory hyperhidrosis (CH).

**Materials and methods** Patients submitted to thoracoscopic sympathectomy between 2013 and 2017 were included. Clinical charts were reviewed for demographic and clinical details. Patients' satisfaction and quality of life were evaluated by interview including a Quality of Life (QOL) questionnaire graded from 1 (best) to 100 (worst).

**Results** During the period of 4 years, 24 patients (17 females, 70.8%) were included and a total of 25 thoracoscopic bilateral T3-T4 sympathectomies were performed. All patients pre-

sented with bilateral palmar hyperhidrosis and the median age at surgery was 13 years (7-17). Except for one case of postoperative bradycardia and one case of transient hypotension, no other immediate complication was observed. Nineteen patients enrolled the interview and completed a multifunctional questionnaire on pre and postoperative QOL. The mean preoperative QOL score was 80.5/100, whereas postoperatively was 28.5/100. Only 2 (10.5%) patients had tried previous medical treatment (topical or oral medication). Nine patients (47.4%) reported compensatory sweating (mostly involving the dorsum or abdomen). All patients were satisfied with the operative results and no patient regretted having been operated on.

**Conclusions** Thoracoscopic bilateral T3-T4 sympathectomy is safe and effective for the treatment of palmar hyperhidrosis. Although near half of the patients developed CH, all patients were satisfied and a positive impact in the quality of life was observed.

**Keywords** palmar hyperhidrosis, thoracoscopic bilateral sympathectomy

### S IX.5: VIDEOTHORASCOPIC SYMPATHICOTOMY UNDER APNEIC OXYGENATION THROUGH ONE SINGLE PORT FOR PALMAR HYPERHIDROSIS IN CHILDREN

Hawkar Kak-Ahmed\*<sup>1</sup>, José A Uroz Tristán<sup>2,3</sup>, Vivian Vialat Soto<sup>3</sup>, Samira Becil Poyato<sup>3</sup>, Liana Ramírez Breña<sup>3</sup> and Luis Antonio García González<sup>3</sup>

E-mail: José A Uroz Tristán — joseurozt@yahoo.es

<sup>1</sup>Raparin Hospital, Erbil, Iraq; <sup>2</sup>Chaîne de L'Espoir, France; <sup>3</sup>Hospital Pediátrico Universitario de Centro Habana, Cuba

**Background** Primary palmar hyperhidrosis is a benign disease characterised by excessive sweating in the hands, which usually begins in childhood and can seriously affect the school and social life of those who suffer it.

We want to evaluate and describe our results with Thoracoscopic sympathectomy through one single port and using apnoeic oxygenation to get lungs collapse.

**Materials and methods** Cross-sectional and descriptive study of 77 children and adolescents aged 11 to 18 years, who were operated on between January 2011 and March 2017 in different developing countries hospitals.

The analysed variables were sex, age, complications, length of stay at hospital and level of satisfaction.

We used a 10 mm Wolff optic with working channel.

**Results** The disease was more frequent in females (68%). Immediate positive results were achieved in 74 patients; dryness and temperature increase in the hands was noticed just at the end of the procedure in each hemi-thorax. Neither postoperative pleural tube nor antibiotics were used. There were no complications. The hospital stay was less than 36 hours. Compensatory sweating was observed in 14 patients and the satisfaction index was 100%.

**Conclusions** This surgical technique has proven to be an effective therapeutic option to improve the quality of life of children and adolescents affected by primary palmar hyperhidrosis.

**Keywords** hyperhidrosis, thoracoscopic sympathectomy, quality of life

### S IX.6: RETROSPECTIVE ASSESSMENT OF OVER 100 PRIMARY PALMAR HIPERHIDROSIS (PPH) PATIENTS BELOW 14 YEARS OF AGE BY CLINICAL EXAMINATION AND HYPERHIDROSIS QUALITY OF LIFE INDEX QUESTIONNAIRE

Adam Mol\*<sup>1</sup>, Raimundo Beltra<sup>1</sup>, Oliver Muensterer<sup>2</sup> and Caridad Hernández Castelló<sup>3</sup>

E-mail: Adam Mol — adammol@web.de

<sup>1</sup>Coplejo Hospitalario Universitario Insular Materno-Infantil, Las Palmas de Gran Canaria, Spain; <sup>2</sup>University Medicine, Johannes Gutenberg University, Mainz, Germany; <sup>3</sup> Medico Adjunto de Cirugía Pediátrica en el Hospital Materno Infantil del Servicio Canario de Salud. Las Palmas de Gran Canaria, Spain

**Background** Excessive hand sweating (primary palmar hiperhidrosis) can develop into serious social and psychological burden, especially in children. The treatment of severe cases of PPH is very difficult and only a surgery offers a permanent solution.

**Materials and methods** We performed thoracoscopic sympathicotomy (TS) under general anaesthesia with conventional single-lumen intubation using low-pressure carbon dioxide insufflation.

We reviewed all medical charts of the children who had undergone thoracoscopic sympathicotomy (TS) in our center between April 2005 and January 2017. Over 100 of them were contacted for a detailed telephone questionnaire involving the validated Hyperhidrosis Quality of Life Index scale. Additionally, almost 80% of the participants underwent a detailed clinical examination.

**Results** We confirmed an over 90% satisfaction rate, high Quality of Life Index after the TS and very good acceptance of compensatory sweating.

**Conclusions** Considering very high satisfaction rate and our good results we regard the thoracoscopic sympathicotomy as the method of first choice for treatment of severe primary palmar hiperhidrosis in children; we came to the conclusion, and are deeply convinced, that there is no point in postponing the operation until adulthood, therefore we recommend performing TS as early as possible, as soon as the quality of life is compromised by hyperhidrosis.

**Keywords** primary palmar hiperhidrosis, thoracoscopy in children

### S IX.7: PLEUROPULMONAR BLASTOMA IN INFANT: A DIAGNOSE TO CONSIDER

Péter Etlinger\*<sup>1</sup>, Catarina Barroso<sup>1</sup>, Ruben Lamas Pinheiro<sup>1</sup>

and Jorge Correia-Pinto<sup>1</sup>

E-mail: Péter Etlinger — epetyo@gmail.com

<sup>1</sup>Hospital of Braga, Department of Pediatric Surgery/Life and Health Sciences Research Institute (ICVS), Braga, Portugal

**Background** The congenital pulmonary airway malformations are frequently diagnosed in the prenatal period, but their postnatal approach is controversial. The risk of infection and the malignant transformation are arguments in favor of early resection. Bilateral involvement, mediastinal deviation, complex morphology and the presence of symptoms or DICER1 gene mutation should raise the suspicion of pleuropulmonary blastoma (PPB). This diagnosis is less probable if prenatal diagnosis of cystic pulmonary lesion, evidence of systemic vascular anomaly or hyperinflated pulmonary areas exist.

**Materials and methods** 7-weeks-old infant without previous obstetrical event, was admitted because of respiratory distress which had presented as tachypnea and subcostal drawing. The absent respiratory sounds in the 2/3 of left superior hemithorax was observed with auscultation. The Computed Tomography of the thorax revealed a multilocular cystic lesion, which occupied the whole left superior lobe, except the lingula.

**Results** Thoracoscopic left upper lobectomy was performed, after disinflation of the cystic lesion and the specimen was removed through one of the ports. The baby was discharged on the 5th post-operative day asymptomatic with total pulmonary expansion. The histological exam revealed type I PPB. Currently is being followed in collaboration with the Pediatric Oncology Center and has been submitted to chemotherapy.

**Conclusions** The described clinical case proves the necessity of considering the diagnosis of PPB when we have a symptomatic infant specially if presenting a complex cystic pulmonary lesion.

**Keywords** pleuropulmonary blastoma, infant

### S IX.8: MEDIASTINAL CYSTIC LESIONS: A BI-CENTRIC EXPERIENCE

Dalia Gobbi<sup>\*1</sup>, Francesco Fascetti Leon<sup>2</sup>, Alba Ganarin<sup>2</sup>, Piergiorgio Gamba<sup>2</sup> and Paola Midrio<sup>1</sup>

E-mail: Dalia Gobbi — daliahg@yahoo.com

<sup>1</sup>Paediatric Surgery, Cà Foncello Regional Hospital, Treviso, Italy; <sup>2</sup>Paediatric Surgery- Women and Children's health Dept, University of Padua, Italy

**Background** Mediastinal cystic masses in paediatric patients are rarely encountered. They can be either congenital or infective or neoplastic lesions. Due to their rarity and location close to vital organs, thoracotomy has been the traditional approach, but videothoracoscopy (VATS) has been described. The experience of two centres is herein reported.

**Materials and methods** Case notes of patients undergoing VATS for mediastinal cystic masses in two centres between March 2001 and March 2017 were reviewed. Data were collected on diagnosis, surgical details, rate of conversions, complications, histology, and follow-up.

**Results** Fourteen cases were operated. Prenatal diagnosis was available in 6 cases and in the remaining 8 the diagnosis occurred at an average age of 97 months (range 17 m- 16 years). None required an emergent procedure. The median age at resection was 62 months (6 months-16 years). VATS was accomplished with a 5 mm scope and 2-4 operative ports. Single lung ventilation was adopted in 8 cases and in 2 an oesophagoscopy was required to help with dissection from the oesophageal wall. Conversions occurred in 5 cases (35,7%) for bronchial tear (1) and poor visualization of pericystic anatomical structures (4). Postoperatively, one patient experienced pericardial effusion due to residual intrapericardial lymphangiomas that required an open approach. Another patient underwent thoracotomy on the 12th p.o day for persistent pneumothorax from iatrogenic bronchopleural fistula. Pathology showed 5 bronchogenic cysts, 3 benign cysts, 2 cystic lymphangiomas, 1 each of coelomic cyst, mature teratoma, oesophageal duplication, and hybrid congenital mediastinal malformation. At a median follow-up of 64 months no relapse has been detected.

**Conclusions** Mediastinal cystic lesions are rare benign masses that, however, require to be resected. In experienced centres VATS with selective intubation is the preferred approach, independently from age of patients. The rate of conversion is still remarkable, mainly due to complexity and importance of vital mediastinal structures and consequences of previous infections.

**Keywords** mediastinal cystic lesion, children, thoracoscopy

### S IX.9: A UNIQUE CASE OF INORGANIC FOREIGN BODY ASPIRATION AS A CONTRIBUTORY CAUSE OF RECURRENT PNEUMOTHORAX IN BILATERAL BULLOUS LUNG

Mario Lima<sup>1</sup>, Tommaso Gargano<sup>1</sup>, Michela Maffi<sup>1</sup>, Ugolini Sara<sup>\*1</sup> and Niel Di Salvo<sup>1</sup>

E-mail: Mario Lima — mario.lima@unibo.it

<sup>1</sup>Sant'Orsola Hospital/University of Bologna, Bologna, Italy

**Background** Paediatric Foreign Body Aspiration (FBA) can be related to a high morbidity and mortality rate, especially in young children. Most common clinical presentations are cough and respiratory infections in the following months (of unnoticed aspiration events); Moreover, severe consequences such as pneumothorax or pneumomediastinum can be associated issues, though extremely rare. Unlike for adults, there is no specific paediatric guideline for treatment of pneumothorax. Most frequently applied surgical treatment of Primary Spontaneous Pneumothorax (PSP), following adult data and surgeon's personal experience, after failing of the first conservative attempt, is bullectomy performed by Video-Assisted Thoracoscopic Surgery (VATS), usually followed by pleurodesis to prevent the recurrence.

**Materials and methods** We describe a case of a 13-year-old girl with a recurrent right-sided pneumothorax in bilateral bullous lung, previously treated twice at Our Institution by robot-

assisted bullectomy and showing once more same signs and symptoms. At conventional thoracoscopy stapling procedure a foreign body (fishing line) was found to be located pointing upwards to the apex.

**Results** At CT scan bullous pulmonary dysplasia was found bilaterally and, after a first conservative attempt, the patient was considered candidate for a robotic-assisted resection of bullae and blebs of the right apex. After an uncomplicated early postoperative course and a stable X-ray at one-month postoperative control, the girl presented again with a massive right-sided recurrent pneumothorax. After analogous treatment protocol and comparable postoperative course, the patient experienced a new episode, that was treated by conventional thoracoscopy approach with the intraoperative finding of an inorganic foreign body (fishing line) was found to be located pointing upwards to the apex.

**Conclusions** Thoracic foreign bodies had been classified into: aspirated, traumatic/accidental or iatrogenic, which nowadays are reduced to extremely rare events; Aspirated ones are the most frequent and clinical consequences reflect sizes, location, and chronicity. In our case, an inorganic fishing line was found at thoracoscopy pointing upwards to the apex of the lung that the patient attributed to an unnoticed aspiration when playing bracelets years before. No surgical sutures had been utilized in the previous done robotic stapling procedures. We acknowledge the foreign body as the contributory cause of persisting of the clinical picture, despite the surgical removal of the pathological parenchyma. Thoracoscopy proved to be very useful procedure in recognizing the inorganic line that was missed at CT.

**Keywords** bullous pulmonary dysplasia, robot-assisted thoracoscopy, foreign body aspiration

#### S IX.10: MINIMALLY INVASIVE TREATMENT FOR SPONTANEOUS PNEUMOTHORAX IN ADOLESCENT

Melih Akin<sup>\*1,2</sup>, Mesut Demir<sup>1,2</sup>, Meltem Kaba<sup>1,2</sup>, Seyma Filiz<sup>\*1,2</sup>, Canan Tanik<sup>1,3</sup>, Çetin Ali Karadağ<sup>1,2</sup>, Nihat Sever<sup>1,2</sup>, Abdullah Yıldız<sup>1,2</sup> and Ali Ihsan Dokucu<sup>1,2</sup>

E-mail: Melih Akin — mlhakin@gmail.com

<sup>1</sup>SBÜ Şişli Hamidiye Etfal Training and Research Hospital; <sup>2</sup>Pediatric Surgery Department, İstanbul, Turkey; <sup>3</sup>Pathology Department, İstanbul, Turkey

**Background** The main reasons of spontaneous pneumothorax are apical segment bullae formation and blebs. Video-Assisted Thoracoscopic surgery (VATS) is especially advantageous to reach apical segments and for easy resections. We retrospectively evaluated the patients with spontaneous pneumothorax who were treated with thoracoscopic resection.

**Materials and methods** We retrospectively collected the data of patients with spontaneous pneumothorax who were operated with VATS between 2010 and 2017.

**Results** Nine patients (7 male, 2 female) were operated with VATS in our hospital with spontaneous pneumothorax. Median

average age was 16.4 (14–17) years. Computed tomography of lungs presented bleb formation at apical area was the most common findings. All of the patients continuing air leakage on tube thoracostomy were operated with VATS and stapler was used for resection. Apical lobe resection due to the presence of bullae formation was the more common aetiology. Average tube thoracostomy time was 3.3 (3–5) days postoperatively. Bleb (most common), Congenital Cystic Adenomatoid Malformation (CCAM) type 2, chronic emphysematous tissue and granulomatosis due to histiocytosis were diagnosed on pathological analyses. Post operative follow up time was 2 (0.5–5) years without any complication.

**Conclusions** Blebs, CCAM, granulomatosis and emphysematous lung tissue can cause spontaneous pneumothorax. Thoracoscopic resection should be the first choice as it is an minimal invasive surgery with the advantage to reach lesions even in apical tissues.

**Keywords** spontaneous pneumothorax, video-assisted thoracoscopic surgery, bullae formation

#### S IX.11: THORACOSCOPIC LOBECTOMY AND SEGMENTECTOMY OF THORAX PATHOLOGIES IN CHILDREN

Ufuk Ates<sup>1</sup>, Nil Yasam Tastekin<sup>1</sup>, Gulnur Gollu<sup>1</sup>, Orkan Ergun<sup>1</sup>, Kutay Bahadır<sup>\*1</sup>, Meltem Bingol-Kologlu<sup>1</sup>, Tanju Aktug<sup>1</sup>, Huseyin Dindar<sup>1</sup> and Aydin Yagmurlu<sup>1</sup>

E-mail: Ufuk Ates — drufukates@gmail.com

<sup>1</sup>Ankara University Faculty of Medicine, Department of Pediatric Surgery, Ankara, Turkey

**Background** Minimal invasive surgery became the first choice of many surgical procedure nowadays. Development of new devices and methods reduced hospital stays and eased postoperative period for patients. Some congenital and acquired diseases may require lobectomy or segmentectomy in children such as Congenital Cystic Adenomatoid Malformation (CCAM), Pulmonary Sequestration, Bronchogenic Cysts, Bullous Lung Pathologies and hydatid cyst. In this study, it is aimed to present our thoracoscopic lobectomy and segmentectomy experience of nine years.

**Materials and methods** Charts of 26 patients were retrospectively reviewed.

**Results** There were 13 boys and 13 girls. The ages of the patients were between 14 days and 17 years (median=12 months). Thoracoscopic or thoracoscopic assisted procedure was completed in 23 of the patients. In four patients conversion to thoracotomy was required; because of bleeding and inadequate exposure respectively. In children undergoing thoracoscopic surgery, blood transfusion was not required during or after the operation. Lobectomy was performed in 19 children and segmentectomy was performed in seven children. The operation time was between 45 and 210 minutes (mean: 107 mins). Chest tube was placed all of the patients and removed on between postoperative 2-10 days (median=4 days) and the ave-

rage discharge time was 5.7 days (3-12 days). No mechanical ventilation was required after surgery in any patient. Pathologic examination revealed CCAM in 13 patients, pulmonary sequestration in five patients, bullous lesions in two patients, hydatid cystic lesion in two patients, Ewing's sarcoma in two patients, bronchogenic cyst in one patient and Wilms tumor metastasis in one patient. No bronchopleural air leak requiring intervention was seen in any patient.

**Conclusions** Thoracoscopic procedures is technically feasible and safe in infants and children. The magnification provided by a thoracoscopic approach makes identification of segmental anatomic planes easier, aiding in safe dissection and resection. Anatomic resection appears to be associated with a low morbidity.

**Keywords** thoracoscopy, lobectomy, segmentectomy, children

### S IX.12: THORACOSCOPIC PULMONARY LOBECTOMY IN INFANTS YOUNGER THAN 3 MONTHS OLD

Catarina Barroso\*<sup>1</sup>, Ruben Lamas-Pinheiro<sup>1</sup>, José Luís Carvalho<sup>2</sup>, Angélica Osório<sup>2</sup>, Helena Salgado<sup>3</sup>, Marta Gonçalves<sup>3</sup>, Maria João Santos<sup>3</sup> and Jorge Correia-Pinto<sup>1</sup>  
E-mail: Catarina Barroso — catabarroso@gmail.com

<sup>1</sup>Life and Health Sciences Research Institute, School of Medicine, University of Minho; ICVS/3B's – PT; Government Associate Laboratory; Department of Pediatric Surgery, Hospital de Braga, Portugal; <sup>2</sup>Department of Pediatric Surgery, Hospital de Braga, Portugal; <sup>3</sup>Department of Anaesthesiology, Hospital de Braga, Portugal

**Background** Thoracoscopic lobectomy for congenital cystic lung lesions is generally accepted, namely in asymptomatic children older than 6 months old. The safety and efficacy of resections in younger symptomatic children have been questioned, due to the smaller size, tissue fragility and technical demands of unilateral lung ventilation.

**Materials and methods** In the last 2 years, 3 children younger than 3 months old underwent thoracoscopic left upper lobectomy at our department. All presented with respiratory distress. Two had congenital lobar emphysema and one had megacystic congenital pulmonary airway disease and post-operative histologic diagnosis of pleuropulmonary blastoma. All infants were operated under unilateral lung ventilation that was monitored by thoracic ultrasound (Sliding lung sign | Marching-ants appearance).

**Results** We completed 3 thoracoscopic left upper lobectomies. Patient age at operation ranged from 17 days to 3 months and weight from 3.1 to 6 kg. Operative time ranged from 145 to 195 minutes. There were no intraoperative or post-operative complications. All of them were orally fed on the first 24h of the procedure. Hospital length of stay ranged from 3 to 5 days.

**Conclusions** Thoracoscopic pulmonary lobectomy is safe and feasible even in symptomatic infants younger than 3 months

old with congenital lobar emphysema and megacystic pulmonary airway disease.

**Keywords** congenital lobar emphysema, megacystic pulmonary airway disease, thoracoscopic lobectomy, infants younger than 3 months

### S IX.13: THORACOSCOPIC TREATMENT OF COMPLICATED CONGENITAL ESOPHAGEAL STENOSIS: VIDEO PRESENTATION

Zafer Dokumcu\*<sup>1</sup>, Emre Divarci<sup>1</sup>, Ata Erdener<sup>1</sup> and Coskun Ozcan<sup>1</sup>

E-mail: Zafer Dokumcu — zdokumcu@gmail.com

<sup>1</sup>Ege University Faculty of Medicine Department of Pediatric Surgery, Izmir, Turkey

**Background** Congenital esophageal stenosis (CES) is very rare. Its differential diagnosis and treatment may be challenging. We present a complicated case of CES who was treated with thoracoscopic approach.

**Materials and methods** Medical records of a case with complicated congenital esophageal stenosis was reviewed.

**Results** Thoracoscopic approach may be performed successfully even in complicated cases of CES.

**Conclusions** A 5 year old girl with complaints of difficulty in swallowing solid food and growth retardation was admitted to another hospital where esophageal dilatation was performed with diagnosis of distal esophageal stenosis. She was hospitalized for 2 months with diagnosis of empyema secondary to esophageal perforation. She could only be fed via a nasogastric tube (NGT) and drooling was evident. Esophagoscopy confirmed the diagnosis and NGT was replaced following rigid dilatation. After 3 weeks, barium swallow esophagography revealed complete occlusion around NGT which could not be pulled out due to esophageal adhesion. Resection and anastomosis was performed with thoracoscopic approach. Postoperative course was eventless and she began to feed orally on 7th day. Endoscopic, fluoroscopic and pHmetric controls revealed no gastroesophageal reflux and recurrence. No additional intervention was necessary within 9 months of follow-up.

**Keywords** congenital esophageal stenosis, thoracoscopy, child

### S IX.14: THORACOSCOPY IN CHILDREN IN THE DEPARTMENT OF PEDIATRIC SURGERY, TRAUMATOLOGY AND UROLOGY IN POZNAŃ

Przemysław Mańkowski<sup>1</sup>, Sebastian Moryciński<sup>1</sup>, Patrycja Sosnowska\*<sup>1</sup>, Olgierd Pietkiewicz<sup>1</sup>, Przemysław Lebioda<sup>1</sup>, Marcin Kapek<sup>1</sup> and Karolina Pańczak<sup>1</sup>

E-mail: Patrycja Sosnowska — patrycja.sosnowska@outlook.com

<sup>1</sup>Department of Pediatric Surgery, Traumatology and Urology, University of Medical Sciences Poznan, Poland

**Background** Thoracoscopy is one of the surgical techniques used for both diagnostic and therapeutic purposes. The aim of

the study is to analyze purposes, complications and outcomes of thoracoscopic procedures in pediatric patients.

**Materials and methods** The retrospective analysis was based on clinical documentation of 88 patients treated in the Department of Pediatric Surgery, Traumatology and Urology in Poznan, who underwent thoracoscopic surgery in years 2000–2016. The following parameters were analyzed: the aim of the thoracoscopy, age of patient during surgery, time of hospitalization, time of treatment, frequency and time of maintenance of pre- and postoperative drainage, preoperative and postoperative diagnostics, postoperative complications, antibiotic therapy and laboratory and bacteriological test results.

**Results** The average age of patients who underwent thoracoscopy was 10 years. Girls accounted 52.6%, and boys 47.4% of patients. The most common indications for surgery were mediastinal tumor removal (15 patients), mediastinal tumor biopsy (15 cases), metastasis in lungs removal (10) and lymph nodes biopsy (9 patients). The average hospitalization time was 7 days, the longest in the group of patients treated for emphysema and mediastinal tumors. The most commonly performed diagnostic imaging was chest radiograph in both pre and postoperative period. Computed tomography was the second choice diagnostic exam. It was preoperatively performed in 38.9% of children. Mean time of surgery was 82 minutes; the longest in case of mediastinal cyst surgery (215 min) and the shortest due to pleural (25 min). Complications occurred in 4 patients, representing 5% of the study group. Observed complications were pneumothorax, which occurred in 3 patients and death of one during the procedure. Drains were inserted into the pleural cavity during 75.3 of surgeries. 85.5% patients had 1 drain and the rest 2 drains. The average drainage time was 7 days. 57.8% of patients had postoperative antibiotic therapy.

**Conclusions** The analysis demonstrated the common use of thoracoscopy, mainly in treatment of oncological diseases. It is an effective and safe method used both in diagnosis and therapy. Radiograph is the main diagnostic imaging used. The decision to use a catheter drain is related to the patient's clinical condition and depends on many factors.

**Keywords** child, oncology, pediatric surgery, thoracoscopy

### S IX.15: CHALLENGING COMPLICATIONS IN NUSS PROCEDURE

Barbora Frybova\*<sup>1</sup>, Jiri Snajdauf<sup>1</sup>, Martin Vyhnanek<sup>1</sup>, Ondrej Petru<sup>1</sup>, Vladimir Mixa<sup>2</sup>, Martin Kyncl<sup>3</sup> and Michal Rygl<sup>1</sup>  
E-mail: Barbora Frybova — barborafrybova@gmail.com

<sup>1</sup>Department of Paediatric Surgery, Charles University in Prague, 2nd Faculty of Medicine, Motol University Hospital, Prague, Czech Republic; <sup>2</sup>Department of Anaesthesiology and Intensive Care Medicine, Charles University in Prague, 2nd Faculty of Medicine, Motol University Hospital, Prague, Czech Republic; <sup>3</sup>Department of Radiology, Charles University in Prague, 2nd Faculty of Medicine, Motol University Hospital, Prague, Czech Republic

**Background** Minimally invasive repair of pectus excavatum (MIRPE, Nuss procedure) has become the method of choice in

funnel chest correction for paediatric and young adult patients. The aim of this study is to present challenging complications - i.e., complications requiring extensive and/or re-do surgery following Nuss procedure and Nuss bar removal and evaluate them.

**Materials and methods** A retrospective study of major complications following Nuss procedure was performed in patients treated between 2004-2016. Minor complications such as pneumothorax after bar insertion, fluidothorax and wound complications were not included in the study.

**Results** The majority of our patients with pectus excavatum underwent successful repair with MIRPE. Although Nuss procedure and subsequent bar removal 3 years after MIRPE is generally believed to be safe, serious perioperative complications can occur.

**Conclusions** During the study period MIRPE was performed on 386 patients. The incidence of major complications was 1.2%. The most serious complication was cardiac perforation when inserting the Lorenz introducer. The patient required urgent sternotomy with right atrial repair, recovering well. The second case of life threatening bleeding which required an urgent thoracotomy occurred at the time of bar removal. One patient required a thoracoscopy and blood transfusion for a significant hemothorax 3 months after Nuss procedure. Another patient presented with spontaneous pneumothorax at the time of bar removal and he underwent thoracoscopic apical lung resection simultaneously. One patient required bar removal and the use of VAC system for the healing of wound defects following serious bacterial infection with pyothorax. There were no deaths in the study group.

**Keywords** MIRPE, Nuss procedure, bar removal, complications

## Session X, Innovations and Robotics II

### S X.1: CONVERSION RATE IN PAEDIATRIC ROBOTIC ASSISTED LAPAROSCOPIC SURGERY

Donatella Di Fabrizio\*<sup>1</sup>, Naved Alizai<sup>1</sup>, Thomas Cundy<sup>1</sup> and Azad Najmaldin<sup>1</sup>

E-mail: Donatella Di Fabrizio — dona.difabrizio@gmail.com

<sup>1</sup>Leeds Teaching Hospitals Nhs Trust, Leeds, United Kingdom

**Background** Robotic assisted surgery is becoming increasingly popular in adults. However, its application in children is still limited. We adopted this approach in 2006, and report our overall conversion rate.

**Materials and methods** All children undergoing robotic assisted surgery under two surgeons were included. Three arms of the Da Vinci system and an open technique insertion of the primary port were used in all procedures. An additional laparoscopy port and/or percutaneous retractor were used when necessary. Theatre set up, anaesthetists, assistants and scrub-

bed nurses changed frequently during the study period. Data collected prospectively.

**Results** There were 26 different types of procedures in 524 children. Some patients had concomitant robotic or non-robotic procedures and 12.6% had scarring from previous surgery. The procedures were urological 58.4% and gastrointestinal 41.6%. The median age was 7.3 years (4 weeks to 17 years, 7% less than 12 months). Twenty nine patients (5.5%) were converted to an open procedure 27 and laparoscopic 2. The reasons for conversion were: inability to start or complete the procedure in 17 (3.1%) - obesity, extensive previous scarring, inflamed giant choledochal cyst, inadequate operating space, fogging and inexperienced staff; inadequate abdominal wall muscle relaxation and/or distended loops of intestine 5 (1%); lack of instruments 4 (0.8%) and faulty robot 3 (0.6%) - camera, light source and working arm. There were no robot related complications in this series. There was no significant correlation between the rate of conversion and the learning curve, age or operator. However, the conversion rate was higher in the re-implantation of ureters and choledochal cyst groups of patients. The overall hospital complication rate was 2.7%.

**Conclusions** In this series, age and types of procedures ranged widely. Even within the learning curve period, the conversion rate of robotic surgery is comparable to that of laparoscopy.

**Keywords** robotic surgery

### S X.2: ROBOTIC REMOVAL OF MÜLLERIAN DUCT REMNANTS: CASE SERIES AND REVIEW OF LITERATURE

Mario Lima<sup>1</sup>, Tommaso Gargano\*<sup>1</sup>, Michela Maffi<sup>1</sup>, Niel Di Salvo<sup>1</sup> and Hubert Lardy<sup>2</sup>

E-mail: Mario Lima — mario.lima@unibo.it

<sup>1</sup>Pediatric Surgery S.Orsola Hospital, University of Bologna, Bologna, Italy;

<sup>2</sup>Pediatric Surgery Centre Hospitalier Universitaire de Tours, Tours, Italy

**Background** Persistent Müllerian Duct Syndrome (PMDS) is a disorder of sexual development which features a failure of involution of Müllerian structures including a uterus, a cervix, fallopian tubes and the upper two thirds of vagina. An enlarged prostatic utricle (EPU) is a kind of Müllerian Duct Remnant (MDR) with a tubular shaped structure communicating with the prostatic urethra. Treatment is aimed at relieving symptoms when present, preserve fertility and prevent neoplastic degeneration. Several open surgical approaches and endoscopic techniques have been used, but laparoscopy has become the gold standard treatment in the last two decades.

**Materials and methods** We describe three cases of successful robot assisted-removal of symptomatic MDRs. The first case came to our attention for pseudoincontinence; the other two for recurrent urinary tract infections. The patients have not presented such symptoms anymore on follow-up. We then reviewed existent literature on authors who have recently investi-

gated the main issues concerning MDRs and have attempted a robotic-assisted approach on them.

**Results** Robot-assisted laparoscopy can be considered a valid, safe and effective minimally invasive technique for the primary treatment of prostatic utricle.

**Conclusions** Robot-assisted laparoscopy, by improving anatomic of the retrovesical structures and surgical precision when performing a challenging dissection within the deep pelvis, can be considered a valid, safe and effective minimally invasive technique for the primary treatment of prostatic utricle.

**Keywords** Müllerian Duct Remnants, robotic surgery, enlarged prostatic utricle

### S X.3: ROBOTIC PYELOPLASTY IN CHILDREN: CRITICAL ANALYSIS OF 10 YEARS EXPERIENCE WITH A SPECIAL FOCUS ON LEARNING CURVE

Quentin Ballouhey\*<sup>1</sup>, Hubert Lardy<sup>2</sup>, Romain Pelette<sup>1</sup>, Karim Braïk<sup>2</sup>, Céline Grosos<sup>1</sup>, Bernard Longis<sup>1</sup>, Laurent Fourcade<sup>1</sup> and Aurélien Binet<sup>2</sup>

E-mail: Quentin Ballouhey — q.ballouhey@gmail.com

<sup>1</sup>CHU Limoges, France; <sup>2</sup>CHU Tours, France

**Background** The use of robotics in children is gaining acceptance and particularly for the treatment of pyeloureteral junction obstruction. The aim of this study was to critically analyse the 10-years experience of two paediatric surgical teaching centres for Robotic Assisted Laparoscopic Pyeloplasty (RALP) with a special focus on the institutional and individual learning processes.

**Materials and methods** A retrospective multicentric study was conducted to review the data of patients who underwent RALP between 2007 and 2016. Total operative time, hospital stay, intra- and postoperative morbidity were analysed. The learning curves were calculated with the operative time and complication rate respectively for each surgeon and for each centre.

**Results** The data of 125 patients were analysed. Median age was 6.6 years (0.6–17.9) and median operative time was 184 min (120–390). Three conversions were performed in 3 toddlers. Median hospital stay was 3.9 days (2–17). Total complication rate was 13.6%, two redo RALP were performed after a mean 24 (2–84) months of follow-up.

The same tendency was observed in both centres with an increased complications rate at the beginning of the implementation (more than 50% in the first 3 years). Most complications concerned urinary drainage devices and children below 15 kg (41% of the whole complications). Concerning individual learning process, operative time was < 200 min after 15 procedures for the pioneers of the robotic program and before 10 procedures for younger surgeons with comparable complications rate.

**Conclusions** These results suggest the morbidity related to RALP is more influenced by the experience of the centre than by the expertise of the surgeon. The RALP personal learning cu-

rive is faster in comparison to standard laparoscopy, resulting in an increased technical accessibility.

**Keywords** robotic, pyeloplasty, learning process, laparoscopy

#### S X.4: ROBOTIC APPROACH TO URETEROPELVIC JUNCTION OBSTRUCTION IN A BIFID PELVIS: OPERATIVE DETAILS

Mario Lima<sup>1</sup>, Michela Maffi\*<sup>1</sup>, Tommaso Gargano<sup>1</sup> and Niel Di Salvo<sup>1</sup>

E-mail: Mario Lima — mario.lima@unibo.it

<sup>1</sup>Sant'Orsola Hospital/University of Bologna

**Background** Duplications of the urinary collecting system are the most common anomalies of the upper urinary tract. They can be complete or incomplete and associated to other anomalies such as vesicoureteral reflux, ureterocele and ectopic ureter. Pelviureter junction (PUJ) is the most common site of obstruction in the urinary tract. Although duplications and PUJO are common, the simultaneous presence of both anomalies is rarely encountered. In incomplete duplicated systems, PUJO usually affects the lower moiety.

**Materials and methods** We report the case of a 5 year-old boy with left bifid renal pelvis and treated by robot-assisted pyeloureterostomy.

**Results** MIS has become increasingly popular in pediatric urology even if the evolution from extirpative procedures to reconstructive ones has been slower because of skills needed in intracorporeal anastomosis. Robotic technology allowed to overcome these limits and shorten the learning curve. These potential advantages are attributed to wristed instrumentation with 7 degree of freedom, a better ergonomics of the surgeon and 3D visualization.

In our case robotic technology allowed a perfect visualization of the anatomy and easily taper the surgical technique to condition of the patient obtaining effective treatment.

**Conclusions** Reconstructive options in incomplete duplicated urinary system can be different because of the wide anatomic variants. Individualized treatment on the basis of pre- and intra-operative findings is mandatory to obtain effective treatment. Robot-assisted pyeloureteroanastomosis is a feasible option in case of bifid renal pelvis with preserved function of both upper and lower moieties.

**Keywords** pyeloureterostomy, bifid renal pelvis, robot-assisted surgery

#### S X.5: ROBOTIC-ASSISTED SURGERY FOR RESECTION OF GASTRIC DUPLICATION CYSTS IN A CHILD (GDCS): A CASE REPORT

Gabriele Lisi\*<sup>1</sup>, Riccardo Rizzo<sup>1</sup>, Nino Marino<sup>1</sup> and Pierluigi Lelli Chiesa<sup>1</sup>

E-mail: Gabriele Lisi — gabriele.lisi@unich.it

<sup>1</sup>Pediatric Surgery Department, University G. d'Annunzio, Chieti-Pescara

**Background** Duplications of the alimentary tract are rare con-

genital anomaly. Gastric duplication cysts (GDCs) represent 4% of all alimentary tract duplications, and they usually become symptomatic before 2 years of age. Early diagnosis and surgical excision in the neonatal / infantile period is usually advocated to avoid potential morbidity and neoplastic degeneration. In pediatric literature there are few reports about laparoscopic resection of GDC but, to the best of our knowledge, robotic-assisted surgery for this condition has never been reported.

**Materials and methods** We report a case of a male patient with post-natal incidental ultra-sonographic diagnosis of two gastric cystic masses (maximal diameter 25 mm and 8 mm, respectively), increasing in size during follow-up. The patient didn't show any gastrointestinal or respiratory symptoms during his growth. At 20 months of age, MRI confirmed the presence of 2 round gastric masses (44x35 mm and 16x12 mm). Two months later (patient's weight 11.5 kg), elective robotic-assisted excision of the cysts combined with suture of muscular layers was completed without complications (da Vinci System XI, console time 115').

**Results** The patient was discharged 6 days after intervention, feeding normally. Hystologic findings confirmed two entirely excised gastric duplication cysts with gastric and respiratory epithelium. After 1-year, clinical and ultra-sonographic follow up didn't evidence any problem.

**Conclusions** In our single experience, we showed that robotic-assisted cystectomy without mucosal perforation is safe, effective and feasible for resection of gastric duplication cysts in children, adding to standard laparoscopic surgery smooth, consistent and precise movements of articulated surgical instruments, with ergonomic comfort and better 3-D visualization for the surgeon.

These results are achieved without difference versus laparoscopy in terms of operative time, complications or length of hospitalization.

This is the first reported case of robotic-assisted cystectomy for CGD in a child.

**Keywords** intestinal duplications, robot-assisted surgery, children

#### S X.6: ROBOTIC-ASSISTED ONCOLOGIC SURGERY IN CHILDHOOD AND ADOLESCENCE: SHOULD WE DO IT?

Gabriele Lisi\*<sup>1</sup>, Nino Marino<sup>1</sup>, Vittorio Guerriero<sup>1</sup>, Giuseppe Lauriti<sup>1</sup> and Pierluigi Lelli Chiesa<sup>1</sup>

E-mail: Gabriele Lisi — gabriele.lisi@unich.it

<sup>1</sup>Pediatric Surgery Unit, Department of Aging Science, University „G. d'Annunzio” of Chieti-Pescara, Italy

**Background** Minimally invasive surgery (MIS) has gained popularity in the diagnostic and staging phases of solid tumors in children, but its therapeutic role remain controversial for the lack of confidence regarding respect of safe oncological principles with this more demanding approach in limited spaces. Robotic-assisted surgery, with its technical and ergonomic ad-

vantages for the surgeon, could represent a valid solution to the limitations of therapeutic standard MIS in oncologic surgery, but very limited data are available in the literature. We present our single Centre experience.

**Materials and methods** We started our pediatric robotic surgical program from June 2015, in the setting of a general hospital. During this period, overall 21 robotic-assisted procedures were performed in 12 female and 9 male patients, mainly gastro-esophageal procedures (9 cases: 6 GERD, 1 achalasia, 1 double gastric duplication cyst, 1 hiatal hernia) and urological procedures (6 cases: 4 hydronephrosis, 1 dysplastic kidney, 1 caliceal cyst). Our robotic program was applied by a team without previous experience in MIS approach to the above mentioned conditions. We evaluated retrospectively oncologic cases performed within this program.

**Results** In the examined period, 4 out of 21 (19%) robotic-assisted procedures were performed successfully for oncologic conditions, without intraoperative complications (table). All patients were female (age range 10–14 yrs, weight range 38–58 kg). Treated conditions were a 25-mm left ovarian dermoid cyst (console time 180', enucleated with minimal spillage), a 35-

mm Frantz's tumor of the pancreatic body (enucleated without complication with a console time of 240'), a left 40x32 mm pheocromocytoma (adrenalectomy, console time 210') and a left 32x27x33 mm para-surrenalic ganglioneuroma, completely removed with adrenal preservation (console time 230'). Length of hospital stay varied from 3 to 10 p.o. days. In the follow up (range 4–15 months), no recurrence was evidenced

**Conclusions** Our initial and limited experience suggests that robotic-assisted procedures are safe, feasible and respectful of surgical oncologic principles in childhood, at least for benign or locally aggressive conditions in older children or adolescents. Given the ergonomic advantages for the surgeon that enhance its operative abilities, robotic-assisted surgery could „democratize“ demanding MIS procedures also for oncologic conditions, making it accessible with a shortened learning curve also to surgeons with limited MIS experience. However, larger and high-quality studies are needed prior to define robotic-assisted approach as the gold standard in this setting, but difficult to perform for conditions relatively rare in childhood.

**Keywords** robotic surgery, minimally invasive surgery, solid tumor, childhood, adolescence

Patient # Sex	Age (weight)	Diagnosis	Tumor size [mm]	Robotic-assisted procedure	Console time [min]	Complications	LOS (days)	Follow up
1 F	13 yrs 40 kg	L ovarian dermoid cyst	25	Enucleation	180	Minimal spillage	3	15 mo
2 F	12 yrs 38 kg	Frantz' tumor (pancreatic body)	35	Enucleation	240	Null	10	7 mo
3 F	14 yrs 38 kg	L pheocromocytoma	40x32	Adrenalectomy	210	Null	5	6 mo
4 F	10 yrs 42 kg	L Para-surrenalic ganglioneuroma	32x27x33	Complete removal (adrenal preservation)	230	Null	5	4 mo

**S X.7: ROBOTIC SURGERY; VERY COSTLY!**

Donatella Di Fabrizio\*<sup>1</sup> and Naved Alizai<sup>1</sup>  
E-mail: Donatella Di Fabrizio — dona.difabrizio@gmail.com

<sup>1</sup>Leeds Teaching Hospitals Nhs Trust, Leeds, United Kingdom

**Background** Robotic surgery can facilitate complicated Minimal Access Surgical (MAS) procedures and in some cases can make a procedure possible through MAS which may not be easily feasible laparoscopically. The biggest argument against robotic surgery is the cost. The aim of this study was to calculate the cost of Robotic Surgery and compare it to laparoscopic surgery for the same procedure.

**Materials and methods** We performed prospective data collection for five robotic procedures, namely Choledochal Cyst excision and Hepatico-Jejunostomy, Cholecystectomy, Splenectomy, Nissen's Fundoplication and Combined Cholecystectomy & Splenectomy. Cost of all instruments used to perform robotic procedures was calculated using the da vinci Si Instrument & Accessory Catalog – May 2015. Cost of laparoscopic instruments was also calculated for reusable and disposable options. The instruments and devices which were common for Robotic and Laparoscopic procedures were removed from cost calcu-

lations. The capital cost of robot and laparoscopic instruments will be discussed in the paper.

**Results**

Procedure	Robotic	Laparoscopic	
		Disposable	Reusable
Choledochal Cyst	898.43€	524.6€	25€
Cholecystectomy	657.43€	377.8€	25€
Splenectomy	657.43€	773.02€	25€
Cholecystectomy + Splenectomy	657.43€	773.02€	25€
Nissen's Fundoplication	896.43€	575.8€	25€

**Conclusions** Disregarding the capital cost of the robot and laparoscopic instruments, as they can be purchased through charity funds (they were in our department), the actual cost of the robotic procedure is reasonable and not excessive. The other advantages of Robotic surgery, which were not the aim of this study, outweighs robotic surgery over conventional techniques with a big margin.

**Keywords** robot, robotic surgery, robotic surgery cost, minimal access surgery cost, laparoscopy surgery cost

**S X.8: COMPARISON OF SKILL ACQUISITIONS FOR ROBOTIC AND LAPAROSCOPIC WITH THE PLS**

Quentin Ballouhey<sup>\*1</sup>, Céline Grosos<sup>1</sup>, Paul Ilhero<sup>1</sup>, Romain Pelette<sup>1</sup>, Jérôme Cros<sup>1</sup>, Bernard Longis<sup>1</sup>, François Caire<sup>1</sup> and Laurent Fourcade<sup>1</sup>

E-mail: Quentin Ballouhey — q.ballouhey@gmail.com

<sup>1</sup>CHU Limoges, France

**Background** Laparoscopic training box is widely used to augment operative skills in minimally invasive surgery. The widespread use of the robotic platform will probably modify the current way of learning for surgeons, including paediatric surgeons. The PLS has been validated for this particular cursus. Our aim was to compare the skill acquisition in limited workspace between robotic (RS) and laparoscopic surgery (LS) among naïve learners.

**Materials and methods** A total of 12 subjects without laparoscopic or robotic experience were randomized to perform a crossover study. Two of the specific tasks of the FLS (transfer plot (TP) and thread the rings (TR)) were both repeated 5 times by each subject alternatively with RS and LS. The learning curve was calculated with the time to perform each trial and data analysis was performed using student test.

**Results** The tasks were achieved faster with the RS than with CT ( $p < 0.001$ ), respectively 63 vs. 264 seconds and 36 vs. 222 seconds for TP and TR. Percentage improvement with increasing trials was similar for RS and LS: final improvement averaged 36% and 50% (TP and TR, respectively) for RS and 37% and 57% for LS ( $p$  non significant). Within the TP task, RS times averaged 59 seconds without previous LS experience vs. 67 seconds with previous LS experience ( $p=0.9$ ); LS times averaged 214 seconds with previous RS experience and 315 seconds without previous experience ( $p < 0.01$ ). Comparable times for the TR task were 31 seconds vs. 39 seconds ( $p < 0.05$ ) and 202 seconds vs. 237 seconds ( $p=0.2$ ).

**Conclusions** As in large workspaces, speeds were faster overall with RS in the PLS. The percentage of speed improvement with trial was similar suggesting comparable learning curves for RS and LS. Paradoxical negative transfer effect from LS to RS was observed for both tasks.

**Keywords** laparoscopy training, robotic, medical education, paediatric

### S X.9: ROBOT-ASSISTED HELLER'S MYOTOMY IN CHILDREN: A SAFE ALTERNATIVE TO LAPAROSCOPY

Maria Enrica Miscia<sup>1</sup>, Gabriele Lisi<sup>\*1</sup>, Nino Marino<sup>2</sup>, Maria Teresa Illiceto<sup>3</sup> and Pierluigi Lelli Chiesa<sup>1</sup>

E-mail: Gabriele Lisi — gabriele.lisi@unich.it

<sup>1</sup>Pediatric Surgery Unit, Department of Aging Science, University, Chieti Scalo, Italy; <sup>2</sup>Pediatric Surgery Unit, Pescara, Italy; <sup>3</sup>Pediatric Gastroenterology and Endoscopy Unit, Pescara, Italy

**Background** Achalasia is a rare esophageal disorder that affects mainly young adults (1-6:100000) without gender prevalence. It is rarer in children, with a prevalence of 0,11:100000 individuals. It presents as the absence of esophageal peristalsis

and an incomplete or absent relaxation of the lower esophageal sphincter. The gold standard for the treatment of achalasia is Heller's myotomy either laparoscopic or robot-assisted. Recently the peroral endoscopic myotomy (POEM) has also been introduced in the practice, leaving the botulinum injection and endoscopic dilatations as palliatives for the cases that cannot undergo surgery.

**Materials and methods** We present the case of a 15 years old girl, who came to our attention after a 7 months history of dysphagia, regurgitation, nocturnal cough and weight loss (almost 10 kilos) with evidence at esophago-gastro-duodenoscopy (EGD) of many food residuals in the esophagus and impossibility to enter the stomach. During hospitalization, we performed an upper gastrointestinal study, esophageal manometry and another EGD under general anesthesia, which returned the diagnosis of achalasia. Since the patient could not feed properly, a peripherally inserted central venous catheter (PICC) was positioned for parenteral nutrition associated with a liquid diet, followed by PICC infection and drug-related neutropenia. Once clinically stable, the girl underwent a robot-assisted Heller's myotomy and Dor's anterior gastric fundoplication (DaVinci Xi Surgical System<sup>®</sup>).

**Results** The procedure was accomplished with the patient in a supine anti-Trendelenburg position. About 8 cm-long myotomy was performed under endoscopic control of mucosal integrity. The robotic procedure was completed in about 200 minutes. The postoperative course was unremarkable: the patient started oral food intake on the first postoperative day, well tolerated, and was discharged on the 6th postoperative day.

**Conclusions** Treatment of esophageal achalasia is mainly mini-invasive.

There are 18 pediatric cases (other than our) of robot-assisted Heller's myotomy reported in literature up-to-date. Most of the patients (12/18) underwent a consensual anti-reflux procedure (4 Dor fundoplication; 2 Thal fundoplication; 6 Toupet partial posterior wrap).

None of them were converted or presented intra- or postoperative complications.

The postoperative course seems to be uneventful and the patients recover well after surgery.

Robot-assisted procedure is reported to be safer than laparoscopy in term of mucosal perforation (0% reported). This may be due to the robotic high definition 3D-view, tremor filtering and motion scaling. Moreover, the higher flexibility of the instruments allow the surgeon to work more comfortably in narrow spaces.

Even if the number of robot-assisted pediatric Heller's myotomy is still limited, this procedure seems to be a valid alternative to both the laparoscopy and the POEM and surely we need further experience to confirm the current data.

**Keywords** achalasia, children, heller's myotomy, robotic surgery