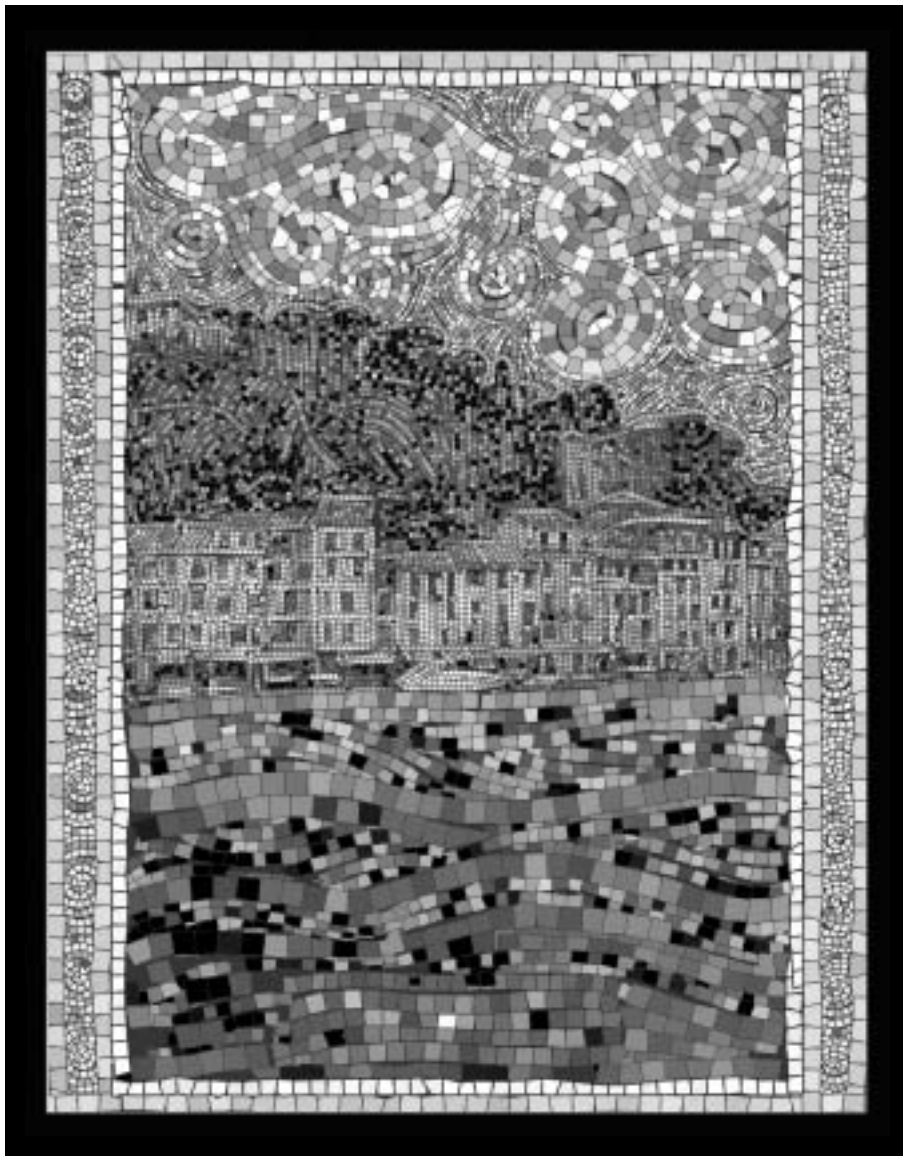


# 11th Annual Congress for Endosurgery in Children



Sponsored by the International Pediatric Endosurgery Group (IPEG)  
May 2-4, 2002 Genoa, Italy

## FINAL PROGRAM

# TABLE OF CONTENTS

GENERAL INFORMATION ABOUT THE MEETING. . . . .	2
SCHEDULE AT A GLANCE . . . . .	4
IPEG CONFERENCE LEADERS. . . . .	5
IPEG SCIENTIFIC SESSION - THURSDAY, MAY 2, 2002. . . . .	6
IPEG SCIENTIFIC SESSION - FRIDAY, MAY 3, 2002 . . . . .	10
IPEG SCIENTIFIC SESSION - SATURDAY, MAY 4, 2002. . . . .	12
S.I.V.I. 4TH NATIONAL CONGRESS. . . . .	14
IPEG MEETING FACULTY . . . . .	16
SHUTTLE SCHEDULE. . . . .	17
IPEG SOCIAL EVENTS. . . . .	18
IPEG ORAL ABSTRACTS. . . . .	19
IPEG POSTER ABSTRACTS. . . . .	35
SIVI MEETING ABSTRACTS . . . . .	61
IPEG 2002 EXHIBITOR INFORMATION. . . . .	72
APPENDIX A: INDEX OF ABSTRACTS - BY AUTHOR. . . . .	74
APPENDIX B: INDEX OF IPEG ABSTRACTS - BY TOPIC . . . . .	79

#### Accreditation of this Meeting:

This activity has been planned and implemented in accordance with the Essentials and Standards of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the Society of American Gastrointestinal Endoscopic Surgeons (SAGES) and the International Pediatric Endosurgery Group (IPEG). The Society of American Gastrointestinal Endoscopic Surgeons (SAGES) is accredited by the ACCME to provide continuing medical education for physicians. SAGES designates this Continuing Medical Education activity for:

#### 13 credit hours for the 11th Congress for Endosurgery in Children

in Category 1 of the Physicians Recognition Award for the American Medical Association. Note: Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

Please also note: The SIVI Meeting was not planned by IPEG and therefore is not accredited for CME credits by this joint sponsorship.



## GENERAL INFORMATION ABOUT THE MEETING

**11th Annual Congress for Endosurgery in Children  
Sponsored by the International Pediatric Endosurgery Group**

**Administrative Offices:**

2716 Ocean Park Blvd. Suite 3000, Santa Monica, CA 90405 USA

Phone: 1-310-314-2536 Fax: 1-310-314-2589

E-mail: [admin@ipeg.org](mailto:admin@ipeg.org) Website: [www.ipeg.org](http://www.ipeg.org)

**IPEG Scientific Sessions: May 2-4, 2002**

"Magazzini del Cotone" Congress Center  
Genoa (Genova), Italy

**SIVI Scientific Sessions: May 3, 2002**

"Magazzini del Cotone" Congress Center  
Genoa (Genova), Italy

**Exhibits**

Thursday, May 2 10:00 AM - 2:30 PM

Thursday, May 2 5:15 PM - 6:00 PM *Opening reception*

Friday, May 3 9:30 AM - 2:30 PM

Saturday, May 4 10:00 AM - 1:00 PM

"Magazzini del Cotone" Congress Center  
Genoa (Genova), Italy

**Posters**

May 2-4, 2002

Congress Center, Outside of the Exhibit Hall



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## SCHEDULE AT A GLANCE

### Wednesday: May 1, 2002

2:00pm - 7:00 pm	Registration Open at the Congress Center
6:30 pm - 9:00 pm	Reception hosted by Gaslini Foundation for all attendees and guests (Location: Gaslini Villa)

### Thursday: May 2, 2002

8:00 am - 9:00 am	Abstract Presentation Session
9:00 am - 10:30 am	PANEL: Neonatal Surgery
10:30 am - 11:00 am	Coffee Break & Exhibits
11:00 am - 12:00 pm	Abstract Presentation Session
12:00 am - 12:20 pm	Presidential Lecture by Professor Jasonni
12:20 pm - 2:00 pm	Lunch, Posters & Exhibits
2:00 pm - 3:30 pm	Abstract Presentation Session
3:30 pm - 5:00 pm	PANEL: Gastro-Esophageal
5:00 pm - 5:15 pm	Industry Forum in Session Room
5:15 pm - 6:00 pm	Exhibit Reception in Exhibit Hall (badges required)
Optional 6:00 - 7:15 pm	Stryker Industry Education event (all attendees and guests welcome; Location: Main Session Room)

### Friday: May 3, 2002

8:00 am - 9:30 am	Abstract Presentation Session
9:30 am - 10:00 am	Coffee Break & Exhibits
10:00 am - 11:30 am	PANEL: Colonic Disease
11:30 am - 12:00 pm	Keynote Lecture: L. William Traverso, MD, 2001-2002 President of SAGES
12:00- 2:00 pm	Lunch, Posters & Exhibits
2:00 - 5:00 pm	SIVI meeting
7:30 - 11:00 pm	Main Event for all attendees and guests at the Aquarium (ticket required)

### Saturday: May 4, 2002

8:00 - 9:00 am	Abstract Presentation Session
9:00 - 10:30 am	PANEL: Urologic Disorders
10:30 - 11:00 am	Coffee Break & Exhibits
11:00 am - 12:00 pm	Abstract Presentation Session
12:00 - 1:00 pm	Last Chance to Visit Posters & Exhibits



## IPEG CONFERENCE LEADERS

Vincezo Jasonni, MD  
IPEG President and Program Director

### EXECUTIVE COMMITTEE

President - Vincenzo Jasonni, MD  
President Elect - Craig Albanese, MD  
Vice President - C. K. Yeung, MD  
Secretary - Takeshi Miyano, MD  
Treasurer - Steven Rothenberg, MD  
Editor (PEIT) - Thom E. Lobe, MD

### REPRESENTATIVES

Chris Kimber, MD - Asia  
Klaas Bax, MD - Europe  
Keith Georgeson, MD - North America

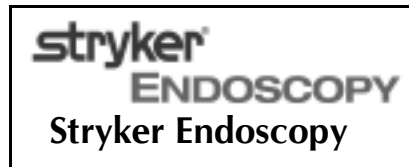
### PROGRAM COMMITTEE

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Peter Borzi, MD  
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James M.. DeCou, MD  
Jeffrey J. Dubois, MD  
Takao Fujimoto, MD  
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## IPEG 2002 Supporters

IPEG gratefully acknowledges the following corporate meeting supporters:

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IPEG acknowledges the generous support of the following for the  
11th Annual Congress for Endosurgery in Children:

- Presidenza Della Regione Liguria
- Assessorato Alla Sanita' Della Regione Liguria
- Fondazione Cassa di Risparmio di Genova e Imperia
- Fondazione Gerolamo Gaslini
- Banca Carige
- Casa Di Cura Villa Montallegro



## IPEG SCIENTIFIC SESSION - THURSDAY, MAY 2, 2002

### Scientific Session 1

8:00 - 9:00 am

Moderators: D. Van Der Zee, C. Kimber

- s01 "ROBOTIC ENTEROTOMY REPAIR IN FETAL PIGS," Celeste M. Hollands, MD, Laramie N. Dixey RN  
 s02 "THORACOSCOPIC REPAIR OF ESOPHAGEAL ATRESIA WITH FISTULA - OUR INITIAL EXPERIENCE," Marcelo Martinez Ferro MD, Gaston Elmo MD, Horacio Bignon MD  
 s03 "INTRATRACHEAL PULMONARY VENTILATION INCREASES THE SAFETY OF PEDIATRIC LAPAROSCOPY IN THE SETTING OF RESPIRATORY FAILURE," Amir Kaviani, MD; Kenneth Watson, RRT; John Thompson, RRT; Christopher Muratore, MD; Alexander Dzakovic, MD; Carrie Simms, MD; Julie Fuchs, MD; Moritz M. Ziegler, MD; Jay Wilson, MD; Dario O. Fauza, MD  
 s04 "VIDEOASSISTED REMOVAL OF TWISTED NEONATAL OVARIAN CYST," A. Porreca M.D., A. Tramontano M.D.  
 s05 "MINIMAL INVASIVE OESOPHAGECTOMY AFTER CORROSIVE BURN IN CHILDREN: A CASE REPORT," Gesmundo R., Garrone C., Lonati L., Morino M., Canavese F.  
 s06 "LAPAROSCOPIC EXTRACTION OF A GIANT GASTRIC BEZOAR," Steven S Rothenberg M.D.

### PANEL 1: NEONATAL SURGERY

9:00 - 10:30 am

President of the Panel: Vincenzo Jasonni, MD

Chairmen: Thom Lobe, MD, Felix Schier, MD

Esophagus.....Steven Rothenberg, MD

Imperforate Anus .....Keith Georgeson, MD

Bowel Atresia .....Klaas Bax, MD

Robotics .....Celeste Hollands, MD

Discussion

*This panel is supported by a generous grant from Tyco Healthcare Group/United States Surgical.*

**10:30 - 11:00 am - Coffee Break in Exhibit Hall**

### Scientific Session 2

11:00 am - 12:00 pm

Moderators: J. Valla, PL.LelliChiesa

- s07 "HOW TO MANAGE THE VANISHING TESTIS DIAGNOSED LAPAROSCOPICALLY? RESULTS OF AN HISTOLOGICAL STUDY," Aceti M.G. R., MD, La Riccia A., M. D., Riccipetioni G., M. D.  
 s08 "COMPLICATION AVOIDANCE IN MINIATURE ACCESS PYLOROMYOTOMY," Levitt MA, Caty MG, Rothenberg SS, Tantoco JG, Chang J, Bealer JF, Brisseau GF, Glick PL  
 s09 "HAND-ASSISTED LAPAROSCOPIC COLECTOMY IN ADOLESCENTS," Klaas(N) M.A. Bax, MD, PhD, David C. Van Der Zee, MD, PhD  
 s10 "IS PEDIATRIC SURGICAL DEPARTMENT SUITABLE FOR QUALIFIED ENDOSCOPY TRAINING?," E.DeGrazia, G.LiVoti, M.DiPace, S.Amoroso, M.LoCascio, C.Acierno  
 s11 "BIGGER ISN'T ALWAYS BETTER," Mark S. Burke BS, Joselito G. Tantoco MD, Marc A. Levitt MD, Guy F. Brisseau MD, Michael G. Caty MD, Philip L. Glick MD  
 s12 "EFFICACY OF LAPAROSCOPIC MUSCLE STIMULATOR IN LAPAROSCOPY ASSISTED ANORECTAL PULL-THROUGH FOR HIGH IMPERFORATE ANUS," Tadashi Iwanaka, MD, PhD, Mari Arai, MD, PhD, Hiroshi Kawashima, MD, Sumi Kudou, MD, Jun Fujishiro, MD, Satohiko Imaizumi, MD, PhD



## IPEG Scientific Sessions - Thursday, May 2, 2002 (continued)

### PRESIDENTIAL LECTURE

**Prof. Vincenzo Jasonni**

12:00 - 12:20 pm

Introduction by President Elect, Craig Albanese, MD



**Lunch, Posters & Exhibits 12:20 - 2:00 pm (Lunch is located near the exhibit hall.)**

### Scientific Session 3

2:00 - 3:30 pm

Moderators: K. Scharschmidt, A. Papparella

- s13 "NISSEN FUNDOPLICATION FOR RESPIRATORY SYMPTOMS," D. Falchetti, MD, F. Torri, MD, P. Orizio, MD, P. Salucci, MD, B. Morelli, MD, F. Braga, MD, G. Ekema, MD
- s14 "LAPAROSCOPIC CARDIOMYOTOMY WITHOUT FUNDOPLICATION FOR ACHALASIA CARDIA IN CHILDREN," Munther J Haddad, Ravindra H Ramadwar, Ashish Minocha, Department Of Paediatric Surgery, Chelsea & Westminster Hospital, London, UK
- s15 "VENTILATORY AND HEMODYNAMIC MODIFICATIONS DURING LAPAROSCOPIC FUNDOPLICATION," G.Mattioli M.D., A.PiniPrato M.D., P.Repetto M.D., S.Leggio M.D., M.Castagnetti M.D., G.Montobbio M.D., V.Jasonni M.D.
- s16 "RECANALIZATION OF AN ESOPHAGEAL ATRESIA ANASTOMOSIS BY AN INTERVENTIONAL RADIOLOGICAL TECHNIQUE," A. Alfred Chahine, Md, Maurice Poplauski, Md, Grigori Rozenblit, Md, Gastone Crea, Md, Shaker Maddenini, Md, Sabrina Falquier, Md, Karl Strom, Md, Michel S. Slim, Md
- s17 "FUNDOPLICATION IS RARELY NECESSARY FOLLOWING LAPAROSCOPIC GASTROSTOMY EXCEPT IN THE NEUROLOGICALLY-IMPAIRED CHILD," David A. Partrick, M.D., Denis D. Bensard, M.D.
- s18 "LONG-TERM FOLLOW-UP AFTER LAPAROSCOPIC TOUPET FUNDOPLICATION IN CHILDREN WITH ATYPICAL SYMPTOMS OF GASTROESOPHAGEAL REFLUX," Mario Mendoza-Sagaon MD, Karen Herreman-Suquet MD, Guillaume Cargill MD, Daniel Caillot MD And Philippe Montupet MD
- s19 "LAPAROSCOPIC INTERVENTION OF INTRA-THORACIC STOMACH IN INFANTS," Makoto Yagi, M.D., Ph.D., Keisuke Nose, M.D., Katsuji Yamauchi, M.D., Takashi Nogami, M.D., Hideki Yoshida, M.D., Harumasa Ohyanagi, M.D., Ph.D.
- s20 "LAPAROSCOPIC GASTROSCOPY ASSISTED VENTRAL THAL HEMIPLICATION AS REDO-PROCEDURE IN RECURRENT GASTROESOPHAGEAL REFLUX," Klaus Schaarschmidt, A Kolberg-Schwerdt, M Lempe, C Neumann
- s21 "ITALIAN MULTICENTER SURVEY ON LAPAROSCOPIC GASTRO-ESOPHAGEAL REFLUX SURGICAL TREATMENT," G.Mattioli M.D., M.Lima M.D., C.Esposito M.D., M.Messina M.D., L.Montinaro M.D., G.Cobellis M.D., L.Mastoianni M.D., M.G.R.Aceti M.D., D.Falchetti M.D., V.Jasonni M.D





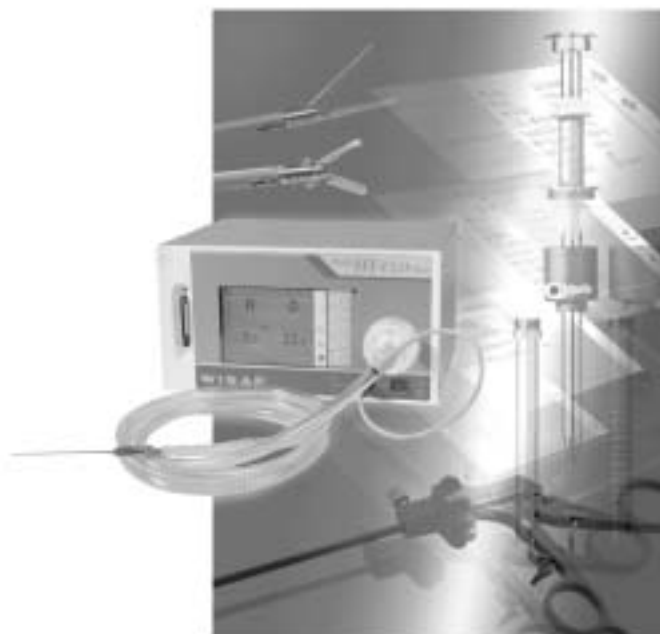
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## PANEL 2: GASTRO-ESOPHAGEAL REFLUX

3:30 - 5:00 pm

President of the Panel: Hock Lim Tan, MD

Chairmen: Patrice Erpicum, MD, Ciro Esposito, MD, Keith Georgeson, MD

Toupet ..... Philippe Montupet, MD

G-Tube ..... Thom Lobe, MD

Achalasia and Fundoplication ..... Craig Albanese, MD

Nissen/Rossetti vs Nissen ..... Girolamo Mattioli, MD

Discussion

*(All panelists will talk about differences in the following cases: Normal, Neurologic impairment, Esophageal atresia, Malrotation.)*

*This panel is supported by a generous grant from Karl Storz Endoscopy.*

## INDUSTRY FORUM - Presented By:

Karl Storz Endoscopy - Stryker Endoscopy - United States Surgical

5:00 - 5:15 pm

Moderator: Steven Rothenberg, MD

Our industry colleagues will present brief educational updates about their company and products.

This short session is not accredited for CME credits.

*Reception in the Exhibit Hall 5:15 - 6:00 pm  
All registrants and registered guests are invited to attend.  
You must bring your badge in order to attend this event.*

## INDUSTRY EDUCATION EVENT

Hosted by Stryker Endoscopy - Optional Educational Opportunity for All Registrants

6:00 - 7:15 pm (Located in the Main Session Room)

The Evolution of Laparoscopic Management of Gastroesophageal Reflux in Children  
presented by Keith Georgeson, MD

At this event, Dr. Georgeson will present his experience during the last decade with laparoscopic management of GER in children. His presentation will include multiple video clips and examples from procedures from the early 1990s and onwards. At the conclusion of his presentation, a discussion will be held during which audience members are encouraged to offer their own opinions and to ask questions of the presenter.

*Because this event was not planned by IPEG, it is not accredited for CME.*



## IPEG SCIENTIFIC SESSION - FRIDAY, MAY 3, 2002

### Scientific Session 4

8:00 - 9:30 am

Moderators: C.K. Yeung, A. Cacciari

- s21a "THORACOSCOPIC LOBECTOMY FOR PRENATALLY DIAGNOSED LUNG LESION," Craig T. Albanese, M.D., KuoJen Tsao, M.D., Roman M. Sydorak, M.D., Hanmin Lee, M.D.
- s21b "LAPAROSCOPIC ADRENALECTOMY IN CHILDREN," Kelly A. Miller MD, Craig T. Albanese MD, Diana L. Farmer MD, Michael Harrison MD, George W. Holcomb III MD
- s21c "CERVICO-MEDIASTINOSCOPIC THYMECTOMIES IN CHILDREN," Olivier Reinberg, Philippe Montu-pet, Helene Martelli
- s21d "CLINICAL RESULTS IN THORACOSCOPIC SURGERY USING AN ELECTROTHERMAL BIPOLAR VESSEL SEALER," Steven S Rothenberg M.D., John T. Bealer M.D., Jack H.T. Chang M.D., Ned Cosgriff M.D.
- s22 "LAPAROSCOPIC APPENDICECTOMY: A SUITABLE CASE FOR THE TRAINEE?," Atul J Sabharwal M.D., Gordon A MacKinlay M.D., Fraser D Munro M.D.
- s23 "ONE-TROCAR VIDEOASSISTED APPROACH TO MECKELÆS DIVERTICULUM IN CHILDREN," G.Cobellis, MD, L.Mastroianni, MD, G.Muzzi, MD, A.Zangari, MD, A.Crucetti, MD, M.Zamparelli, MD, G.Amici, MD And A. Martino, MD
- s24 "LAPAROSCOPIC CECOSTOMY BUTTON PLACEMENT FOR MANAGEMENT OF FECAL INCONTINENCE IN CHILDREN," Aydin Yagmurlu M.D., Carroll M. Harmon M.D., Ph.D., Keith E. Georgeson M.D.
- s25 "LAPAROSCOPIC ASSISTED SURGERY FOR CROHN'S DISEASE," Robertine Van Baren, M.D., Wim G. Van Gemert, Ph.D.
- s27 "GETTING RESIDENTS IN THE GAME: AN EVALUATION OF GENERAL SURGERY RESIDENTS' PARTICIPATION IN PEDIATRIC LAPAROSCOPIC SURGERY," Gerald Gollin, MD And Donald Moores, MD
- s28 "LAPAROSCOPIC SWENSONS PULL THROUGH FOR HIRSCHSPRUNG'S DISEASE-AN OPTIMAL APPROACH FOR BOTH PRIMARY AND SECONDARY PULLTHROUGH PROCEDURES," Peter Borzi, MD
- s30 "COMPLICATIONS AND CONVERSIONS OF PEDIATRIC LAPAROSCOPIC SURGERY: THE ITALIAN MULTICENTRIC EXPERIENCE WITH 2305 PROCEDURES," Esposito C MD PhD, Mattioli G MD, Monguzzi GL MD, Montinaro L MD, Riccipetiotoni G MD, Messina M MD, Pintus C MD, Lima M MD, Settimi A MD, Esposito G MD, Jasonni V MD

**9:30 - 10:00 am - Coffee Break in Exhibit Hall**

### PANEL 3: COLONIC DISEASE

10:00 - 11:30 am

President of the Panel: Peter Borzi, MD

Chairmen: Francois Becmeur, MD, Thom Lobe, MD, Giuseppe Martucciello, MD

Lap Pull Through ..... Keith Georgeson, MD  
 Lap Duhamel ..... David Van Der Zee, MD  
 Laparoscopic Surgery of Inflammatory Bowel Disease ..... Klaus Schaarschmidt, MD  
 Hirschsprung's Disease: The Impact of Laparoscopy ..... Jurgen Schleeff, MD  
 Discussion

*This panel is supported by a generous grant from Stryker Endoscopy.*



**Keynote Lecture: "Surgical Outcomes - Why Get Involved"****L. William Traverso, MD**

11:30 am - 12:00 pm (Located in Main Session Room)

Introduction by Prof. Vincenzo Jasonni

**Lunch, Posters & Exhibits 12:00 - 2:00 pm (Lunch is located near the exhibit hall.)****Societa Italiana di Videochirurgia Infantile (SIVI) Meeting**

2:00 - 5:00 pm

see page 14 for more information.

**Sightseeing in Genoa**

For information on tours, please visit the registration desk.

**Evening Event for all attendees and guests (ticketed event)****7:30 - 11:00 pm****Genoa Aquarium**

## IPEG SCIENTIFIC SESSION - SATURDAY, MAY 4, 2002

### Scientific Session 5

8:00 - 9:00 am

Moderators: G. Holcomb, M. Rivosecchi

- s30a "LAPAROSCOPIC POCKET SPLENOPEXY (LAPS) FOR WANDERING SPLEEN. A NEW TECHNIQUE," Marcelo Martinez Ferro, Gaston Elmo, Lisandro Piaggio
- s30b "THYMECTOMY: PURE THORACOSCOPY VS MINI-THORACOTOMY VIDEO ASSISTED," Francisco Berchi MD, Maribel Benavent MD, Jesus Cuadros MD, Juan Anton-Pacheco MD
- s31 "INTRAVESICAL URETERAL REIMPLANTATION ACCORDING TO COHEN AND USING LAPAROSCOPIC TOOLS. PRELIMINARY EXPERIENCE IN CHILDREN," Valla JS, Almohaidly M, Lembo MA, Carfagna L, Steyaert H
- s32 "OUR EXPERIENCE IN THE MANAGEMENT OF PROBLEMS IN LAPAROSCOPIC PYELOPLASTY FOR HYDRONEPHROSIS IN CHILDREN," K.Selvarajan Mch, M.Ramalingam Mch, M.G. Pai MCh
- s33 "COMPARISON OF LAPAROSCOPIC AND OPEN NEPHRECTOMIES IN CHILDREN," Pavel Zerhau, M.D., Ph.D. Jiri Tuma, M.D., Ph.D.
- s34 "LAPAROSCOPIC ANDERSON-HYNES PYELOPLASTY IN CHILDREN," Bahr M, Korn St, Schier F
- s35 "DEXTRANOMER ENDOSCOPIC INJECTION FOR URINARY INCONTINENCE," Paolo Caione, Nicola Capozza
- s36 "LAPAROSCOPIC VERSUS OPEN NEPHRECTOMY IN PEDIATRIC POPULATION," Luis Garcia-Aparicio M.D.; Josep M. Ribo M.D.; Victoria Julia M.D., Ph.D.; Jordi Rovira M.D., Ph.D.; Xavier Tarrado M.D.; Luis Morales M.D, Ph.D.

### PANEL 4: UROLOGIC DISORDERS

9:00 - 10:30 am

President of the Panel: Felix Schier, MD

Chairmen: George W. Holcomb, MD, Mario Lima, MD

Endoscopic Anti-Reflux ..... Jeff Valla, MD  
 Nephrectomy & Heminephrectomy (+/- ureterocele excision) ..... C.K. Yeung, MD  
 Retroperitoneal Laparoscopy in Pediatric Urology: Where Are We ..... Paolo Caione, MD  
 UPJ Obstruction ..... Peter Borzi, MD  
 Discussion

**10:30 - 11:00 am - Coffee Break in Exhibit Hall**

### Scientific Session 6

11:00 am - 12:00 pm

Moderators: F. Becmeur, G. Riccipetoni

- s37 "TRANSVESICOSCOPIC CROSS-TRIGONAL URETERIC REIMPLANTATION UNDER CARBON DIOXIDE PNEUMOVESICUM FOR VESICoureteric REFLUX: A NOVEL TECHNIQUE," CK Yeung, M.D., PA Borzi M.D.
- s38 "THORACOSCOPIC UPPER THORACIC SYMPATHECTOMY FOR PRIMARY PALMAR HYPERHIDROSIS IN CHILDREN AND ADOLESCENCE: A 10 YEARS EXPERIENCE," Vadim Kapuller, M.D., Zahavi Cohen, M.D.
- s39 "LAPAROSCOPY AND CARBON DIOXIDE VERSUS AIR REDUCE PERITONEAL, SYSTEMIC, AND PULMONARY IMMUNE RESPONSES," BM Ure, MD, NMA Bax, MD, TA Niewold, PHD, GJ Van Essen, MD, DC Van Der Zee, MD
- s40 "PAIN MANAGEMENT AFTER MINIMALLY INVASIVE PECTUS EXCAVATUM REPAIR," Anton Gutmann, MD Maria Vittinghoff, MD Roswitha Gossler, MD Andrea Stockenhuber, MD Christiana Justin, MD Juer-gen Schleef, MD Michael Halwarth, MD



- s41 "SPLENECTOMY FOR PEDIATRIC HEMATOLOGIC DISEASE," Perry Stafford MD, Eileen Houseknecht RN, Daniel Von Allmen MD, Michael Nance MD, And Kim Smith-Whitley MD
- s42 "LAPAROSCOPIC MANAGEMENT OF IMPALPABLE TESTES : A MULTI-INSTITUTIONAL STUDY OF THE ITALIAN SOCIETY OF VIDEO SURGERY IN INFANCY," A.Papparella M.D., P.Parmeggiani M.D., G.Cobellis M.D. , L.Mastroianni M.D., G.Stranieri M.D., N.Pappalepore M.D. ,G.Mattioli M.D. , C. Esposito M.D. And M.Lima M.D.
- s43 "ENDOSCOPIC SURGERY OF DIAPHRAGMATIC ANOMALIES : A MULTICENTRIC STUDY OF THE GROUPE D'ETUDE EN COELIOCHIRURGIE INFANTILE (GECI). PART 2 : MORGAGNI'S HERNIAS," F. Becmeur, MD, P. Philippe, MD, D. Vanderzee, MD, N. Bax, MD, H. Allal, MD, O. Reinberg, MD, M. Lima, MD, Y.Heloury, MD, F. Berchi, MD, A.Debacker, MD, M. Robert, MD, C. Salakos, MD, J.L. Alain, MD, F. Schier, MD, J. Schleef, MD., R. Moog, MD.
- s44 "THORACOSCOPIC EXCISION OF AN INTRAMURAL OESOPHAGEAL DUPLICATION CYST," Adam Watts, M.D., Fraser D Munro, M.D., Gordon A MacKinlay, M.D.
- s45 "LAPAROSCOPIC SIGMOID VAGINAL REPLACEMENT," Bailez, M M.D.; Dibenedetto, V. M.D.; Elmo, G. M.D. And Korman, L. M.D.

***LAST CHANCE TO VISIT THE EXHIBITS AND POSTERS!***  
***12:00 - 1:00 pm***

**Pencil us in:**  
**IPEG joint meeting with SAGES,**  
**March 11-13, 2003.**  
**Los Angeles, CA.**



# S.I.V.I.

## 4th National Congress

**Friday 3 May, 2002**  
**2:00 - 5:00 PM**  
**Magazzini del Cotone**  
**Congress Center**

### S.I.V.I.

President - G. Amici (Ancona)  
 Past President - V. Jasonni (Genova)  
 Honorary President - G. Esposito (Napoli)  
 Vice-President - M. Lima (Bologna)  
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 C. Romeo (Messina)

The S.I.V.I. 4th National Congress will be held on Friday afternoon at the Magazzini del Cotone Congress Centre. This session is included in the IPEG Scientific Session registration. The meeting will be conducted in English. Those attendees who do not wish to attend this session are free for an afternoon of sightseeing. This meeting is not accredited for CME credits

### 1ST SESSION

5' presentation + 2' discussion

President: V. Jasonni

Chairmen: R. Rubino, A. Papparella

E. Leva	HAS LAPAROSCOPY A ROLE IN PEDIATRIC SURGERY? CONSIDERATIONS AFTER SEVEN YEARS OF EXPERIENCES IN CHILDREN
D. Falchetti	NISSEN LAPAROSCOPIC FUNDOPLICATION IN PEDIATRIC NEUROLOGIC PATIENTS
A. Messineo	PERCUTANEOUS ENDOSCOPIC GASTROSTOMY: A NINE-YEAR EXPERIENCE
N. Pappalepore	L'APPENDICECTOMIA LAPAROSCOPICA IN ETÀ PEDIATRICA: STUDIO MULTICENTRICO SIMI
L. Tonegatti	LAPAROSCOPIC SPLENECTOMY IN HEMATOLOGIC DISEASES
F. Pampaloni	EPIDERMOID SPLENIC CYSTS IN PEDIATRIC AGE: LAPAROSCOPIC DECAPSULATION AND PRELIMINARY RESULTS.
M. Lima	LAPAROSCOPIC SURGERY OF ANORECTAL MALFORMATIONS
G. Pelizzo	MINIINVASIVE SURGERY IN A CASE OF EHLERS-DANLOSSYNDROME TIPE IV
A. Porreca	VIDEOASSISTED REMOVAL OF LARGE OMENTAL CYST IN 2-YEAR-OLD CHILD
D. Falchetti	MODIFIED TITANIUM POLIUSE TROCAR FOR SMALL PATIENTS
M. Lima	LAPAROSCOPIC GONADAL BIOPSY FOR CRYOCONSERVATION



**2ND SESSION**

5' presentation + 2' discussion

President: PL. LelliChiesa

Chairmen: C. Esposito, G. Cobellis, GL. Monguzzi

P. Caione	RETROPERITONEOSCOPY IN CHILDREN: THE VISIPOINT TECHNIQUE
E. Podestà	SYRINGOCELE: OUR EXPERIENCE IN CLINICAL APPROACH AND ENDOSCOPIC TREATMENT.
F. Pampaloni	LAPAROSCOPIC RIGHT ADRENALECTOMY FOR ANDROGENSECRETING ADENOMA IN A 3-YEAR OLD GIRL.
M. Lima	THORACOSCOPIC MANAGEMENT IN THORACO-PULMONARY SUSPECTED NEOPLASTIC DISEASE IN CHILDREN
P. Betalli	THORACOSCOPY: A SIX-YEAR EXPERIENCE IN TWO ITALIAN CENTRES
D. Falchetti	LAPAROSCOPIC SPLENECTOMY IN HEMATOLOGIC DISEASES
S. Narne	LARYNGOTRACHEAL STENOSIS: TREATMENT
M. Silvestrini	INFANTILE FIBROSARCOMA OF THE LARYNX: REPORT OF 2 CASES
L. Mirri	FLEXIBLE VERSUS RIGID VIDEOENDOSCOPY IN PAEDIATRIC AGE
R. Saetti	ENDOSCOPIC MANAGEMENT OF CHOANAL ATRESIA
S. Narne	CONTACT DIODE LASER SURGERY IN PEDIATRIC LARYNGOTRACHEAL LESIONS

**SIVI AWARD**

5' presentation + 2' discussion

President: G. Esposito

Chairmen: G. Amici &amp; M. Lima

L. Canazza	APPENDICECTOMIA LAPAROSCOPICA: UN TROCAR O TRE TROCARS ?
M. Zamparelli	LA CHIRURGIA LAPAROSCOPICA DEL COLON IN ETA' PEDIATRICA
A. Centonze	STUDIO COMPARATIVO SULLA FORMAZIONE DI ADERENZE INTRAPERITONEALI DOPO LAPAROSCOPIA E DOPO CHIRURGIA OPEN
B. Locatelli	CONTINUOUS THORACIC EPIDURAL ANESTHESIA IN PEDIATRIC THORACOSCOPIC SURGERY
C. Carlini	I COSTI DELLA CHIRURGIA LAPAROSCOPICA PER LA MALATTIA DA REFLUSSO GASTROESOFAGEO
C. Romeo	EFFETTI DELLA LAPAROSCOPIA SULL'IMMUNITÀ LOCALE INTRAPERITONEALE. STUDI SPERIMENTALI.
C. Noviello	EFFETTI DELLA INSUFFLAZIONE DI CO2 ED ARIA SUL PERITONEO: STUDIO SPERIMENTALE.





## IPEG MEETING FACULTY

**Craig Albanese:** University Of California San Francisco, San Francisco US  
**Giuseppe Amici:** Cattedra Di Chirurgia Pediatrica, Ancona ITALY  
**Klaas Bax:** Wilhelmina Children's Center Utrecht, AB Utrecht NETHERLANDS  
**Francois Becmeur:** Hospital De Hautepierre, Strasbourg FRANCE  
**Peter Borzi:** Royal And Mater Children's Hospital, Brisbane AUSTRALIA  
**Paolo Caione:** Bambino Gesu Children's Hospital, Rome ITALY  
**Patrice Ericpum:** GECI Meeting Chair 2002, Namur BELGIUM  
**Ciro Esposito:** Associate Professor Of Pedatric Surgery, University of Catanzaro, ITALY  
**Keith Georgeson:** Univ Of Alabama School Of Medicine, Birmingham US  
**George Holcomb:** Children's Mercy Hospital, Kansas City US  
**Celeste Hollands:** LA State Univ Health Science Ctr., Shreveport US  
**Vincenzo Jasonni:** Gaslini Institute Dept Pediatric Surgery, Genova ITALY  
**Chris Kimber:** Department Of Paediatrics, Glen Iris AUSTRALIA  
**Mario Lima:** Clinica Chirurgica Pediatrica, Bologna ITALY  
**Thom Lobe:** University Of Tennessee, Memphis US  
**Giuseppe Martucciello:** G. Gascini Children's Hospital, Genoa ITALY  
**Girolamo Mattioli:** Gaslini Institute Dept of Pediatric Surgery, Genova ITALY  
**Gianluca Monguzzi:** Ospedale Dei Bambini, Milan ITALY  
**Philippe Montupet:** Hospital Biceine - Universite Paris XI, Paris FRANCE  
**Alfonso Papparella:** Pediatric Surgery, Napoli ITALY  
**Giovanna Riccipetioni:** Ospedale Deu'ammumeiata, Cosemza ITALY  
**Massimo Rivosecchi:** Ospedale Pediatrico Bambino Gesu, Rome ITALY  
**Steve Rothenberg:** Hospital For Infants & Children, Denver US  
**Klaus Schaarschmidt:** Helios-Klinikum Kindershirurgische Klink, Berlin GERMANY  
**Felix Schier:** Department Of Pediatric Surgery, Jena GERMANY  
**Jurgen Schleef:** Graz University Medical School, Graz AUSTRIA  
**Hock Lim Tan:** Women's And Children's Hospital, North Adelaide SOUTH AUSTRALIA  
**L. William Traverso:** The Virginia Mason Clinic, Seattle US  
**Jean-Nemare Valla:** Hopital Lenval, Nice FRANCE  
**David Van Der Zee:** Wilhelmine Children's Hospital, Driebegen NETHERLANDS  
**C.K. Yeung:** Dept. Of Surgery, The Chinese University Of Hong Kong, Shatin, N. T. CHINA

### DISCLOSURES

In the spirit of full disclosure, the faculty members listed below have voluntarily disclosed that they have a professional affiliation with the following companies who are either sponsors or exhibitors at the 11th Annual Congress for Endosurgery in Children, or whose products may relate to their presentation. The affiliations are not necessarily financial but may also include research grants, volunteer input, etc. IPEG requires speakers who have such affiliations to disclose this verbally prior to their presentation if it is not disclosed in writing. IPEG also requires that speakers disclose if a product is not labeled for the use under discussion or if the product is still investigational.

**Klaas Bax:** *Disclosure:* Karl Storz Tuttlingen- Research Support  
**Philip Glick:** *Disclosure:* Ethicon, Stryker- Grants  
**Celeste Hollands:** *Disclosure:* Computer Motion-Consultant, Speaker's bureau  
**Marc Levitt:** *Disclosure:* Ethicon, Stryker- Grants or research support  
**Steven Rothenberg:** *Disclosure:* Karl Storz- Consultant  
**David Van Der Zee:** *Disclosure:* Speakers Bureau

**PLEASE FILL OUT EVALUTATION & CME FORM AND RETURN THEM TO THE REGISTRATION DESK!**



## SHUTTLE SCHEDULE

### MAY 1 - VILLA GASLINI COCKTAIL

HOTEL JOLLY MARINA: 6:00 PM (departure 6:05 PM: bus stop outside hotel)

HOTEL BRISTOL: 5:45 PM (departure 6:00 PM: bus stop outside hotel)

HOTEL METROPOLI: 5:45 PM meet the hostess in the lobby of hotel  
(departure 6:05: bus stop in Fontane Marose Square)

HOTEL CITY: 5:45 PM meet the hostess in the lobby of hotel  
(departure 6:05: bus stop in Fontane Marose Square)

*RETURN TO HOTELS: 9:00 PM (buses will wait outside the Villa and will take participants back to each hotel)*

### MAY 2 - CONGRESS

HOTEL JOLLY MARINA: 7:45 AM meet the hostess in the lobby of hotel. 5 minutes walk to congress center

HOTEL BRISTOL: 7:30 AM (bus stop outside hotel)

HOTEL METROPOLI: 7:30 AM meet the hostess in the lobby of hotel  
(departure 7:35: bus stop in Fontane Marose Square)

HOTEL CITY: 7:30 AM meet the hostess in the lobby of hotel  
(departure 7:35: bus stop in Fontane Marose Square)

*RETURN TO HOTELS: From 5:30 PM - 7:15 PM buses available outside Congress Center*

### MAY 3 - CONGRESS

HOTEL JOLLY MARINA: 7:45 AM meet the hostess in the lobby of hotel. 5 minutes walk to congress center

HOTEL BRISTOL: 7:30 AM (bus stop outside hotel)

HOTEL METROPOLI: 7:30 AM meet the hostess in the lobby of hotel  
(departure 7:35: bus stop in Fontane Marose Square)

HOTEL CITY: 7:30 AM meet the hostess in the lobby of hotel  
(departure 7:35: bus stop in Fontane Marose Square)

*RETURN TO HOTELS: 1:30 PM buses available outside Congress Center, and 5:00 PM buses available outside Congress Center*

### MAY 3 - DINNER AQUARIUM

HOTEL JOLLY MARINA: 7:15 PM meet the hostess in the lobby (5 minute walk)

HOTEL BRISTOL: 6:45 PM (departure 7:00 PM: bus stop outside hotel)

HOTEL METROPOLI: 6:45 PM meet the hostess in the lobby of hotel  
(departure 7:05: bus stop in Fontane Marose Square)

HOTEL CITY: 6:45 PM meet the hostess in the lobby of hotel  
(departure 7:05: bus stop in Fontane Marose Square)

*RETURN TO HOTELS: Buses will wait for the end of the dinner outside the Aquarium and will take participants back to each hotel.*

### MAY 4 - CONGRESS

HOTEL JOLLY MARINA: 7:45 AM meet the hostess in the lobby of hotel. 5 minute walk to congress center

HOTEL BRISTOL: 7:30 AM (bus stop outside hotel)

HOTEL METROPOLI: 7:30 AM meet the hostess in the lobby of hotel  
(departure 7:35: bus stop in Fontane Marose Square)

HOTEL CITY: 7:30 AM meet the hostess in the lobby of hotel  
(departure 7:35: bus stop in Fontane Marose Square)

*RETURN TO HOTELS: 1:00 PM buses available outside Congress Center*



## IPEG SOCIAL EVENTS

### Welcome to Genoa Reception

Day/Date: Wednesday, May 1, 2002  
Time: 6:30 - 9:00 PM  
Place: Gaslini Villa  
Shuttles: Shuttles will be provided from the hotels.  
Fee: No Fee for Registrants and registered guests

This reception has been generously provided to IPEG by the Gaslini Foundation.

### Reception in the Exhibit Hall

Day/Date: Thursday, May 2, 2002  
Time: 5:15 - 6:00 PM  
Place: Exhibit Hall,  
Fee: No Fee for Registrants and registered guests

Meet the Exhibitors. Enjoy a collegial reception and let your eyes and ears feast on the latest innovations in endoscopic surgery.

### An Evening by the Sea

Day/Date: Friday, May 3, 2002  
Time: Buses depart hotels at 7:30 pm  
Place: Genoa Aquarium  
Dress: Elegant  
Fee: \$75 per person (ticketed event).

This event includes dinner and the opportunity to tour a portion of the Genoa Aquarium. The Aquarium is located immediately adjacent to the Jolly Marina Hotel

**Pencil us in:**  
**IPEG joint meeting with SAGES,**  
**March 11-13, 2003.**  
**Los Angeles, CA.**



## IPEG ORAL ABSTRACTS

### s01. ROBOTIC ENTEROTOMY REPAIR IN FETAL PIGS

Celeste M. Hollands, MD, Laramie N. Dixey, RN,

*Department of Surgery, Louisiana State University Health Sciences Center, Shreveport, Louisiana, USA, Department of Surgery, Louisiana State University Health Sciences Center, Shreveport, Louisiana*

**Introduction:** The purpose of this study was to evaluate the technical feasibility of performing robotic suturing tasks in fetal pigs. Robotic procedures utilizing these tasks have been described in newborn piglets, however, difficulties with these tasks were anticipated in the smaller fetal pigs.

**Methods and Procedures:** Six cadaveric fetal pigs (9-11 inches crown-rump length) underwent enterotomy repair using the Zeus Robotic Surgical System™. Robotic function, port site integrity, and suture time were analyzed. Suture time was the time the suture entered the field until four knots were completed intracorporeally. Suture time was then compared to suture times from previous robotic procedures. Statistical significance was defined at  $p < 0.05$  using the two-tailed student's t-test. **Results:** Five of six cases were completed without robotic function or port site integrity problems. The first case was aborted due to technical problems caused by traumatic enlargement of the port sites. Mean suture time was  $5.4 \pm 0.96$  minutes (fetal pigs,  $n = 5$ ) and was significantly faster than existing times:  $10.1 \pm 2.5$  minutes (newborn piglets,  $n = 24$ ),  $p = 0.0003$ . The faster time is likely a result of enterotomy repair being technically easier than performing an anastomosis.

**Conclusion:** Robotic suturing in this model is technically possible and may extend this technology to human premature infants and fetuses. Further studies using a live animal model are needed to validate feasibility.

### s02. THORACOSCOPIC REPAIR OF ESOPHAGEAL ATRESIA WITH FISTULA - OUR INITIAL EXPERIENCE

Marcelo Martinez Ferro MD, Gaston Elmo MD, Horacio Bignon MD

*National Children's Hospital J.P. Garrahan. University of Buenos Aires. Buenos Aires, Argentina.*

**OBJECTIVE:** To report our personal initial experience with primary thoracoscopic repair of TEF

**METHODS:** Patients: 5 consecutive newborn infants with TEF. Average birth weight was 2750g (2200 to 3300g) all belonged to Spitz I group.

**Technique:** Patient is positioned prone and three trocars are placed (one 5mm and two 3mm). CO2 insufflation to 5mm Hg provides excellent lung retraction. Azygos vein is divided with monopolar cautery and the T-E fistula is dissected and divided using two medium-large 5mm titanium clips. Anastomosis is accomplished using 8 to 10 interrupted stitches of 5/0 PDS using extracorporeal knot tying. A transanastomotic silastic tube is advanced and a 12 french chest tube is inserted via the lowest trocar site.

**RESULTS:** Primary correction was accomplished in all cases. No operative complications were encountered. Operative mean time was of 110 minutes (87 to 189 minutes). One patient (20%) presented a mild postoperative leak. Three patients (60%) presented anastomotic stricture that required periodical balloon dilatation with good results. Postoperative pain management and cosmetic results were significantly better than observed in open thoracotomies.

**CONCLUSIONS:** Although thoracoscopic primary repair of TEF seems to have great advantages, further experience and a bigger number of cases are needed in order to advance in the learning curve thus, at this stage, stricture and leakage rates still seem to be higher than observed historically.

### s03. INTRATRACHEAL PULMONARY VENTILATION INCREASES THE SAFETY OF PEDIATRIC LAPAROSCOPY IN THE SETTING OF RESPIRATORY FAILURE

Amir Kaviani, MD; Kenneth Watson, RRT; John Thompson, RRT; Christopher Muratore, MD; Alexander Dzakovic, MD; Carrie Simms, MD; Julie Fuchs, MD; Moritz M. Ziegler, MD; Jay Wilson, MD; Dario O. Fauza, MD

*Children's Hospital and Harvard Center for Minimally Invasive Surgery (Boston, Massachusetts, USA).*

**Objective:** To determine whether intratracheal pulmonary ventilation (ITPV) can prevent and/or treat the hypercarbia, high ventilating pressures, and hypoxemia observed during laparoscopy in children with severe respiratory failure.

**Methods:** Lung injury was induced in neonatal lambs ( $n = 5$ ) by repeat endotracheal saline lavage. Animals underwent establishment of CO2 pneumoperitoneum. Intraperitoneal pressures were raised from 0 to 15mmHg, at 5mmHg intervals. At each pressure interval, blood gas and hemodynamic data were recorded, along with ventilating parameters, 20 minutes after initiation of both conventional ventilation and pure ITPV, in alternating fashion. In both modes of ventilation, the FiO2, respiratory rate (RR), and inspiratory/expiratory pressures were constant. Statistical analysis was by repeated measures ANOVA, with significance set at  $p < 0.05$ .

**Results:** On conventional ventilation, CO2 pneumoperitoneum resulted in severe respiratory acidosis at intraperitoneal pressures  $\geq 5$  mmHg and severe hypoxemia at pressures  $\geq 10$  mmHg. Compared with conventional ventilation, ITPV led to statistically significant decreases in pCO2 at pressures of 5 and 10mmHg and to significant increases in pO2 at 10mmHg, resolving the acidosis and hypoxemia.

**Conclusions:** ITPV significantly improves CO2 removal and oxygenation during CO2 pneumoperitoneum, allowing for lower ventilating pressures. ITPV increases the safety of pediatric laparoscopy in the setting of pulmonary failure.

### s04. VIDEOASSISTED REMOVAL OF TWISTED NEONATAL OVARIAN CYST

A. Porreca M.D., A. Tramontano M.D.

*Ospedale Santobono, Divisione di Chirurgia d'Urgenza, Naples, ITALY*

We report four cases of twisted ovarian cysts removed with laparoscopic assistance. The diameter ranged from 5 to 8 cm. In all cases the presence of an intracystic debris level was held as a sign of torsion. The age at operation varied from 3 to 10 days.

In all cases a MiniPort® was inserted in the inferior umbilical crease or contralateral flank, pneumoperitoneum was established, and a 2mm telescope MicroLap® was inserted. The cyst was aspirated percutaneously under visual control. The cyst was right sided in three



cases and left sided in one. Preoperative ultrasound diagnosis was of right sided cyst in all cases. Pneumoperitoneum was evacuated to better localize the inguinal crease and a small 1.5 cm emiotomy incision was performed on the crease. The external obliquous fascia was incised along the direction of its fibers like for a gridiron incision. Pneumoperitoneum was reestablished to allow cyst grasping under visual control through the small peritoneal opening. The ovary was totally removed in 3 cases while in one a little piece strictly adherent to the tube was left in place. In two cases the tuba involved in the torsion was removed.

This videoassisted removal of twisted ovarian cysts offers several advantages: it is simple, allows a correct diagnosis of side and a reduction of size of the cyst, adhesions of the cyst are detected, and the size and the site of skin incision offers excellent cosmetic results.

#### s05. MINIMAL INVASIVE OESOPHAGECTOMY AFTER CORROSIVE BURN IN CHILDREN: A CASE REPORT

Gesmundo R., Garrone C., Lonati L., Morino M., Canavese F.

*Divisione di Chirurgia B Ospedale infantile Regina Margherita - Torino - Italy*

*Divisione di Chirurgia D'Urgenza Ospedale Giovanni Battista - Torino - Italy*

**BACKGROUND:** Secondary mucocele is a complication of oesophageal exclusion after corrosive burns treated with oesophageal bypass. The modern approach in pediatric age is to remove the damaged oesophagus during the procedure of oesophageal substitution because of risk for late malignant condition. This paper reports the complete removal by thoracoscopy of a secondary mucocele of the oesophagus in a 17 years old patient following ingestion of caustic substances in childhood.

**CASE REPORT:** At the age of two years the patient drank muriatic acid. Necrosis of the distal third of the oesophagus ensued with various perforations. Left latero-cervical oesophagostomy and gastrostomy were performed and the abdominal oesophagus was cut and closed with G.I.A.. The oesophagus was left in situ. One year later a Postelwheit-Galussi isoperistaltic gastric tube was created. From then on the patient has been well. A recent thoracic CT scan revealed a cystic mass 6 x 5 cm. near the hiatus. Because of the risk of a neoplastic formation the cyst was removed by thoracoscopy.

**CONCLUSIONS:** The procedure is feasible and safe if performed by a skill-practice thoracoscopic team. Minimally invasive oesophagectomy may reduce the morbidity of thoracotomy and allows the patient to return early to routine activities

#### s06. LAPAROSCOPIC EXTRACTION OF A GIANT GASTRIC BEZOAR

Steven S Rothenberg M.D.

*Presbyterian/St Lukes Medical Center Denver, Colorado*

**Purpose:** To describe a technique for laparoscopic removal of a giant gastric bezoar

**Methods:** A 12 year old girl who presented with a proximal bowel obstruction was found to have a giant gastric bezoar, a small piece of which had broken loose and temporarily blocked the 3rd portion of her duodenum. Upon further evaluation and stabilization she underwent laparoscopic exploration for planned removal of the mass. Four ports, all 5mm, were used. An anterior gastrotomy was made and then a large specimen bag was placed through an enlarged umbilical port site, and the bezoar was placed in the bag. The neck of the bag was brought out of the umbilical incision and the mass was removed piece-meal. The anterior gastrotomy was closed with a running suture line.

**Results:** The procedure lasted 70 minutes. An NG tube was left in place and was removed on the fourth post-operative day. The patient was tolerating full feeds on day six and was discharged. There have been no post-operative complications.

**Conclusion:** Laparoscopic removal of an intraluminal gastric mass is a safe and effective technique. Hospital stay is not altered significantly because of the large gastric incision but pain control and cosmetic result are significantly improved.

#### s07. HOW TO MANAGE THE VANISHING TESTIS DIAGNOSED LAPAROSCOPICALLY? RESULTS OF AN HISTOLOGICAL STUDY.

Aceti M. R. G., M.D., La Riccia A., M.D., Riccipetioni G., M.D.

*Division of Paediatric Surgery, Ospedale dell'Annunziata - Cosenza (ITALY)*

**AIMS OF THE STUDY:** Controversy exists about the necessity to remove the testicular nibbin in case of vanishing testis diagnosed laparoscopically. We reviewed the histological findings of our series and we discuss the effectiveness of a further inguinal surgery.

**MATERIALS AND METHODS:** In the period January 1994 - September 2001, we submitted to a laparoscopic approach for a condition of non palpable testis 82 patients, aged between 1 and 13 years; 4 of them were bilaterally affected, for a total of 86 testes investigated.

At diagnostic laparoscopy we found : 41 intraabdominal testes, 34 vanishing testes with the atretic vessels and vas deferens entering into the inguinal canal, 11 cases of intraabdominal blindended vessels. All the 34 patients with vanishing testis were treated through a minimal inguinal incision (1 cm); the residual testicular tissue was removed and submitted to histological study. The histopathologic findings revealed : fibrosis and absence of testicular tissue in 33 specimens (97.1%), the presence of rare Leydig's cells without any seminiferous tubules in the remaining one case (2.9%).

**CONCLUSIONS:** We conclude that in patients with inguinal vanishing testis the removing of the residual tissue cannot be mandatory. In fact, in these cases the relief of seminiferous tubules and Leydig' cells is exceptional, so the risk of malignant degeneration can be considered remote.

#### s08. COMPLICATION AVOIDANCE IN MINIATURE ACCESS PYLOROMYOTOMY.

Levitt MA, Caty MG, Rothenberg SS, Tantoco JG, Chang J, Bealer JF, Brisseau GF, Glick PL

*Department of Pediatric Surgical Services, Miniature Access Surgery Center, Children's Hospital of Buffalo, Department of Surgery, Miniature Access Surgery Teaching, Training, and Research Center, State University of New York at Buffalo, Buffalo, New York*

**Purpose.** Miniature access pyloromyotomy is a well-established procedure in the management of infants with pyloric stenosis. Several studies have compared the miniature access and open approaches, and the incidence of complications is similar. The miniature access



approach has benefits such as superior cosmetic results, earlier feeding, and shorter hospital stay. We describe our complications and complication avoidance techniques in miniature access pyloromyotomies. Methods. 160 infants with pyloric stenosis underwent miniature access pyloromyotomy at two centers over a two-year period. Complications and complication avoidance techniques are described. Results. Seven complications were noted. Two duodenal perforations, two incomplete myotomies, one omental evisceration, and two umbilical wound infections. The following measures were used to prevent complications; avoidance of the umbilicus if it has inadequate epithelialization, low pressure carbon dioxide insufflation, use of a retractable knife, making the ideal myotomy incision, use of a special spreader, applying slow gentle pressure while spreading, injection of air and/or methylene blue in the stomach after the myotomy, and meticulous inspection of the myotomy. Conclusions. Miniature access pyloromyotomy is an excellent procedure with avoidable complications. Key complication avoidance techniques should be employed.

#### s09. HAND-ASSISTED LAPAROSCOPIC COLECTOMY IN ADOLESCENTS

Klaas(N) M.A. Bax, M.D., Ph.D., and David C. van der Zee, M.D., Ph.D.

*Wilhelmina Children's Hospital, University Medical Center, Utrecht, The Netherlands*

Objective of the study: To increase the awareness amongst pediatric surgeons of the usefulness of a hand-assisted laparoscopic technique for complex operations such as colectomy in adolescents.

Methods and procedures: Two adolescents underwent colonic resection using a hand-assisted laparoscopic technique. The first patient had a left hemicolectomy with terminal colostomy and blind closure of the rectal stump for Crohn's disease. The second patient underwent a subtotal colectomy, ileo-neo-rectal anastomosis and protective ileostomy for ulcerative colitis. In both patients a 10cm long incision was made in a suprapubic skin crease. Through the minilaparotomy classic open surgery was performed as far as possible, which entailed also preparation of the vascularized ileal mucosal graft for inlay in the mucosetomized rectum in the second patient. For mobilization of the remaining colon a hand-assist inflatable ring (Omniport™) was inserted in the minilaparotomy wound. Three more ports were inserted: a 11 mm one through the umbilicus for the telescope, and a 6mm port on either side of the umbilicus for the working instruments.

Results: The hand-assisted removal of the colon in both patients proved simple and lasted respectively 1 and two hours.

Conclusions: Hand-assisted laparoscopic colectomy is much simpler than a non-hand-assisted laparoscopic technique. It is especially useful in obese adolescents which is often present as an expression steroid toxicity.

#### s10. IS PEDIATRIC SURGICAL DEPARTMENT SUITABLE FOR QUALIFIED ENDOSCOPY TRAINING?

E. DeGrazia, G. LiVoti, M. DiPace, S. Amoroso\*, M. LoCascio, C. Acierno\*\*

*\*Pediatric Surgery of University of Palermo, \*\*General Pediatric Hospital of Palermo*

Introduction: The NASPGAN has defined the minimum level of procedures to perform to be considered a reliable endoscopist (100 diagnostic egd plus 50 total colonoscopy). The aim of this study is the evaluation of the number and the quality of procedures performed in a ten years time in the surgical pediatric district of west Sicily to verify the reliability of a pediatric endoscopic training program.

Methods and procedures: All the endoscopic procedures performed in the University and the General pediatric hospital in a ten years time are classified as esophagogastroduodenoscopy or rectosigmoidoscopy or total colonoscopy. The indications are compared to the end diagnosis; emergency and operative endoscopies are considered.

Results: 1757 procedures were performed. 1350 egd and 407 colonoscopy, 41% of which were total colonoscopy. The indications were confirmed as reflux esophagitis and peptic disease 202, foreign body removal 78, esophageal stenosis 94, ematemesis by variceal or peptic bleeding 55, caustic injury of esophagus 47, peg 3, recurrent abdominal pain by h.pilori or peptic disease 180, others 11, inconclusive 680. Emergency endoscopies were performed in 13%. The indications to colonoscopy were suspected chronic bowel disease or rectal bleeding. The 407 procedures were divided as 90 polyps removal, 317 suspected inflammatory disease 89 of which confirmed the suspected diagnosis (28%). The results of endoscopic examinations were concordant to the suspected diagnosis in 49% of cases.

Conclusions: The reported data demonstrate that even in surgical units is possible to held an endoscopic training program. The number of procedures performed allows training one person every 3 years. The lack of sufficient number of advanced procedures as ercp, peg or variceal banding needs also a cooperative program with adult general endoscopic unit or virtual endoscopic equipment.

#### s11. BIGGER ISN'T ALWAYS BETTER.

Mark S. Burke BS, Joselito G. Tantoco MD, Marc A. Levitt MD, Guy F. Brisseau MD, Michael G. Caty MD, Philip L. Glick MD.

*Department of Pediatric Surgical Services, Miniature Access Surgery Center, Children's Hospital of Buffalo, Department of Surgery, Miniature Access Surgery Teaching, Training, and Research Center, State University of New York at Buffalo, Buffalo, New York*

Purpose. Use of smaller telescopes in miniature access surgery has the benefits of lesser abdominal wall trauma, easier intracorporeal manipulation and superior cosmesis. We hypothesized that 5mm telescopes offer sufficient visualization and clarity so that use of a 10 mm scope is rarely required, and that the use of telescopes smaller than 5mm may offer disadvantages. Methods. Total and readable fields of view were measured using 5 Stryker telescopes. 10mm and 5mm 0 deg., 10mm and 5mm 30 deg., and 2.7mm 30 deg. scopes were used at varying focal lengths. Light output readings were taken with clean and blood stained lenses. Results. Field of view measurements for the 5mm 0 degree telescope were greater than the 10 and 2.7mm scopes for each focal length ( $p < .05$ ). Differences in light readings between the 10mm-0 and 5mm-0 laparoscopes were not significant when the lenses were clean but were better for the 10 mm scope when stained with blood ( $p < .05$ ). No significant differences in light readings were noted between 0 and 30 degree scopes ( $p > .05$ ). Light readings for the 2.7 mm scope were significantly lower than readings for the 10mm and 5mm scopes ( $p < .05$ ). Conclusions. The 5mm scope provides visualization and image clarity equal to the 10mm scope. The 2.7mm scope provides inferior visualization and illumination when compared to the 5mm scope. The advantage of lesser abdominal wall trauma provided by the 2.7mm scope is outweighed by the compromised visualization and illumination.

#### s12. EFFICACY OF LAPAROSCOPIC MUSCLE STIMULATOR IN LAPAROSCOPY ASSISTED ANORECTAL PULL-THROUGH FOR HIGH IMPERFORATE ANUS

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PhD

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Purpose: To report laparoscopic findings of levator muscle and efficacy of laparoscopic muscle stimulator (LMS) in infants with high imperforate anus.

Methods: Since May 2000, 10 patients have undergone laparoscopy assisted anorectal pull-through (LAARP) for high imperforate anus (2 rectovesical fistulae, 4 rectourethral fistulae, 2 rectovaginal fistulae, 1 rectocloacal fistula, and 1 rectal agenesis). Following laparoscopic dissection of the distal rectum and division of the fistula, levator muscles in the pelvic floor were stimulated with 5mm diameter LMS. Dilatation was done by inserting a guide-wire and balloon catheter through the center of the levator muscle sling and muscle complex. Rectal pull-through and anastomosis between the rectum and anus were successfully completed.

Results: LMS showed good contraction of levator muscles and enhanced accurate midline placement of pull-through rectum. LMS was especially useful in observing weak muscles in infants with rectovesical fistula.

Conclusions: Laparoscopy and LMS offer excellent visualization of the pelvic musculature and precise tract of rectal pull-through. Fecal continence will be assessed by long-term follow-up.

### s13. NISSEN FUNDOPLICATION FOR RESPIRATORY SYMPTOMS.

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Introduction Laparoscopic fundoplication, though effective on esophagitis, has unclear effects on gastroesophageal reflux (GER)-induced respiratory symptoms. Aim of this study is the assessment of this procedure on those symptoms in our patients.

Methods Between February 1995 and September 2001 44 patients underwent Nissen laparoscopic fundoplication for GER disease. 10 patients (24%) complained mostly respiratory symptoms (7 bronchopneumonia, 1 asthma, 1 laryngitis, 1 ALTE) assumed as related to GER. Diagnosis was based on clinical findings in 4 patients, on abnormal 24-hour pH-studies in 6. Eight patients underwent endoscopy with biopsy and esophagitis was found in 3. Medical trial was attempted in all patients for a mean of 12 months (1-40 months). Mean age at operation was 21 months (range 6-42). Mean weight was 11 Kg (range 3,7-20). Average follow up was 19 months (1-54).

Results There were no intra-peri-operative complications. Normalization of pH monitoring and histological studies previously abnormal was observed in all patients. Respiratory symptoms were completely relieved in 8 patients, significantly improved in 2.

Conclusions GER can be responsible for respiratory symptoms without causing esophagitis. These patients need a careful preoperative assessment. Laparoscopic fundoplication is a safe and effective procedure for treatment of infants and children with severe respiratory symptoms related to GER.

### s14. LAPAROSCOPIC CARDIOMYOTOMY WITHOUT FUNDOPLICATION FOR ACHALASIA CARDIA IN CHILDREN.

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Aims: Achalasia cardia has been successfully treated laparoscopically in children. However most of the surgeons prefer to perform a partial or complete fundoplication along with cardiomyotomy. We feel that fundoplication is unnecessary and contribute to persistent symptoms. The aim of our study was to evaluate our results.

Method: Since 1998, five patients were diagnosed to have achalasia cardia on barium swallow. Endoscopy was performed at the time of definitive surgery as an aid to cardiomyotomy. Four out of 5 patients underwent laparoscopic cardiomyotomy successfully without fundoplication.

Results: The median operation time was 90 minutes. The median time to oral fluids was 12 hours and the median hospital stay was 96 hours. One patient had a mucosal oesophageal perforation and hence was converted to open. The perforation was stitched with omental patch. The patient made a rapid recovery and was free of symptoms. Four out of 5 patients were asymptomatic at follow-up and one patient had occasional cough.

Conclusion: Laparoscopic cardiomyotomy without fundoplication achieves satisfactory symptomatic relief in patients with achalasia cardia. It can be performed with minimal morbidity. We feel that fundoplication (partial or complete) is not required in most of the patients with achalasia cardia.

### s15. VENTILATORY AND HEMODYNAMIC MODIFICATIONS DURING LAPAROSCOPIC FUNDOPLICATION

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A prospective study on anesthesiological management during pediatric lap.fundoplication is presented. 33 patients, operated on in the period 1/00-7/01, were included. Mean age was 6y(SD4.2) and weight 24Kg(SD17). 19 had gastrointestinal symptoms while 14 had respiratory symptoms. Mean duration of pneumoperitoneum and of anaesthesia was 70 min (SD21) and 116 min (SD21) respectively. To evaluate cardiorespiratory status we used an electrocardioscope, non-invasive blood pressure monitor, pulse oxymeter (partial oxygen saturation) and capnography (End-Tidal CO<sub>2</sub>, ventilation efficacy index). Moreover, after one hour of pneumoperitoneum or if necessary, a venous blood gas analysis was performed (O<sub>2</sub> and CO<sub>2</sub> partial pressures, pH value, and bicarbonate concentration). No significant cardiovascular changes occurred. Partial O<sub>2</sub> saturation remained within normal range in all the patients. End-Tidal CO<sub>2</sub> increased in 5 patients (15%), 3 of whom were inhalers, but never exceeded 45 mmHg. In one patient End-Tidal CO<sub>2</sub> persisted elevated after desufflation. Blood gas analysis showed a pH less than 7.3 in 5 patients (15%), 4 of whom were inhalers. No major complications nor need to conversion were experienced. When intra-abdominal pressure is maintained less than 12 mmHg, CO<sub>2</sub> insufflation seems not to impair cardiovascular function, or to interfere significantly with gas exchanges. However, pneumoperitoneum reduces ventilatory function, requiring an increase in ventilation rates or volumes. The use of bicarbonates or THAM is necessary when pH drop is evident and ventilatory exchanges are not sufficient; this happens mainly in inhalers with various degrees of underlying pulmonary dysplasia.



### §16. RECANALIZATION OF AN ESOPHAGEAL ATRESIA ANASTOMOSIS BY AN INTERVENTIONAL RADIOLOGICAL TECHNIQUE

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We present a new tool using the interventional radiology technique of transjugular intrahepatic portosystemic shunts (TIPS) to recanalize a failed esophageal anastomosis in an infant.

**CASE REPORT:** The 1.5 Kg patient was born at 31 weeks with esophageal atresia (EA) and tracheoesophageal fistula (TEF). Because of a long gap, division of the TEF and gastrostomy were performed. Two months later, she underwent a delayed primary anastomosis. The contrast study showed the proximal pouch to be connected to a false lumen. Endoscopic recanalization was unsuccessful. Under fluoroscopic control, the needle used for TIPS was introduced through the gastrostomy, pushed through the membrane of the false channel and grabbed by a basket introduced through the mouth. A wire was left in place. The lumen was sequentially dilated using pneumatic and bougie dilations to a size 30 Fr. She required 9 dilations over a course of 2 months. She expired two months after the last dilatation of unrelated sepsis. At the time of her death, there was no clinical evidence of stricture.

**DISCUSSION:** Obliteration of the anastomosis by a false lumen is a rare complication of EA repair. Spontaneous fistulization did not occur in this patient. Applying this technique, we were able to recanalize the lumen and dilate it to an adequate size, sparing her a third thoracotomy. This technique could be applied to cases of severe strictures where a lumen could not be established by standard methods.

### §17. FUNDOPLICATION IS RARELY NECESSARY FOLLOWING LAPAROSCOPIC GASTROSTOMY EXCEPT IN THE NEUROLOGICALLY-IMPAIRED CHILD.

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**Introduction:** Laparoscopic gastrostomy is a safe and effective technique. Patients may have evidence of uncomplicated gastroesophageal reflux (GER), leading some to advocate prophylactic fundoplication at the same time as gastrostomy. The purpose of this study was to determine if uncomplicated GER necessitated subsequent fundoplication.

**Methods:** From 1997 to 2000, 45 children referred for feeding access with no evidence of esophagitis/stricture, lung disease, or apnea, were offered laparoscopic gastrostomy. The operation was performed utilizing a two-port technique. Postoperatively, children failing medical management of GER or developing complications of GER were treated with fundoplication.

**Results:** Indications for feeding access included neurologic impairment(12), aspiration(10), trauma(7), malignancy(6), failure to thrive(6), and cystic fibrosis(4). Mean age of the children was 5.7+-5.5 years with a mean weight of 11.2+-6.5 Kg. Eighteen children(40%) had clinically-suspected or radiographically-proven GER prior to laparoscopic gastrostomy. Postoperatively, 5 patients(11%) subsequently underwent fundoplication. Three of these five patients were neurologically impaired.

**Conclusions:** Although fundoplication became necessary in 11% of all patients, this was done in only 6% of neurologically normal children and 25% of neurologically impaired children. Therefore, in the absence of absolute indications, fundoplication concomitant with laparoscopic gastrostomy is unnecessary.

### §18. LONG-TERM FOLLOW-UP AFTER LAPAROSCOPIC TOUPET FUNDOPLICATION IN CHILDREN WITH ATYPICAL SYMPTOMS OF GASTROESOPHAGEAL REFLUX

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The aim of this study was to evaluate the long-term follow-up in patients with atypical symptoms of gastroesophageal reflux (GERD) submitted to a laparoscopic Toupet fundoplication (LTF). A questionnaire was mailed to patients operated between 06/93 to 01/00. Questions included: symptoms before and after surgery; medication; re-operations; postoperative (PO) X-rays, pHmetry, esophageal manometry and endoscopy; recurrence of symptoms; quality of life, esthetics, and psychological outcome. 94 questionnaires were mailed. 39 boys and 31 girls responded. Mean age was 8.3 yrs (8m-25yrs). Mean follow-up was 3 yrs (6m-7yrs). 67% reported a notorious decrease of symptoms, 51% reported vomit, nausea, diarrhea or hick-ups within the first PO weeks. 88% suspended antireflux medication after surgery. None of them have been re-operated. 74% have had a normal PO pHmetry, Upper GI, or manometry. 84% are free of symptoms. A good to excellent result was reported in 94% regarding esthetics, 81% in PO psychological status, 94% in the quality of life and 91% in the general result to this procedure. These results show that LTF is an excellent surgical option for children suffering from GERD with atypical symptoms.

### §19. LAPAROSCOPIC INTERVENTION OF INTRA-THORACIC STOMACH IN INFANTS.

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[Aim] Intra-thoracic stomach is an uncommon condition that is divided into three types. The aim of the paper is to describe our experience of four infants with intra-thoracic stomach repaired by a laparoscopic operation. [Subjects] The age of the patients on diagnosis ranged from thirteen days to one year and two months. The symptoms were severe anemia due to gastric bleeding in one case and failure to thrive in two cases. The other case was neurologically impaired. The diagnosis was confirmed by gastrographin study. Preoperative nutrition was maintained via oral in two cases and via naso-duodenal tubing in the others. [Operation] Laparoscopic reduction of the stomach was easily performed in all. Oro-gastric tubing served to keep the stomach in the abdomen. The type of hiatal hernia was paraesophageal hernia in one case and sliding hernia in three. In the case of sliding hernia, the esophago-phrenic membrane was very thick, so the membrane was completely removed to make sure the crus. After closing the crus, 360-degree fundoplication was performed in all cases. In paraesophageal hernia, the cuff was sutured to the crus to prevent relapse. Gastrostomy was made in one case of





neurological impairment.[Results] Follow-up term is from one month to three years. No relapse was seen.Without neurologically impaired case, the growth and the development of the patients are within normal limit.[Conclusion] Laparoscopy is feasible and effective for the treatment of intra-thoracic stomach.

#### s20. LAPAROSCOPIC GASTROSCOPY ASSISTED VENTRAL THAL HEMIPLICATION AS REDO-PROCEDURE IN RECURRENT GASTROESOPHAGEAL REFLUX

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Objectives: Being satisfied with open Thal particularly for handicapped children with impaired esophageal motility we performed gastroscopy assisted lap. Thal as routine since 3/1993 in Berlin-Buch and since 1998 for recurrences. To evaluate the procedure patients were followed prospectively.

Methods: Preoperatively (6, 24, 60 months) patients had oesophageal pH-monitoring, oesophagogastrosopy, and most upper GI series/szintigraphy. Surgery was indicated by convincing history of vomiting, aspiration, failure to thrive despite maximal medication >6 months plus massive reflux (pH < 4, >20% of time) plus histological esophagitis, three had peptic stenosis.

Results: Out of 54 lap. Thals seven handicapped children got gastroscopy assisted laparoscopic redo-Thal after 1-5 failed open Nissen funduplications and one Thal. In all, satisfactory Thal wrap could be confirmed by intraoperative gastroscopy, but two conversions were necessary for esophageal perforation and inadequate vision. After 5-32 months all children are clinically free of symptoms, 5 have a normalized ph study (< 2 %) and only 2 have borderline ph studies (4.2 and 5 % Reflux) after 6 months. Reflux index has dropped from a mean of 52.8 % ± 23.1% (range 17-81,8%) preoperatively to 2.1 % ± 2% (range 0,1-5%) postoperatively (6-24 months).

Conclusions: Gastroscopy assisted lap. Thal hemiplication is a safe and effective new technique for redo procedures even in small children and after multiple open procedures.

#### s.21 ITALIAN MULTICENTER SURVEY ON LAPAROSCOPIC GASTRO-ESOPHAGEAL REFLUX SURGICAL TREATMENT

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The authors present the experience of 8 Italian pediatric surgical units on the laparoscopic treatment of gastro-esophageal reflux (GER). Inclusion criteria were: fundoplication performed after 1/98 in children younger than 14 years, with a minimum follow-up of 6 months. 288 children were included. Mean age was 4.8 years (3m-14y). Esophagitis was the main symptom in 182 cases, asthma in 53, respiratory infections in 80. Hiatus hernia was present in 84 and associated diseases in 101 (neurological impairment in 73 and previous TEF in 12). Esophageal pHmetry was performed in 89%, endoscopy in 74%, upper GI tract meal X-ray in 94%, gastro-duodenal transit time in 12% and respiratory tract endoscopy in 11%. In 93% of cases the procedure was completed by laparoscopic approach. A Nissen fundoplication was done in 25%, a floppy Nissen in 63%, a Toupet in 1.7% and other procedures in 10% of patients. Sectioning of the lesser omentum was routinely performed in all the cases of 4 centers and no resection of the short gastric vessels in 6 centers. Naso-gastric tube was maintained for at least 24 hours in 6 centers. Gastrostomy was always associated, if neurological impairment or feeding disorders were present. Mean follow-up was 15 months (6-54); 17 children (6%) needed re-operation because of stricture of the wrap or recurrence of GER. The experience of the different centers showed a great variability in indication and procedure with a similar outcome. Details will be discussed.

#### s21a. THORACOSCOPIC LOBECTOMY FOR PRENATALLY DIAGNOSED LUNG LESION

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Objective: Few lung lesions, now diagnosed with increasing frequency antenatally, lead to in utero demise or require prenatal intervention. For patients delivered at term, we present our early series of surgical management using modern minimal access techniques.

Methods: Retrospective chart review performed at single institution from June 1999 to October 2001. Patients with prenatally diagnosed lung lesion not requiring prenatal intervention comprised study group (n = 12; 8 males, 4 females). All patients underwent elective postnatal lung mass excision, and clinical characteristics and perioperative course were analyzed.

Results: All lesions demonstrated size regression prenatally. No neonate was symptomatic at birth. CT scan confirmed diagnosis despite normal chest radiograph at birth in all. All patients underwent elective thoracoscopic lobectomy at mean age of 6 months (range 3-15 mos). Mean operating time, 110 min. Ten were cystic adenomatoid malformation, 1 extralobar sequestration, and 1 intralobar sequestration. Eleven were left-sided (10 lower lobe); 1 was right-sided (lower lobe). There were no intraoperative or postoperative complications. Average hospital stay was 38 hours.

Conclusion: Accurate prenatal diagnosis and surveillance of fetal lung lesions has resulted in a group of postnatally asymptomatic patients who are candidates for elective thoracoscopic resection. These lesions can be safely removed using modern minimal access techniques.

#### s21b. LAPAROSCOPIC ADRENALECTOMY IN CHILDREN

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PURPOSE: Laparoscopic adrenalectomy is being recognized as the new gold standard in the management of adrenal pathology in adult patients. Few reports have described the use of this technique in pediatric patients.

METHODS: A bi-institutional retrospective chart review of all patients undergoing laparoscopic adrenalectomy between January 1997 and November 2000 was performed.

RESULTS: Fifteen laparoscopic adrenalectomies were performed in ten females and five males with a mean age 9 yrs (range, 3-16 yrs). Pathology was isolated to the left adrenal gland in 11 patients and right gland in 4 patients. The average duration of operation was 103 minutes, the estimated blood loss was less than 30 ml in all cases, and the mean size of the adrenal lesions as 4.6 cm in greatest dimension.



The mean length of postoperative hospitalization was 35 hours with average length follow-up of 23 months. There were no intraoperative complications. However, the one patient with carcinoma had tumor thrombus in the adrenal vein and this procedure was converted to an open operation for renal vein tumor thrombectomy.

CONCLUSIONS: Laparoscopic adrenalectomy can be performed safely and effectively with a short postoperative stay and minimal blood loss in children. We believe it should become the approach of choice for excision of select pediatric adrenal pathology.

### s21c. CERVICO-MEDIASTINOSCOPIC THYMECTOMIES IN CHILDREN

Olivier Reinberg (1), Philippe Montupet (2), Helène Martelli (2)

Introduction: After having performed 2 video-assisted thymectomies in children in 1997 we changed for a totally closed approach in 3 additional cases, so-called cervico-mediastinoscopy.

Method: Children ranged from 5 to 15 years of age. All but one suffered from myasthenia gravis. Through a 1 cm medial substernal incision the thymic lodge is entered and a pneumodissection is performed. Two lateral 3 mm ports allow dissection of the thymus and its total removal.

This approach provides a very good view of the vascular bundles. The freeing of the gland from the innominate vein is easy and leads to a wide view of the mediastinum, thus helping to ensure entire removal of the thymus. An extensive dissection can be done through this approach as is evidenced by the position of the drain along the pericardium, when being used. No complication occurred, but a significant hypotension in 2 patients, resolved with adequate fluid infusion. Children were discharged the day after surgery and returned to school within the same week. They remain free of symptoms at follow up from 50 to 5 months later.

Conclusion: This procedure, which differs from latero-thoracic video surgery previously described in adults, avoids a sternotomy, gives a wide and nearly micro-surgical view of the thymic area and of the surrounding structures and provides as good or even better proof of total removal of the thymus.

### s21d. CLINICAL RESULTS IN THORACOSCOPIC SURGERY USING AN ELECTROTHERMAL BIPOLAR VESSEL SEALER

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Introduction: Advanced thoracoscopic surgery requires a method of obtaining reliable hemostasis and lung sealing to ensure successful outcomes. The recent introduction of bipolar sealing technology has made it possible to seal arteries and veins up to 7mm in diameter safely and effectively through a 5mm port. Chronic animal studies have demonstrated the effectiveness of the vessel-sealing device on both the pulmonary vasculature and the lung parenchyma. We have previously reported on our initial experience with this device in pediatric MIS surgery and we now report on its use in advanced thoracoscopic procedures.

Methods: From September 1999 to September 2001, 14 patients, ranging in age from 2 months to 18 years, and weight from 4.2 to 78 Kg, underwent thoracoscopic lobe resections, (2 upper, 12 lower), using the bipolar vessel sealing system as the primary method for hemostasis, vessel occlusion, and parenchymal sealing. Vessels completely sealed by the system include the inferior pulmonary vein and the pulmonary artery to the lower lobe. The device was also used to seal and divide lung parenchyma when the fissure was incomplete.

Results: Operative times ranged from 50 to 120 minutes. There were no technical failures of the device to achieve hemostasis and lung parenchymal seal was complete in every case (no air leak). As experience was gained no other hemostatic modalities were necessary or used, even on the main pulmonary vessels. The instrument worked well as a dissecting tool limiting the need to exchange instruments, and blood loss was minimal in all cases. The dissection was carried out completely through the trocars with the largest port site necessary being 5mm in the later cases. Mini-thoracotomy was not required in any case. Hospital stay ranged from one to 4 days.

Conclusion: Continued experience with the laparoscopic bipolar vessel-sealing device in thoracic surgery indicates that it is effective for dissecting and permanently sealing vessels and lung tissue commonly encountered during thoracoscopic lung resection. Its 5mm size eliminates the need for placing larger trocars for the introduction of endoscopic staplers, clips or other devices, and allows these procedures to be performed even in small infants.

### s22. LAPAROSCOPIC APPENDICECTOMY: A SUITABLE CASE FOR THE TRAINEE?

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Objective: To assess the impact of laparoscopic appendicectomy (LA), as an alternative to open appendicectomy (OA), has had on Surgical Training in our unit. In particular, can LA be safely performed by trainees under supervision.

Methods: A prospective 3 year review (1998-2000) was undertaken of all appendicectomies in patients with suspected appendicitis. LA was offered if the Consultant on-call had laparoscopic training. A record was kept of grade of operator, mode and length of procedure, nature of appendix and any complications.

Results: Over the 3 years the percentage of LA vs OA were 27/73%, 31/69% and 32/68%. The main operator in LA was either a Consultant or SpR, the percentages from 1998 to 2000 being 66/34%, 31/66% and 46/54%. Median lengths of LA by Consultant were 55, 50 and 51 minutes and for SpRs 45, 40 and 53 minutes. Of the OA cases SHO(III)s carried out 49, 42 and 43% each year while SHO (I) grades carried out 23, 15 and 38% of cases. There were no significant differences in complication rates either by operator grade nor mode of procedure.

Conclusions: In our unit over half LA cases are now carried by trainees under Consultant supervision. There is a minimal increase in operation duration compared to OA performed by the same trainees but no increase in complications as compared to LA carried out by a Consultant or OA. We believe LA is the ideal operation for training in paediatric laparoscopic surgery.

### s23. ONE-TROCAR VIDEOASSISTED APPROACH TO MECKEL'S DIVERTICULUM IN CHILDREN

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Introduction The authors report their experience with a videoassisted technique for Meckel's diverticulum diagnosis and treatment



using only one trocar.

Methods and procedures Between January 1998 and June 2001 transumbilical one-trocar ileal exploration was performed in 5 patients with intestinal bleeding. Meckel's scan had been performed in all patients. Mean age was 6.8 years ( range 6 months- 12 years). An Hasson 10 mm ballooned trocar was placed in an open fashion through the umbilicus and pneumoperitoneum was established to a pressure of 12 mmHg. Using a 10 mm operative telescope terminal ileum was grasped with an atraumatic instrument and exteriorized through the umbilicus. Ileal exploration and diverticulum treatment was performed using traditional methods outside the abdominal cavity.

Results Radionuclide scan was positive in only 1 patient. Overall in 2 patients a Meckel's diverticulum was found at videoassisted transumbilical ileal examination and intestinal resection and anastomosis performed (mean operative time 65 minutes). No complications were observed at a maximal follow-up of 36 months.

Conclusions This technique is a safe and effective minimvasive procedure for both diagnosis and treatment of Meckel's diverticulum in children.

#### s24. LAPAROSCOPIC CECOSTOMY BUTTON PLACEMENT FOR MANAGEMENT OF FECAL INCONTINENCE IN CHILDREN

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Introduction: The antegrade colonic enema (ACE) procedure offers a surgical solution for many children with chronic constipation and encopresis associated with Hirschsprung's disease and anorectal malformations. This study's purpose was to evaluate the safety and efficacy of a new laparoscopic technique for cecostomy button placement (LCBP) to allow ACE treatment.

Methods and Procedures: Charts of children with encopresis undergoing LCBP between 1999 and 2001 were reviewed. Patient's age, weight, primary diagnosis, operation time, hospital stay, associated complications, follow-up duration and outcome were investigated. The surgical technique (modification of that described for primary gastrostomy button placement) utilized a 'U stitch' method.

Results: Of the five patients - between 4 to 12 years (mean 7.8+-1.56) old and weighing 15 to 44 kg (mean 25.8+-5.16)- 3 had Hirschsprung's disease and 2 had anorectal malformations. LCBP was successful in all with no intra-operative complications. The mean operative time was 32.2+-2.03 minutes. Hospital stay was 2 to 5 days (mean 3.8+-0.58). Two patients had granuloma formation, which responded to topical therapy. The button was changed twice in one patient due to mechanical malfunction. Mean follow-up was 12.6+-4.39 months (range 5 to 29). One or two daily antegrade enemas resulted in continence with minor soiling in all.

Conclusion: LCPB is safe and efficacious in the treatment of overflow incontinence in children.

#### s25. LAPAROSCOPIC ASSISTED SURGERY FOR CROHN'S DISEASE

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Objective: In 1993 the first laparoscopic assisted ileocecal resections in adults were described. In 1999 we started this procedure in adolescents. Feasibility and postoperative course were investigated.

Methods: From July 1999 till October 2001, 12 consecutive patients underwent laparoscopic assisted surgery for Crohn's disease. The procedures, operative time, postoperative complications and hospital stay as well as outpatient follow-up were reviewed.

Results: There were 5 girls and 7 boys: mean age 15 yr (range 10 yr -17 yr), mean body weight 46 kg (range 30 kg - 65 kg). Presenting symptoms consisted of persistent abdominal pain (10), growth retardation (8) and osteoporosis (5) due to medication. One patient had cystic fibrosis. All 12 contrast studies were abnormal, showing a stenosis in 7. All 12 patients underwent an ileocecal resection, one patient had a combined partial resection of the jejunum. Three resections extended to the right colon. One of these patients had an ileosigmoid fistula causing conversion to an open procedure and in one patient with a stenosis in the left colon an ileostomy was performed. The mean operative time was 2.24h(range 1.27h - 3.25h). There were 2 postoperative complications: a gastric dilatation and, after the open procedure, an abdominal abscess, that caused readmission and was managed by ultrasound guided drainage and intravenous antibiotics. The mean postoperative hospital stay was 5 days (range 4d - 8d). Three late readmissions occurred for exacerbation of Crohn's disease, leading to a laparoscopic assisted subtotal colectomy in one. The mean follow-up was 14 months (2m - 27m). There were no cicatricial hernias. The cosmetic results were excellent.

Conclusions: Laparoscopic assisted surgery for Crohn's disease is feasible, without major complications. The adolescents were very satisfied with the excellent cosmetic result.

#### s27. GETTING RESIDENTS IN THE GAME: AN EVALUATION OF GENERAL SURGERY RESIDENTS' PARTICIPATION IN PEDIATRIC LAPAROSCOPIC SURGERY

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Objective: In a large children's hospital, we evaluated general surgery residents' experience with pediatric laparoscopic procedures and the impact of their participation on patient outcome. Methods: The records of all children who underwent laparoscopic appendectomy, splenectomy, fundoplication or pyloromyotomy were reviewed. The level of participation (surgeon, first assistant or none) by general surgery residents in each of these operations was determined. Outcome was assessed for these procedures in terms of intraoperative and postoperative complications. Results: The following table summarizes the frequency of resident participation in pediatric laparoscopic



procedures and indicates any significant adverse outcomes in the overall group.

Operation	Total operations	Resident as surgeon	Adverse outcomes (level of surgeon)
Appendectomy	174	163 (94%)	1 wound infection (R2) 1 phlegmon (R4) 2 intra-abdominal abscesses (R2)
Splenectomy	36	35 (97%)	
Fundoplication	104	78 (75%)	5 cases of recurrent reflux requiring re-op: (3 R4, 2 attending) 1 esophageal injury (R4)
Pyloromyotomy	97	72 (74%)	1 incomplete myotomy (R2) 1 mucosal injury (R4)

Conclusions: We have demonstrated that well-supervised general surgery residents can perform common, pediatric laparoscopic operations with excellent results. Although it is essential for established pediatric surgeons and fellows in pediatric surgery to acquire expertise in minimally invasive surgery, once they have confidence in their own skills they may safely permit qualified general surgery residents to perform laparoscopic procedures in children.

### s28. LAPAROSCOPIC SWENSONS PULLTHROUGH FOR HIRSCHSPRUNG'S DISEASE - AN OPTIMAL APPROACH FOR BOTH PRIMARY AND SECONDARY PULLTHROUGH PROCEDURES

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Background/Aim: Primary laparoscopic assisted endorectal colonic pull through has been widely described and accepted in recent years with proven advantages over the traditional open approach in Hirschsprung disease (HD). In recent years there has been an increasing trend to apply the technique to a purely perineal endorectal technique. We have been performing Laparoscopic Swensons (LSw) pull through both for primary and secondary procedures as well as seromuscular biopsy/ frozen section for siting of stoma. To evaluate its use we report our experience with both primary and secondary laparoscopic swenson's pull through for HD in children.

Methods: A retrospective review of all children who underwent laparoscopic procedures for HD in the last six years. A three port technique allowed the transition zone to be identified with seromuscular biopsies. The distal bowel is devascularised with diathermy and mobilized to deep into the pelvis. This was followed by anal mobilisation of the ganglionated bowel and perineal anastomosis. Follow-up was performed in all patients.

Results: Forty-two children underwent a laparoscopic pullthrough for HD( 19 primary neonatal).

Of these, LSw was performed in 29 children, which included 16 primary neonatal Swenson procedures. The median weight of this group of neonates was 3.4 kg at the time of surgery. Secondary Swenson's pull through procedure was performed in the remaining 13 children which included three patients with total colonic HD who underwent laparoscopic total colectomy and swenson's pull through. The median operating time was 105 minutes (range: 66 - 175 minutes). The median time to commence full diet was 48 hours (range: 24 - 86 hours). No patient required conversion to open. Post operative ileus was noted and self limiting in three patients. There was no difference in operative time for primary as well as secondary pull through although it was easier to perform as a primary pull through. Enterocolitis was noted in two patients in the Swenson's group. Follow-up was between 6 months to six years with a median of three years. Majority of the patients have excellent continence. There are 2 children with Laparoscopic MACE who now are soil free

Other procedures included Laparoscopic assisted Soave procedure (n = 8), Laparoscopic Duhamel (n = 3) and laparoscopic colectomy with stoma (n = 2).

Conclusions: Swenson's procedure seems to be the most suitable procedure for laparoscopic management of biopsy proven HD in children, both for neonatal one stage primary pull through and secondary pull through procedures.

### s30. COMPLICATIONS AND CONVERSIONS OF PEDIATRIC LAPAROSCOPIC SURGERY: THE ITALIAN MULTICENTRIC EXPERIENCE WITH 2305 PROCEDURES

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Aim: Reports of complications during pediatric laparoscopic procedures are seldom found in the international literature.

Methods: Between 1996 and 1999, during a 4-year-period the data on 2305 procedures performed in 11 Italian centers of pediatric surgery were collected. The data from two centers, for a total of 616 laparoscopic procedures, were largely incomplete, and were thus excluded from the study. We analyzed the data from 9 centers only, for a total of 1689 laparoscopic operations. The type of operations performed ranged from basic laparoscopic procedures such as varicocelectomy and cryptorchidism, to advanced laparoscopic procedures such as splenectomy, total colectomy, and esophageal achalasia.

Results: We recorded 79 complications (4.6%) in our series. In 57/79 cases (72.2%) the problem was solved by laparoscopy. Twenty-two cases (27.8%) required conversion to open surgery. There was no mortality in our series. At a maximum follow-up of 4 yrs, all children were alive and had no problems related to the laparoscopic complications.

Conclusions: The authors believe that the routine use of open laparoscopy in pediatric patients is a key factor to help avoid complications. Moreover the surgeon's laparoscopic experience, the correct indications for laparoscopic surgery, and the verification of the



laparoscopic equipment before surgery, are also important rules to follow to reduce the incidence of complications.

### s30a. LAPAROSCOPIC POCKET SPLENOPEXY (LAPS) FOR WANDERING SPLEEN A NEW TECHNIQUE

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**OBJECTIVE:** To report a new technique for splenopexy in cases of wandering spleen.

**METHODS:** Case Report: A 4 years old boy consulted for recurrent abdominal pain and a palpable mass. Wandering Spleen diagnosis was achieved by ultrasound. For Laparoscopic Pocket Splenopexy (LAPS) an extraperitoneal space was created using an inflatable balloon device. Using a 3 ports approach, the spleen was introduced and fixated inside the created pocket.

**RESULTS:** Operative time was 90 minutes and the patient was discharged 24 hs after the procedure. Recovery was uneventful. Postoperative Doppler ultrasound follow-up shows a well fixated spleen in the left upper quadrant. The patient remains without symptoms 1 year after the procedure.

**CONCLUSIONS:** LAPS is a easy and reproducible technique that can be used for definitive treatment of wandering spleen in children.

### s30b. THYMECTOMY: PURE THORACOSCOPY VS MINI-THORACOTOMY VIDEO ASSISTED

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Video-assisted thoracoscopic surgery became an important tool in the surgical treatment of various diseases. Currently many interventions which routinely required thoracotomy can be performed by a VATS safely and with excellent results. This includes thymectomy for myasthenia gravis, thymomas, thymic cysts, hyperplasia, etc. In most cases, myasthenia gravis and thymoma require complete removal of the thymus gland and resection of the pericardial fatty tissue. There is some debate, however, over which surgical approach is best for thymectomy. The left axilla was exposed with the arm in an extended position. 3 thoracos-copic ports were placed in an inverted triangle position in the left axilla with a 5mm, 30 degree angled camera port at the posterior axillary line in the 4th intercostal space and 2X5 mm operating ports at the anterior axillary line in the 3rd and 5th intercostal spaces. In all cases the mediastinum was accessed

through the left chest. A pneumotorax was evaluated and eventually chest tubes were used. There was no conversion to open technique, no complication, no postoperative ventilation and no mortality. The thymus must be dissected by gentle traction and separated from pericardium, brachiocephalic vein and aorta behind the sternum. The thymus is removed with a complete

resected specimen. The procedure results in a shorter hospital stay, quicker recovery, better cosmetic and significantly reduces the overall cost to health care.

### s31. INTRAVESICAL URETERAL REIMPLANTATION ACCORDING TO COHEN AND USING LAPAROSCOPIC TOOLS PRELIMINARY EXPERIENCE IN CHILDREN.

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**Introduction :** Previously described minimally invasive surgical techniques for treating vesicoureteral reflux include laparoscopic extravesical reimplantation according to Lich-Gregoir and Trigonoplasty according to Gil-Vernet. The former needed a transperitoneal approach and the latter has a significant failure rate. In order to perform with minimally invasive technique, the same technique we use with open surgery, we have performed intravesical ureteral reimplantation according to Cohen with laparoscopic tools. A video illustrates the technique (4').

**Methods :** Three children ages 4 to 6 years underwent transtrigonal reimplant (one unilateral, one bilateral and one with duplication). Three 5mm ports were placed percutaneously into the bladder for 5mm 30° telescope and two operating devices. The bladder is insufflated with a 8mm Hg CO2 pressure. The air leak through the urethra is avoided by the balloon of a Foley catheter. All the steps of the procedure are realized intravesically : dissection of the ureter, creation of the submucosal channel, resection of the distal part of the ureter and ureterovesical anastomosis with 6/0 absorbable suture. No ureteral catheter was left in place, no drain in the perivesical spaces, but a Foley catheter during the first two postoperative days.

**Results :** Operative time ranged between 2 and 3,5 hours. The hospital stay for these first cases is 3 days. Post-operative hematuria is reduced to one day. We have had no postoperative complication but the follow up is very short and no patient have yet had their six months following studies with VCUR, ultrasound and cystography.

**Discussion :** This endoscopic COHEN reimplantation is feasible and because the main steps are similar to open reimplantation the same long term results could be expected. However many technical problems remain : the working space is narrow, the potential extravasation of CO2 into the extravesical space, the closure of trocar sites in the bladder, the necessity to use specially designed trocar to avoid inadvertent removal (not available in 3mm) etc...

**Conclusion :** Minimally invasive transtrigonal reimplantation is technically feasible. Potential advantages include reduced abdominal wall trauma and, above all, reduced bladder wall trauma. In the future, robotic technology especially the use of surgical telemanipulators may have an increasing role in the endoscopic treatment of pediatric vesicoureteral reflux.

### s32. OUR EXPERIENCE IN THE MANAGEMENT OF PROBLEMS IN LAPAROSCOPIC PYELOPLASTY FOR HYDRONEPHROSIS IN CHILDREN

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Laparoscopic management of hydronephrosis in children has been tried in our centre as an alternative to open pyeloplasty. There are certain issues in laparoscopic pyeloplasty like position of the patient, placement of ports, how to expose the PUJ, stenting (the timing, the



type of stent and from where and how to place the stent), the site and type of drain.

#### Materials and methods

14 cases of laparoscopic pyeloplasty was done in children between the ages of 3 months to 11 years. The time taken was between 340minutes maximum and 136 minutes at the lowest. The difficulties encountered were analysed and modified (a). Position: Instead of true lateral position, a pad or slight increase in kidney bridge will open the space between pelvis and costal margin for better working. (b)Ports: selected on the basis of PUJ level was helpful while suturing than based on hilum of the kidney. (c) Colonic mobilisation: can be avoided if pelvis found to be distended medial to colon and transmesocolonic approach to pelvis is done. (d)Stenting: RGP and keeping the guide wire and stent just below PUJ before pyeloplasty. It helps to keep this stent from below especially just before completion of anterior layer of pyeloplasty.(e)Drain:a corrugated flank drain found to be draining well due to its dependent position.

#### Results

Laparoscopic pyeloplasty is a technically highly demanding surgery. It is time consuming due to various factors. Our experience reveals that, apart from learning curve, once the difficulties were overcome by modifications explained above, the length of surgery grossly has come down from 340 minutes to 136 minutes. Not only the time but also the real difficulties encountered earlier were overcome and the ease of doing pyeloplasty has been standardised. Effective drainage in the form of flank drain helped the incidence of paralytic ileus in many cases.

#### Conclusion

Laparoscopic pyeloplasty just like every technique needed modifications to give better results and it should be done easily by all. In that way, the modifications which are explained above were really useful in performing pyeloplasty easily thereby reducing the difficulties to a great extent as well as minimising the overall time taken for laparoscopic pyeloplasty.

### §33. COMPARISON OF LAPAROSCOPIC AND OPEN NEPHRECTOMIES IN CHILDREN

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INTRODUCTION: We compare our experience with laparoscopic and open nephrectomy in a pediatric population.

METHODS AND PROCEDURES: Between August 1997 and October 2001 18 children aged 13 months to 15 years underwent laparoscopic nephrectomy on account of benign kidney disease, 11 by a transperitoneal, 7 by the retroperitoneal approach. Retrospectively this group was compared with a group of 18 children aged 1 month to 15 years in which in 1995-1998 open nephrectomy was performed for the same reasons.

RESULTS: Mean operative time was 101,6 versus 54,2 minutes ( $p=0,00003$ ), the postoperative drainage of the wound was 1,05 days versus 2,0 days ( $p=0,009$ ), the mean hospital stay was 4,9 versus 6,6 days ( $p=0,0003$ ), analgetics were administered for 21,3 and 31,25 hours after operation ( $p=0,03$ ) in the laparoscopic and open nephrectomy groups, respectively. As to beginning of oral food intake there was no significant difference, a blood transfusion was administered to one patient after the open operation. One patient developed a postoperative complication after open nephrectomy.

CONCLUSION: Operative time was significantly longer in our laparoscopic group, postoperative hospital stay, postoperative drainage and analgetics administration were significantly shorter than for open surgery. We consider laparoscopic nephrectomy in children a safe and useful method.

### §34. LAPAROSCOPIC ANDERSON-HYNES PYELOPLASTY IN CHILDREN

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#### Objective

The experience of transperitoneal laparoscopic dismembered pyeloplasty in 12 children is presented.

Methods and procedures: In 12 children (aged 4 months to 14 years, median 4 years) a laparoscopic Anderson-Hynes pyeloplasty was performed. The patient was in a lateral decubitus position. A 5-mm laparoscope and two 2-mm trocars were inserted. The access to the pelvis was transperitoneal. In the last three patients, double-J stents were used.

Results: The operative times were 6.5 hours in the first patient and 2.5 hours in the second patient. None of the following procedures exceeded 3 hours operating time. A urinoma, which was treated using a percutaneous pyelostoma, developed postoperatively in the 14-year-old boy. No other complications occurred. Ultrasonographic controls at 3 months postoperatively showed a residual dilatation of the pelvis in all children. Scintigraphic controls were performed one year after surgery. The results were comparable to the "open" approach.

Conclusion: The excessive operating time in the first patient was due to inexperience with the approach. Technical improvements resulted a significant reduction in operating time in the second patient. Even with practice, the operating time still remained longer than in conventional surgery. The first patient would have benefited from the placement of a stent. The procedure has the usual advantages of laparoscopic techniques, but is technically demanding because of extended laparoscopic suturing. The question whether the transperitoneal or the retroperitoneal approach is better will only be answered by comparing larger series of both approaches. We prefer the transperitoneal approach because a natural cavity is used and because the approach is familiar to most laparoscopists. The opened peritoneum will seal off within a day.

### §35. DEXTRANOMER ENDOSCOPIC INJECTION FOR URINARY INCONTINENCE

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INTRODUCTION: Different bulking substances have been proposed to gain continence with endoscopic treatment. Deflux™ is a new synthetic material.

METHODS: Over a 2-year period, 16 patients aged 8 to 22 years (mean 13.5 years) were treated endoscopically for stress urinary incontinence using Deflux (3 neurogenic bladder, 13 structural sphincteric deficiency). Deflux is a suspension of dextranomer in a 1% hyaluronan solution. Injected volume ranged from 1.8 cc to 4.0 cc (average 2.5 cc). Six patients had 2 injections and 3 had 3 injections.



Results at 6 and 12 months follow-up were compared with the preoperative status (Fisher's Exact test).

**RESULTS:** 37 injections were performed (mean 2.3 injections/patient). Dry interval increased from 35 mins to 80 mins average (0-190 mins,  $p < 0.005$ ). Functional bladder capacity changed from 85 cc to 125 cc ( $p < 0.005$ ). Three patients (18.7%) became fully day-time dry (2 ½ -3 hours voiding or CIC interval). 2 patients became night-time dry, 6 (37.5%) ameliorated the nocturnal pad-test. In 8 patients (50.0%), results were not changed. No side effects or upper tract deterioration were observed.

**CONCLUSION:** Endoscopic injection of Deflux improved urinary continence in selected patients. The substance was demonstrated to be safe and easy to inject, increasing outlet resistance.

### s36. LAPAROSCOPIC VERSUS OPEN NEPHRECTOMY IN PEDIATRIC POPULATION

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**Purpose:** Laparoscopy has become a successful approach for many procedures in pediatric urology. We compare the laparoscopic and open approach to perform nephrectomies in pediatric population.

**Material and Methods:** A total of 53 patients who underwent nephrectomy for renal benign disease from 1994 to 2000 in our institution were reviewed retrospectively for relevant clinical data. Laparoscopic nephrectomy (LN) were performed in 25 patients and open nephrectomy (ON) in 28. The transperitoneal approach was performed in the laparoscopic group.

**Results:** Mean operative time was 135,4 versus 120,5 minutes in the laparoscopic and open groups, respectively. There were no conversions to open surgery. Blood loss was insignificant in both groups and there were no intraoperative complications. Mean time for oral intake after surgery was 7.2 and 12.7 hours for laparoscopic and open nephrectomy. Mean hospital stay was better in the laparoscopic approach than in the open nephrectomy, 2.6 and 5.1 days, respectively.

**Conclusions:** Laparoscopic nephrectomy and nephroureterectomy is the technique of choice for renal benign disease in pediatric population. Although operative time is longer, discomfort and the hospital stay is shorter than open procedure.

### s37. TRANSVESICOSCOPIC CROSS-TRIGONAL URETERIC REIMPLANTATION UNDER CARBON DIOXIDE PNEUMOVESICUM FOR VESICoureTERIC REFLUX: A NOVEL TECHNIQUE

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Traditionally bladder surgery is performed either through a cystoscope or an open vesicotomy. With the advent of minimally invasive surgery in children, laparoscopic ureteric reimplantation through a transperitoneal extravesical approach has been described. The approach however necessitates transgression of the peritoneal cavity and can be technically difficult in the small pelvis of a young child. From a pilot animal model we have found that with carbon dioxide insufflation the bladder could provide a large potential space allowing various intravesical endoscopic procedures to be conducted. **Objective:** To evaluate the effectiveness of endoscopic intravesical cross-trigonal ureteric reimplantation under carbon dioxide insufflation of the bladder, or pneumovesicum, in infants and children.

**Patients and Methods:** Twelve patients (7 boys, 5 girls) with dilating primary vesicoureteric reflux (6 bilateral; 18 refluxing ureters), associated with recurrent urinary tract infections and multiple pyelonephritic renal scarring, underwent endoscopic Cohen's transtrigonal ureteric reimplantation with carbon dioxide pneumovesicum. Age ranged from 10 months to 13 years (mean: 4.3 years). The bladder was first drained and then insufflated with carbon dioxide to 10-12 mm Hg pressure, with a balloon catheter inserted per urethra to occlude the internal urethral meatus. A 5 mm Step port was inserted over the bladder dome and a 5 mm 30 degree scope was used to provide intravesical vision. Two more 3 mm working ports were then inserted on either side of the camera port. Intravesical mobilization of the ureters, dissection of submucosal tunnel and a Cohen's type of ureteric reimplantation using interrupted 5 zero polyglecaprone or polydioxanone sutures was then performed under endoscopic guidance. Bladder drainage by an urethral catheter was maintained for 24-48 hours post-operatively.

**Results:** Endoscopic transtrigonal ureteric reimplantation with carbon dioxide pneumovesicum was successfully performed in all twelve patients. The mean operating time was 108 minutes (range: 75 -145 minutes). One boy developed mild scrotal emphysema post-operatively that subsided spontaneously. The camera port was displaced after a successful reimplant in another patient leading to open conversion. All patients recovered uneventfully and remained well.

**Conclusions:** This preliminary experience illustrates that endoscopic intravesical ureteric mobilization and transtrigonal ureteric reimplantation can be safely and effectively performed with carbon dioxide insufflation of the bladder. The long-term outcome and potential physiological effects of carbon dioxide pneumovesicum on the bladder and upper tract function will need to be further evaluated.

### s38. THORACOSCOPIC UPPER THORACIC SYMPATHECTOMY FOR PRIMARY PALMAR HYPERHIDROSIS IN CHILDREN AND ADOLESCENCE - A 10 YEARS EXPERIENCE

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We report our experience over the last 10 years with thoracoscopic sympathectomy for severe palmar hyperhidrosis in children and adolescents. 278 patients underwent 553 thoracoscopies. There were 170 females and 108 males, age ranging between 5.5 and 18 years.

An operative one-channel thoracoscope was used through a single 10 mm axillary port in all patients. The procedure include ablation of T2 and T3 ganglions, each side.

272 patients (98%) had immediate and permanent relief of palmar sweating. The immediate postoperative course was uneventful in 265 patients. Ten patients had a residual pneumothorax following surgery, that required a 24-hour intercostal drainage and three patients had bleeding from intercostal vessels that were successfully managed.

The obvious advantage of the thoracoscopic approach to sympathectomy is the feasibility of performing bilateral procedure at the same time as well as minimal operative trauma, easy postoperative course, short hospitalization, excellent cosmetic results and a quick return to



school and normal activities.

We emphasize the benefit of early surgery in children with severe palmar hyperhidrosis, thus avoiding many years of psychological, social and physical discomfort.

### s39. LAPAROSCOPY AND CARBON DIOXIDE VERSUS AIR REDUCE PERITONEAL, SYSTEMIC, AND PULMONARY IMMUNE RESPONSES

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The immunological impact of laparoscopy versus laparotomy with exposure to CO<sub>2</sub> and room air was investigated.

Method: Twenty piglets were randomized for: CO<sub>2</sub> laparoscopy, air laparoscopy, CO<sub>2</sub> laparotomy, air laparotomy. Laparotomy was performed in a sterile balloon with a pressure similar to laparoscopy. Interleukine-1, interleukine-6 (IL-6), tumor necrosis factor (TNF), polymorphnuclear cells (PMN) and macrophages (mf) were determined in abdominal lavage fluids at 0, 2, and 48h, and in alveolar fluids at 48h. Macrophages were assessed for reactive oxygen species production (ROS). Systemic responses included white blood cell count (WBC) and cytokines.

Results: Peritoneal: Laparotomy versus laparoscopy, when performed with CO<sub>2</sub>, significantly increased PMN and decreased the %mf. There was a significant increase in IL-6, and a four-fold increase in mf ROS. Similar differences between the procedures were found with exposure to air. The use of air versus CO<sub>2</sub> in laparoscopy, but not in laparotomy, resulted in an increase of peritoneal PMN, and a decrease of the %mf up to 48h. Air increased the local IL-6 release in both procedures, and fourfolded mf ROS. Systemic: Laparotomy produced a significant increase in WBC, which was more pronounced with exposure to air. No alteration of other cytokines was seen. Pulmonary: The number of mf and the mf ROS were significantly increased after air versus CO<sub>2</sub> laparoscopy, but not in the laparotomy groups.

Conclusions: Laparoscopy and exposure to CO<sub>2</sub> reduced immune responses. Peritoneal responses were affected to a larger degree than systemic and distant organ parameters. Laparotomy overruled the effects of CO<sub>2</sub> on chemotaxis and distant organ injury, but not on peritoneal cytokine release.

### s40. PAIN MANAGEMENT AFTER MINIMALLY PECTUS EXCAVATUM REPAIR

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Objective: We assessed the effectiveness of three different methods of pain relief in children undergoing minimally invasive repair of pectus excavatum.

Patients and methods: a retrospective review of the pain protocols of 41 patients (8 f, 33 m) aged 8 - 25 years (mean 12,9) operated on between January 2000 and October 2001 was conducted. 19 patients received bilateral paravertebral infusions of local anaesthetics; 17 received lumbar epidural infusions of local anaesthetics together with morphine; and 9 received thoracal epidural infusions of local anaesthetics.

All patients were regularly assessed for pain (0 = no pain, 10 = worst pain) as provided in our pain protocol. Whenever the pain score was higher than 4, an additional intravenous opioid bolus was administered. The charts of patients were also reviewed for adverse events.

Results: All methods showed good results with low pain scores and we saw no major adverse events. Details are shown in Table 1.

	Paravertebral	Lumbar epidural	Thoracal epidural
Mean pain score	1,1	0,9	2,9
Mean opioid bolus needed per patient	2,6 (0-16)	1,2(0-10)	6(4-9)
Catheter dislocation	2	2	1
Vomiting	2	5	0
Urine retention	0	6	2
Horner Syndrome	1	0	1
Itching	0	1	0

Conclusions: Paravertebral infusion of local anaesthetics was best. Lumbar infusion of local anaesthetics together with morphine showed better pain control than thoracal infusion of local anaesthetics. The higher incidence of vomiting and urine retention in the lumbar epidural group needs additional therapy.

### s41. SPLENECTOMY FOR PEDIATRIC HEMATOLOGIC DISEASE

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INTRODUCTION: Splenectomy has an established role in the treatment of selected hematologic diseases in children. The purpose of





this outcome study was to compare open with laparoscopic splenectomy.

**METHODS:** A retrospective chart review identified 154 children who consecutively underwent elective splenectomy for hematologic disease during the twelve year period (1988-2001) at a single teaching hospital. Demographic information and outcome parameters were identified and compared between the open splenectomy (OS, n=99) and laparoscopic splenectomy (LS, n=55) groups. The unpaired Student's test was used for statistical comparison with a P value of less than 0.05 considered significant.

**RESULTS:** The two groups were demographically similar. Operative time was longer and times to diet and discharge were shorter in LS than OS (P<0.05). There were no significant differences in other collected outcome parameters. Operative time for LS decreased with increasing experience. Family and patient satisfaction were good for both OS and LS. There were three deaths, all due to patient disease.

**CONCLUSION:** OS and LS are equally safe and efficacious surgical procedures. Standard in-hospital outcome parameters revealed no significant differences between the two techniques except a shorter time to diet and discharge in LS. Selection of the surgical technique for elective splenectomy in children with hematologic disease should be made by the surgeon based on experience and patient preference.

#### s42. LAPAROSCOPIC MANAGEMENT OF IMPALPABLE TESTES : A MULTI-INSTITUTIONAL STUDY OF THE ITALIAN SOCIETY OF VIDEO SURGERY IN INFANCY

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We report the results of a study of the Italian Society of Video Surgery in infancy on the laparoscopic management of impalpable testis.

From 1992 till 1998 , 344 boys from 2 to 10 years old ( median age 4.4) underwent laparoscopy for a total of 378 impalpable testes . Five laparoscopic findings were considered : blind ending cord structures , intrabdominal testis, cord structures entering the inguinal ring, testicular ectopia and agenesis. A primary orchidopexy , staged Fowler-stephens or autotrasplant procedure were performed , depending on patency and the distance from the internal inguinal ring . An inguinal exploration was performed for cord structures into the ring .In 131 (38%) cases for a total of 145 testes an intrabdominal testis were found . 90(62.06%) testicular units were found nearby the ring and a primary orchidopexy was performed. 55 ( 37,9%) Testicular units were found high in the iliac fossa or the pelvis. In 42 cases a Fowler -Stephens and/or a testicular autotrasplant were performed. In 149 patients cord structures into the inguinal ring were observed and 139 underwent an inguinal exploration . Blind ending cord structures were found in 78 patients and in 6 cases testicular agenesis. No complications were recorded. The laparoscopic classification of abdominal testis is reliable and can disclose the most suitable surgical technique .Laparoscopy is a valuable tool in the diagnosis and treatment in the 62.5 % of the patients.

#### s43. ENDOSCOPIC SURGERY OF DIAPHRAGMATIC ANOMALIES : A MULTICENTRIC STUDY OF THE GROUPE D'ETUDE EN COELIOCHIRURGIE INFANTILE (GECI). PART 2 : MORGAGNI'S HERNIAS

F. Becmeur,MD, P. Philippe,MD, D. Vanderzee,MD, N. Bax,MD, H. Allal,MD, O. Reinberg,MD, M. Lima,MD, Y.Heloury,MD, F. Berchi,MD, A.Debacker,MD, M. Robert,MD, C. Salakos,MD, J.L. Alain,MD, F. Schier,MD, J. Schleef,MD., R. Moog,MD., CHUHauteepierre, Strasbourg;CHL,Luxembourg;WKZ,Utrecht; CHU, Montpellier;CHV, Lausanne; CHU,Bologna; CHU,Nantes; HUM112Octubre, Madrid; AZVUB, Brussel; CHU,Tours; CHR,Roubaix; CHU,Limoges; CHU,Iena; KH,Graz

**Objective of the study:** The aim of this study was to establish laparoscopy as the procedure of choice for the repair of Morgagni's hernia in children.

**Methods and procedure:** A retrospective questionnaire study was conducted in January 2001 among the members of the GECI.

**Results:** We collected 22 cases, with 23 operations (mean age: 37 mo., mean weight: 13.9kg, 1 redo). There were 5 pts with Down syndrome and 1 with myopathy. Only 3 trocars were used in 17/23 cases. Colon(15), liver(8), stomach(5), bowel(4) or omentum (1) were found in the hernia. A sac was removed in 12 of 18 cases where it was present. The defect was closed in 18/23 patients by different techniques of direct suture and with a prosthetic mesh in 4. One conversion was necessary because of the large size of the defect in a small child. One bowel injury was repaired at laparoscopy. One pneumothorax was drained postoperatively. Mean operative time was 94 minutes. Mean hospital stay was 4,7 days. With a mean follow-up of 13 months, there was only 1 recurrence, reoperated successfully by laparoscopy.

**Conclusion:** Laparoscopic repair of Morgagni hernia, by direct closure or with a patch, is easy, safe, and effective in children. From our data, we suggest that laparoscopy should become the standard for repair of this type of diaphragmatic hernia in children.

#### s44. THORACOSCOPIC EXCISION OF AN INTRAMURAL OESOPHAGEAL DUPLICATION CYST

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The Royal Hospital for Sick Children, Edinburgh, Scotland

**Objective:** To report a case of an intramural oesophageal duplication cyst in a 7 month old boy which was totally excised thoracoscopically and to show the operative technique.

**Method:** Review of case record

**Report:** A 7 month old male presented with a chronic cough. CXR showed hyperinflation of the right lower and middle lobes. A cyst was seen in the posterior part of the right hilum on MRI scan.

**Surgery** was carried out with one lung ventilation after left endobronchial intubation. Three ports were used ( Two 5mm and one 3.5mm). The cyst was seen to be arising from the oesophagus with the muscle thinned over its surface. Dissection was made on the surface of the cyst and the muscle incised a little away from the oesophagus. The cyst was able to be dissected away from the oesophageal mucosa in its entirety. The muscle layer was then repaired with vicryl. The operating time was 100 mins. The patient made an uneventful recovery and is swallowing normally.

**Conclusion:** Complete excision of an intramural oesophageal duplication cyst can be accomplished thoracoscopically. Previous authors have suggested leaving the portion of the cyst most closely applied to the oesophagus in situ, in order to avoid the dissection between cyst and oesophageal mucosa, and ablating the lining with diathermy or laser. This has, however, been associated with a significant recurrence



rate and complete excision, if possible, seems preferable.

#### s45. LAPAROSCOPIC SIGMOID VAGINAL REPLACEMENT

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Sigmoid vaginoplasty is an alternative technique for vaginal replacement in patients with flat perineum and little inter-uretero-rectal space (male pseudohermaphroditism), in those patients presenting with associated malformations requiring simultaneous reconstruction (cloaca, recto-vestibular or recto-vulvar fistula and in those with solitary vaginal agenesis after failure of other treatment modalities). Major disadvantages of this technique are that a laparotomy is always necessary which is associated to known complications such as pain, nasogastric suction. After the advent of mechanical suture, we have abandoned the use of routine nasogastric suction and our next goal was to avoid laparotomy. In April 2000 (IPEG meeting) we reported the first patient who underwent laparoscopic sigmoid vaginal replacement. We now present an update on our experience with this procedure in 8 patients. Their mean age was 16.3 y. Six patients had a Mayer Rokitansky Syndrome and 2 a complete androgenic resistance previously treated by laparoscopic bilateral orchiectomy. All patients were informed about different treatments and chose this procedure. We have used 4 ports : A 10mm one (umbilical) , a 12 mm( right lower quadrant) and two 5 mm.(left lower quadrant and hypogastric) .The lens was initially introduced through the umbilical port and afterwards inserted through the right lower quadrant one in order to achieve a better visualization of the vascularization of the sigmoid. The sigmoid was trans-iluminated with a 5 mm lens through the port located in the left lower quadrant. After isolating a segment of the sigmoid using endoclips, bipolar or ultrasonic devices and two endostapplers , we undertook a perineal dissection creating a space between the urethra and the rectum under laparoscopic vision. Colo-colonic anastomosis was achieved using a circular mechanical suture through the rectum and taking outwards the proximal end of the colon through the umbilicus. The remaining end was placed at the endosuture. Both the ensemble and shooting were done under laparoscopic control. The peritoneum near the Douglas space was incised in order to allow the passage of a forceps from the perineum which enabled the descent of the isolated bowel. Vaginoplasty was completed through the perineal route. Mean operative time was 4 hours . There were no intra or post-operative complications except for an accidental opening of the bladder that was sutured. All patients were able to tolerate food after 24 hours of the procedure and 7 were discharged after 48 hours of the operation We learned that a complete perineal dissection of the vesicorectal space is required before trying to open it from above A righth pelvic kidney made the procedure more difficult , requiring more "camara work" .On the other hand ,a left pelvic kidney exposed the sigmoid vessels, making isolation of the colon easier.. Viability and patency of neovagina are excellent after a mean follow up of 6 months (4- 20 m )





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## IPEG POSTER ABSTRACTS

### p01. LAPAROSCOPIC STAGING FOR HODGKIN'S DISEASE IN CHILDREN

Edward Esteves, MD, Elecy M. Oliveira, MD; Patricia O. Brito, MD; Cesar Bariani, MD; Rosemary G. Crocetti, MD.  
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There are some controversies regarding surgical staging for Hodgkin's disease (HD) in children, due to the good results of chemotherapy (CHT) and radiotherapy allied to advances in imagenology. Considering the risk of under or overstaging without surgical exploration, specially in clinical stages higher than 2A or in those who need splenectomy or oophoropexy, the advantages of laparoscopy compared to laparotomies allow more adequate staging with low morbidity. Methods: The authors analysed prospectively all childrens (n=21, ages 4-18 years) submitted to laparoscopic staging for HD, with or without concomitant thoracoscopy. Laparoscopic procedures were accomplished with 3-5 trocars, including multiple biopsies (lymphnodes, liver, spleen, masses), splenectomies (11), oophoropexy (9), appendectomy (6), coupled with bone marrow biopsies. Results: Change of clinical preoperative staging occurred in 19% of the children after surgery. Four children also required thoracoscopy. All procedures were achieved without complications, approaching all abdominal quadrants with few trocars. CHT could be started earlier than commonly accomplished after laparotomies (mean 3 days versus 7 days,  $p < 0,05$ ). Conclusions: Patients with HD in whom abdominal or thoracic exploration is necessary, can be benefited by laparoscopic staging with or without splenectomy, with less complications related to surgical trauma, allowing early postoperative adjuvant therapy according to a correctly staged disease.

### p02. LAPAROSCOPIC ADRENALECTOMY FOR NEUROBLASTOMA: A REPORT OF 2 CASES

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Objective: The aim of this study is to describe the treatment and outcome of 2 children who underwent laparoscopic adrenalectomy (LA) for neuroblastoma.

Methods and Technique: Case I: A 12-month-old girl was diagnosed with a 3.2 x 4 cm right adrenal mass during work-up for thelarche. Case II: A 31 month-old boy was diagnosed with a 4x5 cm left adreanal mass during work-up for persistent fevers and hip pain. Metastatic neuroblastoma was confirmed by iliac crest biopsy. Neoadjuvant therapy was administered for 3 months. Both children underwent successful LA with removal of their tumors and surrounding lymph nodes. The specimens were placed in a laparoscopic specimen retrieval bag and morselated in situ. The tissue samples were adequate for all required pathologic analysis, including genetic studies and nMYC. Mean operative time was 185 min. There were no intra- or peri-operative complications. Both children were discharged home within 24 hours. One year post-operatively, the 12 month-old girl is disease free without further therapy. Four months post-operatively, the 31 month-old boy has healed well from surgery. His metastatic tumor is being treated with further chemotherapy and bone marrow transplantation.

Conclusions: Our preliminary data suggests that LA for neuroblastoma can be safely performed in children. The benefits of LA, including minimal surgical morbidity and a significantly shorter hospital stay, are to be expected in this patient population.

### p03. LAPAROSCOPIC RESECTION OF PARARENAL TUMOURS

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*The Royal Hospital for Sick Children, Edinburgh, Scotland*

Objective: Recent reports on early experience with laparoscopic pararenal surgery in children have been made and we present our experience dealing with three patients with a diagnosis of pararenal tumours.

Method: An 11 year old boy had a right adrenal pheochromocytoma excised at laparotomy 2 years earlier. He then presented with a left varicocele with no symptoms or signs of adrenergic hyperactivity. Abdominal ultrasound revealed a 5 cm mass in the left anterior renal hilum compressing the renal vein. Preoperative antihypertensive medication was not required.

A 9 year old boy presented with a 5 week history of headaches, fever, nausea, lassitude and weight loss. On ultrasound a 6,5 x 4,7 x 6 cm mass was seen in the region of the left adrenal. Phenoxybenzamine alpha blockade and propranolol were instituted for 1 month pre-operatively

A 6 year old girl presented with a 4 month history of breast and pubic hair development and accelerated growth. MRI scan of the abdomen showed a mass related to the left adrenal gland.

Results: Laparoscopic resection was successfully performed in all 3 patients. The patients with phaeochromocytoma were remarkably stable under GA with no need for cardiovascular intervention. Pathology confirmed complete excision in all 3 cases. All patients remain well on follow up.

Conclusions: The laparoscopic approach to pararenal tumours is safe and provides better visualisation and dissection than open techniques.

### p04. TWO-PORT VERSUS 3-PORT LAPAROSCOPIC APPENDECTOMY IN CHILDREN WITH UNCOMPLICATED APPENDICITIS

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Objective: Laparoscopic appendectomy (LA) is commonly performed through 3-port technique. We compared our experience of 2-port laparoscopic assisted appendectomy (LAA) to 3-port LA with uncomplicated appendicitis (UA) in term of the efficacy, safety and cost.

Methods: We evaluated all 86 children aged 3 to 12 years with UA undergoing LA (2-port n=45, 3-port n=41) during 4.5 years period. Technique depends upon the surgeon's choice and position of appendix. We excluded all children (2-port n=8, 3-port n=15) with complicated appendicitis (CA).

Results: There was no difference in age at the time of presentation, gender, weight, duration of symptoms and severity of disease in both



techniques of LA. In 2-port LAA, the operative (40 versus 68 minutes,  $P < 0.05$ ) and anesthesia (67 vs. 96 minutes,  $P < 0.05$ ) time were shorter. Average post-operative stay (2.5 days in 2-port vs. 3.3 days in 3-port) and analgesia requirement were also less in 2-port LAA. Two children (3-port LA) required conversion to open appendectomy. There was no post-operative complication in either group. Extra cost of endo-loops with one port and one day hospital stay was saved with 2-port LAA.

Conclusion: We concluded that 2-port LAA is a safe and effective alternative for the management of UA. When successful, overall cost is less in 2-port LA because of advantage of quicker to perform, less anesthesia time, no requirement of endo-loops, endo-clips, or endo-GIA, shorter hospital stay and less post-operative analgesia.

#### **p05. WHY PEDIATRIC SURGEONS CAN'T AFFORD NOT TO PERFORM LAPAROSCOPIC APPENDECTOMY**

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I. Laparoscopic pediatric appendectomy (LPA) has been rejected because of apparent small benefit. The importance in training pediatric surgeons so that endosurgical procedures (EP) can be performed safely is not to be neglected. We looked at our LPA in relation to all EP performed in a first 4 year period.

II. 151 EP were performed since august 1997 in patients from 4500g on, aged 3 month to 16 years. 110 were LPA the others corresponding to 9 gynecologic, 9 urologic, 7 thorascopic interventions and 8 cholecystectomies, 1 fundoplication, 1 anterior diaphragmatic hernia and 6 miscellaneous.

III. Operating time decreased from average 68 minutes (first 10) to 40 minutes (actual) for LPA. 7 intraabdominal abscesses, 6 treated with oral antibiotics alone and 3 conversions in the first 66 patients were recorded. In the no LPA EP 1 nefrectomy was converted and 1 trocar site omentum hernia closed. No bleeding, no wound or abdominal wall infection and no procedure related injury occurred.

IV. LPA might bring small benefit for patients but is extremely usefull to keep pediatric surgeons trained for performing a great variety of EP.

#### **p06. OMENTAL INFARCTION IN CHILDREN: A TWISTED 'TAIL' OF A NOT SO INFREQUENT PROBLEM**

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Purpose: Miniature access surgery (MAS) for appendicitis affords a better abdominal cavity inspection and diagnosis of other surgical maladies that may otherwise have been missed with a limited RLQ incision. Omental infarction is a rare cause of acute abdominal pain with an incidence of 0.1%. We hypothesized that with MAS, omental infarction would be more commonly diagnosed.

Methods: We reviewed all patients operated on with a diagnosis of appendicitis during one year.

Results: 203 patients were compiled; 195 (96%) were managed with MAS. 38 cases (18.7%), had a normal appendix and 5 of these had infarcted omentum, (13.5%). The incidence of omental infarction was 2.5%. These children were 7 and 11 years of age, and all were obese (BMI > 97th %). The pain was prolonged (1-3 days) and did not change location. Localized peritonitis was not always at McBurney's point. No patients had nausea or vomiting, all were afebrile, and had a mild leukocytosis (mean, 13000).

At MAS, all 5 patients had a normal appendix with a distal segment of infarcted omentum in the RLQ. The omentum were resected with MAS and all were discharged in < 48 hours. Pathologies were consistent with acute ischemia and chronic fibrosis.

Conclusion: Omental infarction illustrates the utility of MAS in children with a diagnosis of appendicitis. Our data suggests an increased incidence of omental infarction likely due to the increased diagnostic yield of MAS. Further, the infarcted omentum can be easily managed with MAS.

#### **p07. SURGICAL PROCEDURE FOR VIDEO-ASSISTED COLONIC PULL-THROUGH WITH SECTION OF INFERIOR MESENTERIC ARTERY**

D. Falchetti MD, F. Torri MD, S. Benvenuti MD, L. Tonegatti MD, S. Milianti MD, B. Morelli MD, F. Braga MD, G. Ekema MD

Introduction We perform video-assisted endorectal pull-through for the treatment of Hirschsprung's disease with a modified Georgeson's procedure. We reviewed our experience to assess its safety and advantages

Methods The left colon is freed just dividing the inferior mesenteric vessels (IMV) at their origin next to the aorta. This procedure allows section of the mesocolon on its avascular plane from the splenic flexure to the pelvic peritoneal reflection and preservation of its larger vessels (left colic and sigmoid arteries) blood supply. This dissection is safely away from nerves around Waldeyer's and Denonvillier's Fascia. As usual the pelvic rectum is dissected by endorectal mucosectomy from below, starting about 0.5cm above the pectinate line, and after the section of the prolapsed muscular cuff the colon completely mobilized is loosely pulled down transanally until the level of normal bowel innervation. The colo-anal anastomosis is always performed by hand.

Results This technique has been used in 15 patients ageing 25 days to 12 years. In every case adequate mobilization was achieved. No intraoperative problem required conversion to open surgery.

Conclusion Video-assisted endorectal pull-through with IMV section is a safe technique and allows quick and neat mobilization of the left colon.

#### **p08. LAPAROSCOPIC RECTOPEXY: A NEW APPROACH IN CHILDREN**

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Aim: Rectopexy is one of the accepted forms of treating full thickness rectal prolapse in children. A variety of techniques including laparoscopic rectopexy have been reported in adults. We report our experience of laparoscopic rectopexy in children.

Method: Patients with full thickness rectal prolapse resistant to conservative treatment underwent laparoscopic rectopexy. Three 5mm ports were inserted, one in right upper quadrant for a zero degree telescope, one in left upper quadrant and one in right iliac fossa. Two graspers were introduced through the lateral ports and the rectum was identified. The mobility of the rectum was checked. The peritoneum



was incised lateral to the left internal inguinal ring to create a raw area. The rectum is fully stretched and sutured to the transversus abdominis muscle with 2-0 ethibond sutures. Postoperatively feeding was commenced once the patients were awake. The patients were discharged the next day and were followed up in the clinic after six weeks.

Results: All 4 patients underwent this technique. The median operation time was 50 minutes and the median hospital stay was 24 hours. All patients tolerated the procedure well and there were no complications. At follow-up there were no recurrences.

Conclusion: Laparoscopic rectopexy can be easily performed in children. Our technique is simple and had excellent results. We recommend laparoscopic rectopexy in children with rectal prolapse resistant to conservative management.

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**p09. LAPAROSCOPY ASSISTED ANORECTAL PULL-THROUGH FOR RECTOCLOACAL FISTULA: A CASE REPORT**

Tadashi Iwanaka, MD, PhD, Mari Arai, MD, PhD, Hiroshi Kawashima, MD, Sumi Kudou, MD, Jun Fujishiro, MD, Satohiko Imaizumi, MD, PhD

*Department of Surgery Saitama Children's Medical Center*

Purpose: To report successful laparoscopy assisted anorectal pull-through and posterior skin-flap vaginoplasty.

Case report: A 13-month-old female child had initial sigmoidostomy at birth, presented with rectocloacal anomaly: double vagina and intermediate confluence of urogenital sinus with a high type of rectovaginal fistula. She underwent laparoscopy assisted anorectal pull-through and posterior skin-flap vaginoplasty, simultaneously. Following vaginoplasty, the distal rectum was laparoscopically dissected and the rectovaginal fistula divided. Laparoscopic muscle stimulator with 5mm diameter showed good contraction of levator muscles in the pelvic floor. Dilatation of the pull-through tract was achieved by inserting a guide-wire and balloon catheter into the center of the levator muscle sling and muscle complex, with laparoscopic visualization. Rectal pull-through and anastomosis between rectum and anus were successfully completed. The operation took 4.25 hours, and blood loss was minimal.

Conclusions: Laparoscopy and laparoscopic muscle stimulator provide excellent visualization of the rectovaginal fistula and levator muscle sling. Better visualization of the tract facilitates successful rectal pull-through.

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**p10. LAPAROSCOPIC MECKEL'S DIVERTICULECTOMY**

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Meckel's diverticulum has an incidence of approximately 1-2 percent in the population, may be present at any age and carry an approximately 4 percent risk of complications throughout life. Over 40 percent of complications occur before the age of 10 years. The type of complication and the clinical presentation vary greatly with age - gastrointestinal bleeding and intestinal obstruction are more common in children. Many authors recommend routine diverticulectomy, but some authors illustrate that the risk of diverticulectomy outweighs the benefits for some patients. From August 1999 to August 2001 identification of Meckel's diverticulum was performed on all children (4 to 18 years of age) undergoing laparoscopic appendectomy. Retrograde examination of the ileum in 34 children identified Meckel's diverticulum in 5 cases (almost

15 percent incidence!). In the same period we had 2 children with symptomatic Meckel's diverticulum - gastrointestinal bleeding (2 years old boy) and intussusception (18 months old girl). We performed laparoscopic diverticulectomy by stapler, but in case of intussusception it was necessary to carry out wedge-shaped resection (broad-based diverticulum). We had no complications. Results: We recommend active identification of Meckel's diverticulum in all children undergoing laparoscopic procedure (appendectomy). Diverticulum resection is not always required, because the risk of developing symptomatic problems is decreased with age. It is appropriate to carry out diverticulectomy in children under 10 years of age.

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**p11. LAPAROSCOPIC DRAINAGE AND EXCISION OF INTRA-ABDOMINAL CYSTS**

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Objective: In children presenting with intra-abdominal cysts, as demonstrated on ultrasound, the conventional treatment is with laparotomy. This presentation describes the laparoscopic treatment of intra-abdominal cysts.

Method: A 5 day old boy presented to an out-patient clinic with a mobile abdominal mass. This had previously been demonstrated on antenatal ultrasound at 19 weeks and reported a simple cyst. Further ultrasonic examination revealed a mobile cyst in the right upper quadrant measuring 4 cm in diameter and freely mobile, thought to be mesenteric or an enteric duplication cyst.

One neonate with an ovarian cyst and one older child with an ovarian dermoid were also included in the study and the departmental experience of intra abdominal cysts is reviewed.

Results: Under general anaesthesia laparoscopy demonstrated a spherical duplication cyst on the anti-mesenteric aspect of the small bowel. Using a spinal needle this was drained and the deflated cyst was excised and removed via the umbilical port site. The child was discharged the following day. The ovarian cyst was treated in a similar manner. The ovarian dermoid was formally excised and removed within a bag via the umbilical port site.

Conclusion: Some varieties of intra-abdominal cysts are suitable for laparoscopic drainage followed by definitive treatment, intra- or extra-corporeally thus achieving all the benefits of laparoscopic treatment over laparotomy.

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**p12. EXPERIENCES ON 19 CASES LAPAROSCOPE-ASSISTED SWENSON OPERATION**

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Aim: To introduce the experiences on laparoscope-assisted Swenson's operation of congenital megacolon. Method: We performed 19 cases of micro-laparoscope assisted Swenson's operations during Oct. 1999 to July 2001. Age of the patients ranged from 27 days to 18 months. Results: The 19 cases were done with assistance of laparoscope. There was minor damage to the abdominal and pelvic cavity, less bleeding, less pain, small incision, speedier recovery compared to the traditional Swenson's method. Conclusions: Part of Swenson's operation can be done by laparoscopy. The laparoscopic method has the advantages of speedier recovery, shorter hospitalization time and



less complications. It's worthy to be populized.

### **p13. LAPAROSCOPIC PROCEDURES FOR MECKEL'S DIVERTICULUM PATHOLOGY IN CHILDREN**

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Fifty-eight patients (from 1 month to 14 years) with Meckel's diverticulum pathology underwent laparoscopy for bleeding (39 cases), for acute abdomen caused by diverticulitis or diverticulum perforation (14) or for acute bowel obstruction (5) within the period from 1993 to 2001.

According to laparoscopic findings the following surgical procedures were performed:

- Open small bowel resection - 6 cases;
- Laparoscopic resection of the diverticulum - 52 cases with no signs of pathology in its basis and in the adjoining bowel:
  - ligature resection - 24 patients;
  - resection with endostapler - 26 cases;
  - in 2 cases - hand resection with double-row endoscopic stitch.

Three trocars (3-12 mm) were used in all cases. The operating time varied from 15 to 100 min. (average - about 30 minutes). The usual hospital stay after laparoscopic procedure was 3 days.

There were no complications and conversions to open procedure, no cases of recurrent bleeding during the period of postoperative observation from 1 month to 8 years.

In our opinion laparoscopy provides the best diagnostic possibilities and effective minimally invasive surgical methods for the treatment of Meckel's diverticulum pathology in children.

### **p14. RETROPERITONEAL TUMOR TREATED BY LAPAROSCOPIC WAY**

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Background : retroperitoneal tumors are not common in the first two decades of life. About 75 % of them are potentially malignant.

Aim: discuss uses of laparoscopic treatment for retroperitoneal tumors.

Case report: 15-years-old girl who presented abdominal pain. Ultrasonography showed a thin-walled cystic image 3.7 cm diameter, with homogeneous content situated in the retroperitoneum, close to the tail of the pancreas. By computed tomography was shown the tumor contacting the tail of the pancreas, aorta, vascular renal pedicle, and left suprarenal vein. It could not be identified the origin of the tumor. The anatomic limits were improved by magnetic resonance. The tumor markers, and serology tests, were negative.

Results: the patient was under general anesthesia, in left lateral decubitus. A pneumoperitoneum was performed with Varess needle under 12 mmHG pressure maximum. Trocar 10 mm umbilical, (camera), 5 mm epigastric, 10 mm left flank . Dissection of the colonic esplanic angle, retroperitoneal space was open by up the upper pole renal, where the pancreas was identified (corpus and tail) and the upper pole renal, an esferic tumoral mass was found with a good line of section, its limits were: pancreas up, aorta in the midline, low renal pedicle and lateral external suprarenal vein. The complete excision was possible by using the armonic bistury. The extraction of the specimen was performed in a bag, through the trocar placed in the flank. Operation time was 75 minutes. There were no perioperative complications. The histopathologic examination revealed: gastric duplication cyst.

Discussion: the laparoscopic approach let us the diagnostic and treatment in a safely and efficiently way for a disease with a difficult anatomic access, with a low morbidity and soon functional recovery.

### **p15. VIDEO-ASSISTED TREATMENT FOR A CASE OF ATRESIA DUODENAL**

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Background: atresia is the most frequent cause of congenital bowel obstruction during neonatal period.

Objective: to study the utility of laparoscopy for the treatment of duodenal atresia.

Case report: patient 24-hours-old, with a birth weight of 2,950g, diagnosed as duodenal atresia type I. The radiography showed an image of a double bubbles. A rotegenogram contrast showed the partial obstruction.

Results: patient was under general anesthesia, in back decubitus position. Some 8 mm Hg maximum pressure pneumoperitoneum was performed. Trocar 10 mm umbilical (camera), 5 mm hipocondrius, and left flank. The laparoscopic exploration is performed from the duodenum to the colon, showed a proximal duodenum dilation, the second and third portion of the duodenum are liberated following with the complete dissection of the transition segment. In that zone, we performed a skin incision of one centimeter long, and through it we made a duodenal vertical incision, and performed a V-shaped portion of the membrane is excised. The vertical incision is closed transversely whit one layer interrupted 5-0 sutures.

Operation time was 55 minutes. There were no perioperative complications. The patient was fed during the following 72 hours, and she was discharged on the fifth postoperative day.

Discussion: laparoscopic approach made it possible the diagnostic confirmation of atresia type I, performed the dissection of the bowel transition segment, locating and limitating the incision size with a safe anastomosis, low morbidity and soon functional recovery.

### **p16. IS LAPAROSCOPY SAFE AFTER MAJOR BLUNT TRAUMA OF THE ABDOMEN IN CHILDREN?**

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Introduction: Most of the abdominal trauma's in children are not operated. In case of hemodynamic instability or signs of peritonitis however, exploration is mandatory.

We describe 2 cases of full minimal-invasive major blunt trauma's management and discuss the feasibility.

Case Reports: The first case is a 9 years old boy with peritonitis after empalement on a broom stick. Peritonitis was clinical and visible on Xrays; laparoscopy occurred 6 hours after the accident. A perforation of the sigmoid was closed and complete lavage of the abdominal



cavity done. There was no drainage.

The second patient was 5 years old and transferred after delayed diagnosis (60h) of colonic perforation due to a scooter. After few hours reconditioning laparoscopy was decided. A right colonic flexure was sutured and covered with omentum. Lavage was complete and drainage without colostomy was decided.

Discussion: This cases are illustrations of the excellent combination between radiology and laparoscopy to manage mini-invasively major trauma's of the abdomen. Volume and fat are not important in a child's abdomen and bowel length is short. That allows probably better exploration in comparison with adults. Magnification permits undoubtedly more accurate sutures and lavage is certainly better by laparoscopy. This and a perfect antibiotic strategy decrease the need for colostomy even in delayed cases.

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**p17. MINIATURE ACCESS CHAIT CECOSTOMY: A NEW APPROACH TO THE MANAGEMENT OF FECAL INCONTINENCE**

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Purpose. Antegrade continence enema is a well-established procedure in the management of children with fecal incontinence. Chait and Shandling described the percutaneous approach for the management of these children. The procedure eliminated the need for an operation, can be performed under sedation and local anesthesia, and is clinically effective with minimal morbidity. However, it has several potential disadvantages. First, it is a blind procedure. Second, the cecum is not secured to the abdominal wall. Third, the procedure requires a skilled interventional radiologist. And fourth, the procedure requires two stages. Methods. Miniature access Chait cecostomy was used in 4 children with fecal incontinence. Under direct vision the cecum is identified, mobilized, sutured to the anterior abdominal wall, and with precision the Chait device is inserted. Results. The procedure permitted excellent cecal visualization and mobilization. Precise positioning of the device in the cecum was achieved. Antegrade continence enemas were performed at 10 days. The procedure was clinically effective with no postoperative complications. Conclusions. Miniature access Chait cecostomy for children with fecal incontinence is a safe option. The procedure allows excellent cecal visualization and mobilization minimizing the risk of complications. It is a single stage procedure performed by the surgeon, the same person responsible for long-term bowel management.

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**p19. LAPAROSCOPY IN DISEASES INVOLVING THE GREATER OMENTUM**

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Diseases involving the greater omentum are very rare and are often only recognised intraoperatively. They are usually accompanied by an acute abdomen and are then an incidental finding. Our patient population of 1350 children, who underwent laparoscopy included 7 with primary diseases of the greater omentum accompanied by acute abdominal symptoms: omental cyst, lymphangioma, omental infarction, abscess, tumor and cord formation with chronic incarceration. The age ranged between one and 9 years. The diagnosis was established preoperatively only for cyst and lymphangioma. The therapeutic procedure was dependent on the findings. The cyst was fenestrated by laser and the lymphangioma was resected. In the tumor (rhabdomyosarcoma), we only took a biopsy. Partial resection of the greater omentum was performed for omental infarction and chronic omental abscess. The cord formation with chronic hernial incarceration was resected by laser. None of the children had intra- or postoperative complications, no drainages were necessary.

Keywords: laparoscopy, omental disease, children

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**p20. LAPAROSCOPY FOR INTESTINAL BLEEDING IN INFANCY**

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AIMS: The localisation of the site of origin of gastro-intestinal bleeding in childhood is difficult. It has been suggested that laparoscopic examination of the abdominal viscera should precede upper gastro-intestinal endoscopy in investigation protocols, as the latter may lead to significant intestinal distension of the bowel with insufflated air, rendering subsequent safe laparoscopy difficult. We report a case of significant gastro-intestinal bleeding in an infant in whom initial laparoscopy necessitated subsequent upper GI-endoscopy and laparotomy during the same anaesthetic to successfully excise an intra-gastric lesion. The place of laparoscopy in the investigation protocol of childhood gastrointestinal bleeding will be discussed.

METHODS: A four month old male infant presented acutely with profound anaemia (Hb 3.9g/dl) and melaena stool. He was otherwise well and had no significant past medical history. Notably there was no history of haematemesis. Following resuscitation, ultrasound examination of the abdomen was performed (normal) and he proceeded to laparoscopy under general anaesthesia. At operation a small vitelline remnant was identified but the proximal intestinal lumen was found to contain altered blood. Subsequent upper GI-endoscopy demonstrated the presence of a polypoid, 5cm diameter mass arising from the posterior wall of the body of the stomach, associated with altered blood intraluminally. Exploration of the abdomen through a left upper quadrant transverse muscle-cutting incision was performed, gastrotomy allowing complete excision of the intra-gastric mass.

CONCLUSION: Initial upper GI-endoscopy followed by subsequent endoscopic retrieval/laparotomy would have avoided unnecessary laparoscopy in this child. The role of laparoscopy in the investigation of GI-bleeding in childhood needs clarification.

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**p21. ENDOSCOPIC SURGERY OF DIAPHRAGMATIC ANOMALIES : A MULTICENTRIC STUDY OF THE GROUPE D'ETUDE EN COELIOCHIRURGIE INFANTILE (GECI). PART 1 : POSTEROLATERAL HERNIAS (BOCHDALEK) AND EVENTRATIONS**

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**Introduction :** To evaluate its feasibility, we reviewed the thoraco- and laparoscopic access to diaphragmatic posterolateral hernias of Bochdalek (PLH) and eventrations (EV) in a multicentric study.

**Method and procedures :** In a retrospective study within GECL, we collected 67 patients with 70 laparo- or thoracoscopic operations from 18 centers. Among those were 31 PLH (22L,9R), age 15mo.(2d. to 13y.), weight 7.6kg (2.5 to 20kg), including 10 neonates(NN), and 10 EV (3L,7R), age 10.5mo.(5d. to 32mo.), weight 7kg (2.5 to 16kg), including 5 NN. Data analysed were age, weight and symptoms, success or conversion, causes for conversions. Results : In the PLH group, were 9 thoraco- and 24 laparoscopies (2: thoraco and laparoscopy). The procedure was successful in 20/31 (64.5%). In neonates, 5/10 (50%) were converted. In the EV group, were 6 thoraco- and 4 laparoscopies, with 6 conversions. Conversions were due to: lack of visibility / working space (11), irreducibility (5), size of the defect(1), bowel injury(1), ventilation difficulties(1). The repair was by direct suture or plication (20) or with a patch (4). Operating time was 97 min(45-205), hospital stay 5.7 d.

There was 1 recurrence. There were no adverse effect of the endoscopic attempt in 17 converted patients. Conclusions: Endoscopic repair of the diaphragm is possible in 2/3 of the patients. With no adverse effects of a conversion on outcome, and its well-known advantages, a minimally invasive access deserves further trial and evaluation.

## **p22. THREE TROCARS NISSEN FUNDOPLICATION IN A CHILD WITH LIMITED ACCESS**

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**Introduction** Our usual technique of Nissen fundoplication requires 4 ports. We had to treat a 3year-old neurologic child with intractable emesis and recurrent ab ingestis pneumonia in which a percutaneous endoscopic gastrostomy (PEG) and a ventriculo-peritoneal shunt (VPS) hindered access to abdominal cavity.

**Methods** A 10mm trocar was positioned in epigastrium for camera with "open" technique, and two 5mm trocars in upper left abdomen and in xifoid region respectively. With two devices the lesser omentum could be opened without injuring hepatic branch of vagus, the distal esophagus dissected and a retroesophageal window created handling with two retractors. A 360° wrap was fashioned and fixed to the esophagus acting with a supplementar tool through the channel of an operating laparoscope (STORZr).

**Results** Fundoplication was performed laparoscopically respecting both PEG and VPS. The procedure took about 120min. There were no intra-peri-operative complications and the child enjoyed a quick bowel function recover.

**Conclusions** Laparoscopic exploration and unusual surgical tricks seem to be justified before giving up the chance of endoscopic surgery even in patients with limited access.

## **p23. FOLLOW.UP OF VLS TREATED GERD THROUGH A NEW PARAMETER: AREA UNDER H+**

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**Objectives:** we compare the data provided by 24-hour esophageal pH monitoring pre and post-operatively in a group of patients who have had a surgical treatment for Gastro-Esophageal Reflux Disease (GERD) and in a group of controls. We used both conventional parameters and the area under the curve of hydrogen ion activity (AUH+), a new parameter describing the real acid exposure, considering the length and the depth of acidity fall. **Methods:** 15 controls and 27 patients with GERD (15 without endoscopic esophagitis and 12 with Savary I-IV endoscopic esophagitis or erosive GERD) were enrolled in a study based on pre and postoperative 24 hour pH monitoring, to compare reference values through Receiver Operating Characteristic (ROC) discriminant analysis and Mann-Whitney test. **Results:** Best ROC cutoff values were AUH+ = 103.7 mmol/l/min with sensitivity 76.7% and specificity 93.3% for not erosive GERD patients and AUH+ = 114.1 mmol/l/min with sensitivity 100% and specificity 96.7% for erosive GERD. The sensibility increases of 16.7% for not erosive GERD and of 10% for erosive GERD against the most used conventional parameter (DeMeester score). Postoperatively, the whole series were under AUH+ = 103.7 mmol/l/min. **Conclusions:** AUH+ could be a reliable clinical aid being a more sensitive parameter in discriminating negative or positive pediatric patients with or without esophagitis. Furthermore AUH+ is the most reliable parameter to evaluate the outcomes after medical and surgical treatment.

## **p24. LAPAROSCOPIC GASTROSTOMY TUBE PLACEMENT: IS THERE A BEST TECHNIQUE?**

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**Introduction:** Because of frequent complications many surgical techniques have been described for pediatric gastrostomy tube placement. The purpose of this study was to determine the outcomes for three different laparoscopic gastrostomy techniques performed by one surgeon. **Methods:** A retrospective 144-chart review, 1992 -1996, was undertaken. Data included patient demographics, neurologic status, indication for operation, concomitant fundoplication, OR time and complications. Laparoscopic surgical techniques included 1) T-fastener, 2) Stamm-type gastrostomy through a trocar site and 3) trans-abdominal wall/stomach 'U' stitch. Fisher's Exact Test was used for statistical analysis with p < 0.05 considered significant. **Results:** Technique frequency was 29% T-fastener, 31% trocar site and 40% U-stitch. Neurologic impairment was noted in 79% with fundoplication performed in 92%. In gastrostomy alone cases OR times were similar for U-stitch and trocar technique but longer for the T-fastener technique (28 and 31 vs 42 min). Minor complications were similar with the U-stitch (16%) and trocar site (18%) techniques but less frequent in the T-fastener (11%) technique (p=0.01). Major complications (re-operation/hospitalization) were similar between techniques (14-22%, p=0.35). **Conclusion:** The laparoscopic gastrostomy approach has not eliminated frequent postoperative problems (25-40%). The 'T-fastener' technique may have fewer minor complications than the trocar site or U stitch method.

## **p25. LAPAROSCOPIC REDUCTION OF GASTRIC VOLVULUS AND REPAIR OF GIANT HIATAL HERNIA IN A NEW-BORN**

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Gastric volvulus in the newborn period is a rare clinical entity. Most often these infants have associated diaphragmatic defects. We report a three week old term infant weighing 2.4 kg who was referred for failure to gain weight, tachypnea with feeds, and frequent emesis. A chest X-ray demonstrated an intrathoracic stomach and barium swallow confirmed this as well as revealing no obstruction. Laparoscopic evaluation revealed a large hiatal hernia, normal diaphragms, and an inverted, completely intrathoracic stomach. Reduction was achieved using one 5 mm and two 4 mm trocars. Laparoscopic hiatal hernia repair with placement of a primary gastrostomy button was performed. The infant fed well for only one week after which she developed recurrent emesis. Studies revealed hypertrophic pyloric stenosis. Laparoscopic pyloromyotomy was completed and the infant did well for the next month. Recurrent episodes of emesis and failure to achieve sustained weight gain influenced the decision to perform a laparoscopic Nissen fundoplication. The infant was gaining weight and thriving following the final procedure. Gastric volvulus with large hiatal hernia is amenable to laparoscopic management and repair. The complexity of this case did not preclude the performance of multiple subsequent minimal access approaches to correct problems such as pyloric stenosis and gastroesophageal reflux which developed.

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**p26. LAPAROSCOPIC ASSISTED GASTRIC TRANSPOSITION IN INFANT: CASE REPORT**

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**INTRODUCTION:** We report on a female infant born with oesophageal atresia type III who underwent primary repair. Few months later, she developed signs of dysphagia associated with failure to thrive. An upper GI study showed a patent anastomosis with an extended stenosis (about 5 cm.) between the middle a lower oesophagus. On these basis, we decided to go for oesophageal replacement by intrathoracic gastric transposition. At the time of surgery, she was 10 months old with a weight of 5 kgs.

**METHODS AND PROCEDURES:**The laparoscopic approach was similar to that routinely used for correction of G-E reflux. The first step was to divide the short gastric vessels between clips and to cut the gastro-phrenic ligament. Then, the gastro-oesophageal junction and the oesophagus were dissected up into the mediastinum through the diaframmatic iatus. Also the little gastric curvature was mobilised by dividing the left gastric ligament preserving the gastric artery. Finally, the oesophageal iatus was dilated to facilitate the passage of the stomach. After the abdominal time was performed by laparoscopy, the operation was completed through the right thoracotomy. The post-operative outcome was uneventful and, actually, the child is feeding and growing well.

**CONCLUSIONS:** The development of sophisticated laparoscopic techniques and the acquisition of expertise allow to modify standardised surgical approach to execute unusual operative procedures safely with good results in infants.

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**p27. THE LEARNING CURVE FOR LAPAROSCOPIC PYLOROMYOTOMY - IMPACT ON GENERAL SURGICAL RESIDENCY EXPERIENCE**

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**Background:** Laparoscopic Pyloromyotomy(LP)is feasible and safe.Improved cosmesis, decreased surgical stress,earlier postoperative recovery,and possibly shorter hospitalization are potential advantages over the traditional open procedure(OP).The impact of this procedure on general surgery resident training,especially in programs with pediatric surgical trainees,has not been evaluated.We reviewed our early experience with LP,specifically focusing on the impact of the learning curve upon surgical training.

**Methods:** Retrospective review of all pyloromyotomies performed between July 97-June 98.

**Results:** Twenty nine patients were identified -9 LP and 20 OP.The groups were matched for body weight,age,clinical and physiologic status and size of the pylorus.The learning curve accounted for longer operative times in the early LP cases. There was no statistical difference in time to full feeds,length of stay,and complications. Postoperative emesis was lower in the LP group.The general surgery resident did 75% of OP cases but no LP cases.

**Conclusions:**

The learning curve for LP results in fewer cases being available for surgical residents.The impact of this and other newer minimally invasive techniques on resident operative skills appears to be significant.Residents are unlikely to perform an adequate number of procedures to achieve competency,placing children who might require these procedures in the community at risk.

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**p28. PRELIMINARY COMPARISON OF LAPAROSCOPIC VS. OPEN NISSEN FUNDOPLICATION IN PATIENTS WITH CONGENITAL HEART DISEASE**

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**Purpose:** To compare the feasibility, risks, and overall efficacy of open with laparoscopic Nissen fundoplication in infants with congenital heart disease.

**Methods:** A retrospective analysis was performed on 38 infants with congenital heart disease requiring antireflux surgery from June, 1994 to April, 2000. Twenty-eight patients underwent open Nissen fundoplication (Open); 10 patients underwent laparoscopic Nissen fundoplication (Lap). Patient demographics and intraoperative and postoperative outcomes were evaluated. Student's T-test was utilized for statistical analysis, and P<0.05 was considered statistically significant. Results: The groups were of similar gestational age and birth weight (Lap 37 +/-3 wks, 3.2 +/-0.7 kg; Open 36 +/-5 wks, 2.6 +/-0.9 kg). The age and weight at time of surgery were similar (Lap 32 +/-45 wks, 5.6 +/-2.5 kg; Open 58 +/-61 wks, 6.6 +/-3.6 kg). Mean operative time was not statistically different (Lap 98 +/-37 mins; Open 94 +/-24 mins). Time to full feeds and length of stay were not statistically different (Lap 6 +/-7 days, 8 +/-8 days, Open 6 +/-5 days, 7 +/-4 days). 1 patient in the Open group sustained transection of the anterior vagus nerve. There was 1 post-op death in each group.

**Conclusion:** Laparoscopic Nissen fundoplication in infants with congenital heart disease is a safe, feasible surgical technique with



results comparable to open Nissen fundoplication.

### p29. HOW THE PROCESSUS VAGINALIS OBLITERATES

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**Objective:** The mechanism of physiologic closure of the processus vaginalis (in boys) is still unknown. The only data available stem from historic series of post mortem examinations of children.

**Methods and procedures:** During routine laparoscopies for inguinal hernias in children (n = 247; aged 3 weeks to 13 years, median 1.8 years) the processus vaginalis was evaluated and its configuration recorded.

**Results:** In 5% of hernia patients, a partially occluded processus can be observed. (The majority of patients have either wide open or completely closed processus). As to be demonstrated by several video recordings, the processus occludes in the form of segmental narrowings, much like an hour-glass.

**Conclusions:** Routine laparoscopy answers the open question of how the processus physiologically closes. The mechanism also explains the occurrence of hydroceles and funiculocoeles, the latter being entrapments of fluid between two segmental closures.

### p30. LAPAROSCOPIC APPROACH OF A CLOACAL ANOMALY ASSOCIATED WITH VAGINAL AGENESIS

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Present a rare spectrum of cloacal malformation and the role of laparoscopy in its diagnosis and treatment. **Introduction:** . Laparoscopy gives an optimal view of the pelvis and helps to achieve a low dissection of the fistula with minimal trauma. We previously (Ipeg 2001) reported our experience with laparoscopy combined with total urogenital sinus mobilization for the treatment of cloacas with a high abdominal rectum. We now present a patient with a cloaca associated with vaginal agenesis and the important role that the initial laparoscopic approach played in its diagnosis and reconstruction. **Case Presentation :** A 4 years old female was admitted for cloacal reconstruction. She had a normal sacrum and kidneys and a sigmoid diverted colostomy. Distal cologram showed a very short tracted sigmoid and an intermediate rectum ending in the cloacal channel . No vaginal structures were seen with xray contrast studies. Under general anesthesia , an endoscopic study of the cloacal channell showed a good bladder neck and proximal urethra and a rectum ending 3 cm from the cloacal opening No vaginal opening was recognized. Laparoscopy showed two solid lateral mullerian remnants and confirmed uterovaginal dysgenesis . It also demonstrated clearly that a very short distal sigmoid was left. We decided then to leave the rectum as a vagina and descend the proximal sigmoid colostomy to the perineum . The external sphinther was recognized and incised from the perineum. Under laparoscopic vission an expandable sheat trocar was introduced behind the rectum to achieve sigmoid descent..Colostomy was taken down and a stappler was placed distally ,leaving the rectum as a blind ending vagina.The proximal sigmoid was brought down to the perineum using the perineal port. Anoplasty was completed and the cloacal channell was mobilized and opened to create a "vaginal" wide opening . As there wasn ´t any suture line except for anoplasty left in the perineum , a protective colostomy was not opened..Operative time was 5 hours. We started feeding her after 72 hours postop. After 4 months of follow up she presents voluntary bowel movements without constipation or soiling. **Discussion:** .Only 12 out of 160 females with anorrectal malformations assisted in our hospital had complete uterovaginal dysgenesis . Only 2 of them were cloacas. Leaving the rectum as a vagina has been previously described in patients with a rectovestibular fistula and vaginal agenesis. A combined initial endoscopic and laparoscopic assessment of the anomaly permitted a less invasive and time consuming approach in a case that would be a candidate to start with redoing "the inadequate colostomy".

### p31. COMBINED HISTEROSCOPIC AND LAPAROSCOPIC TREATMENT OF OBSTRUCTED UTERINE DUPLICATIONS

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Present a rare obstructed supracerical defect of lateral fusión of the mullerian ducts and its minimally invasive treatment. **Introduction:** Obstructed lateral fusion uterovaginal anomalies result from a failure of fusion of both mullerian ducts associated with one side failure of the lumen to communicate with the outside. The most frequent variety is the double uterus with an obstructed hemivagina and ipsilateral renal agenesis ( Wunderlich-Heryn-Werner syndrome) which treatment is endovaginal resection of the septum, creating one single vagina. A higher level of obstruction (uterine cervix) is rare and its symptoms very acute because of the loss of the reservoir-like action of the duplicated vagina to accommodate the menstrual blood. **Patients & Methods :** Five adolescents with this anomaly were assisted between July/2000 and August/2001 Their mean age was 13,5 years. They were admitted with acute abdominal pain . All of them had severe dysmenorrhea ; normal external genitalia and a patent vagina. There was no endovaginal "bulging" and ultrasound showed normal kidneys and an asymmetric uterine duplication. MRI showed an asymmetric hematometra in all of them but misdiagnosed an hematosalpinx as an hematocolpos in 1patient. One patient had a previous failed endovaginal instrumentation .We started doing a laparoscopy to confirm the suspected anomaly and evaluate endometriosis , followed by an operative hysteroscopy through the nonobstructed uterus to resect the duplicated uterine walls (septum), creating one single uterine cavity. The laparoscope was left in place to monitor the hysteroscopic operation and reduce the risk of perforation. The intense of the laparoscopic illumination was occasionally reduced to allow to judge the thickness of the uterine walls as the operation progressed. **Results:** The procedure was completed sucessfully in 4 patients with a mean operative time of 90 min .The non obstructed uterus was thin and displaced by the obstructed and caution needs to be taken not to perforate its walls. On the other hand the septum was very thick and it was hard to reach the obstructed cavity , specially in the first case. One patient required an open surgery because we were not able to dilate her uterine cervix to introduce the hysteroscope. She underwent a conventional metroplasty and salpingoplasty because of a severe associated hematosalpinx . Mean hospital stay was 1,5 days. Patients are asymptomatic , with regular menses and no ultrasonic evidence of obstruction after a mean follow up of 7 months. **Conclusion:** These patients represented the 23,8% % of uterovaginal anomalies of lateral fusion (Class III) assisted in our institution ( 21 p). We point out the absence of associated renal anomalies and the utility of MRI.

Although there are no previous reports of this minimal invasive approach in pediatrics , we consider this preliminary data suggests that it



may be included as a valid option to treat and preserve an obstructed müllerian structure.

**p32. LAPAROSCOPIC OVARIAN TRANSPOSITION TO PRESERVE FERTILITY IN PEDIATRIC PATIENTS PRIOR TO PELVIC IRRADIATION**

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Background: preserving fertility is an important consideration in children needing pelvic irradiation for cancer therapy. Transposing ovaries out of the designated radiation field may be an effective method of protecting gonadal function in these children. Laparoscopy provides a minimally invasive method of achieving these goals.

Case report: four children underwent laparoscopic ovarian transposition to remove ovaries from the field of pelvic irradiation. Two patients had Hodgkin's disease, one patient had pelvic rhabdomyosarcoma, and one patient had a cerebellar medulloblastoma requiring cranio-spinal irradiation. Ovaries were transposed to two locations: medially behind the uterus to protect them from irradiation of pelvic nodes or laterally above the pelvic brim to protect them from central radiation. Patients' ages ranged from 1 to 18 years. Results: markers placed on the transposed ovaries showed they were indeed shielded from irradiation. There were no operative complications and patients were discharged from our service the day following surgery. At this time pain was well managed with po medications, patients were tolerating regular diets, ambulating, and voiding spontaneously. In all four cases, blood loss was minimal. Subsequent return of menstruation was observed following radiation.

Conclusion: laparoscopic ovarian transposition is a safe and effective option for preserving fertility in pediatric cancer patients who require pelvic irradiation.

**p33. ONE-TROCAR RETROPERITONEOSCOPIC VARICOCELECTOMY: OUR EXPERIENCE**

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Introduction: We present our experience with the one-trocar retroperitoneoscopic varicocelectomy.

Methods and procedures: 41 patients with left varicocele underwent one-trocar retroperitoneoscopic varicocelectomy (January 1999-2001). Mean age was 12.1 years (range 6-18). The patient was placed in flank position. Through a 1.5 mm sub-costal incision and muscle splitting the retroperitoneal space was reached. The Gerota's fascia was opened, a 10 mm ballooned Hasson trocar introduced and the pneumoretroperitoneum established (15 mmHg). Retroperitoneal dissection was completed by a blunt tip dissector through the operative telescope. Spermatic vessels were identified, dissected and cut after bipolar coagulation. All patients had a Doppler study at least 6 months after the operation. Retrograde spermatic venography was performed for varicocele persistence.

Results: In 7 patients (17%) no identification of the spermatic vessels was achieved and conversion to laparoscopic transperitoneal approach was performed. In the 34 patients completed retroperitoneoscopically the mean operation time was 25 minutes (range 15-50). Mean hospital stay was 2.3 days. Mean follow-up was 13 months (range 6-24). Five patients (14.7%) had varicocele persistence. Venography showed collaterals in 2 cases. One patient (2.9%) had mild bilateral hydrocele.

Conclusions: Our experience shows that one-trocar retroperitoneoscopic varicocelectomy is a good mini-invasive alternative for varicocele treatment.

**p34. MINI-LAPAROSCOPIC PALOMO'S PROCEDURE BY BIPOLAR COAGULATION FOR VARICOCELE IN CHILDREN AND ADOLESCENTS**

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Aim : to evaluate the effectiveness and complication rate of mini-laparoscopic approach in the treatment of varicocele.

Methods : From January to September 2001, 17 children with left side varicocele underwent a mini-laparoscopic procedure according to Palomo's Technique. Mean age was 13 years (8-17 yrs). Varicoceles were classified as grade II in 3 cases and grade III in 14 patients. Under general anesthesia, a 5 mm port was inserted under direct vision through the umbilicus and pneumo-peritoneum was established. Two 3 mm re-usable working ports were inserted in the right lower quadrant and in left flank. Peritoneum overlying spermatic vessels was incised 3-4 cm above the vas. The internal spermatic vein(s) and artery were mobilized, accurately coagulated with a 2.7 mm bipolar forceps and finally divided. Local anesthesia at port sites, was performed to reduce p.o. pain.

Results : No perioperative complications occurred in this series. Mean operative time was 35 minutes (20 to 52 min.). All but two patients were discharged within 8 hours from intervention. Six months after surgical procedure a color-Doppler sonography was carried out. No recurrent varicocele or testicular volume reduction was detected. Postoperative hydrocele was observed in two patients and in a case required a surgical procedure. Esthetic results were excellent.

Conclusion : Mini-laparoscopic approach for treatment of varicocele seems to be as safe and effective as open procedure. Larger series are necessary to compare incidence of complications of these different procedures.

**p35. LAPAROSCOPIC CLOSURE OF PATENT PROCESSUS VAGINALIS AND TRANS-SCROTAL ORCHIOPEXY FOR UNDESCENDED TESTIS**

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The principle of the orchiopexy for undescended testis consists of closure of the patent processus vaginalis (PPV) and placement of the pedunculate testis in the dartos pocket. Laparoscopic PPV closure with an Endoneedle conducted us to its application to orchiopexy for nonpalpable and palpable testis. The procedures are performed with a 5-mm telescope through the umbilicus. The testicular vessels and the seminal cord are prepared for stretching by coagulator / endoscissors through a 15-G sheath needle inserted just above the internal inguinal ring (IIR). A 1.5-cm skin incision is made at the uppermost portion of the scrotum and a dartos pocket is made downward to the bottom. The testis is drawn out from the scrotal skin incision through the lowest portion of the PPV. The pedicle is detached from



surrounding tissues high at its neck, and stitched to the dartos layer under gentle traction of the testis downward. While, the PPV is closed extraperitoneally with the Endoneedle. The testis is placed in the dartos pocket after confirmation of blood stream by Dopp flowmetry. Since May 2000, this procedure has been carried out in 10 boys with undescended testis, including two intra-abdominal testes. In all cases the testis was delivered successfully. No testicular atrophy or hernia formation has occurred, and cosmesis in all patients is excellent.

This procedure may provide one-stage diagnostic and therapeutic maneuver for all nonpalpable and palpable undescended testes.

### p36. LAPAROSCOPIC NEPHROURETERECTOMY- A MODIFIED TECHNIQUE

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**Introduction:** We present our technique of laparoscopic nephroureterectomy and its advantages over conventional laparoscopic techniques.

**Methods:** Eighteen consecutive children (10 boys, median age 5y) undergoing laparoscopic nephroureterectomy were studied prospectively. All had a poorly/nonfunctioning kidney and a dilated ureter. The technique involves creating a peritoneal window directly over the kidney, mobilisation of the kidney, ligation of the vascular pedicle, extraperitoneal placement of the kidney and its extraperitoneal retrieval via the iliac fossa cannula site. In case a concomitant bladder is performed, the specimen is retrieved extraperitoneally via the lateral aspect of the Pfannenstiel incision. No preoperative stenting or enema is required.

**Results:** Early conversion was required in one child with an undiagnosed horseshoe kidney, recurrent perirenal sepsis and ureterostomy. The median operating time was 92 minutes (66-120) and median hospital stay was 2 days (1-4). Analgesia was for a maximum of 12 hours postoperatively. There were no laparoscopy related complications and the cosmetic results were excellent. All children remain well at between 1 to 7 years follow up.

**Conclusion:** Our technique of laparoscopic nephroureterectomy is a safe and effective alternative to conventional laparoscopic and open surgery. It is particularly attractive in those patients already undergoing an open bladder procedure.

### p37. ENDOSCOPIC TREATMENT OF VESICoureTERAL REFLUX IN CHILDREN: HAVE 505 PROCEDURES WITH COLLAGEN TM BEEN WORTHWHILE ?

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**Objective:** To report the clinical experience in children with vesicoureteral reflux treated endoscopically with Collagen tm.

**Materials and methods:** In 8 years we were performing on 192 children 505 endoscopic subureteric injection procedures for vesiculoureteral reflux with collagen.

**Results:** After one to 3 subureteric injections we had a success rate of 74.9 percent for either no more reflux or first to second grade reflux without symptoms. Discussed are the grade of the reflux at the beginning of the therapy and accompanying anomalies as well as the number of injection therapies and its success into regard on long time results in addition. Success was tested on persistent reflux and the necessity of operative treatment by reimplantation of the ureter as well as the number of recurrences.

**Conclusions:** Subureteric injection with collagen tm is safe and sufficient in the endoscopic treatment of vesicoureteral reflux in children even when it is unstable and tends to migration; under the influence of BSE crisis we are nowadays using Delfux tm for subureteral injection.

### p38. LAPAROSCOPIC PYELOURETEROSTOMY

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**Introduction:** Duplication of pelvis is managed according to the problems which the child has at the time of presentation. 8 months old male child with duplication of right kidney with lower moiety hydronephrotic secondary to vesicoureteric reflux was managed successfully by laparoscopic surgical technique by doing pyeloureterostomy and excising the lower ureter.

**Material and Methods:** 8 months old male child presented with an attack of UTI and it was investigated with ultrasound, isotope renogram, MCU and cystourethroscopy apart from biochemical tests and histopathological study of urine. It revealed refluxing (GR IV) ureterohydronephrosis of lower moiety with reduced function and normally functioning upper moiety. By laparoscopic method, the pelvis of lower moiety was anastomosed to ureter of the upper moiety (end to side) and the ureter of lower moiety was excised in toto. Post operative period was uneventful and anastomosis is functioning well.

**Results:** Pyeloureterostomy is reasonable technique here as the upper moiety ureter was normal (neither obstructive nor refluxing). The refluxing lower ureter was excised to prevent further damage to lower moiety. The good functioning of the anastomosis will preserve the function of the both moieties.

**Conclusion:** Of the options available for treatment of duplication of the kidney the pyeloureterostomy is one of the best methods. Technical expertise in doing laparoscopic method is alone a prerequisite to reduce the morbidity of open surgical method in addition to all benefits like reduced cutting of tissues while exposure, less pain, early return to activity and minimal scar.

### p39. DIAGNOSTIC LAPAROSCOPY IN RECURRENT ABDOMINAL PAIN IN CHILDREN - MILIARY T.B. ABDOMEN IN RARE CAUSE FOUND

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**Introduction:** Recurrent abdominal pain is perplexing one and is a testing time for all pediatric surgeons in dealing with many children who have such problem. Surprises are the rule in diagnostic laparoscopy many times and miliary tubercles involving the entire peritoneum and all viscera was found in a child.

**Materials and methods:** 12 year old male child was suffering from recurrent abdominal problems for 8 months. No other complaints except for a poor intake of food. All investigations including x-ray abdomen and chest, haematology and mantoux were inconclusive except



on Ultrasound scan which showed minimal ascites and thickening of greater omentum. Diagnostic laparoscopy revealed miliary tubercles involving entire peritoneal cavity both visceral and partial peritoneum, liver, gallbladder, spleen, stomach, small and large intestines, mesentery, pelvic organs etc. Biopsy of few tubercles on the parietal peritoneum was taken and it proved to be tuberculous. Antituberculous drugs was started.

Results: Diagnostic laparoscopy is an accepted procedure for recurrent abdominal pain in children. Here the child with recurrent abdominal pain had a positive finding and that too, an unusual problem with a very rare presentation namely miliary tubercles in the abdominal cavity involving all organs and entire peritoneum. Treatment was started and child improving well.

Conclusion: The criteria to decide for diagnostic laparoscopy for recurrent abdominal pain in children is yet to be agreed upon among Pediatric surgeons, But the severity and frequency of abdominal pain should warrant diagnostic laparoscopy based on the individual surgeons assessment. Tuberculous abdomen is itself a rare cause which usually diagnosed by laparotomy in early days. Laparoscopy is a very useful tool in such rare problems where biopsy is required to diagnose as well as to treat the condition.

#### **p40. AN AUDIT OF THE FIRST SEVEN YEARS EXPERIENCE IN EDINBURGH OF LAPAROSCOPIC LIGATION OF TESTICULAR VESSELS FOR VARICOCELE**

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Objective: To review all laparoscopic varicocelectomies undertaken at the RHSC, Edinburgh, since the first was undertaken there, in 1994.

Methods: A retrospective analysis was undertaken of all the laparoscopic ligations of testicular vessels, for varicoceles, during the 7-year period. 32 patients were operated on. The average age was 160 months. Of the 32, 31 were left-sided and 1 right. Duration of operations, complication rates, recovery profiles and testicular size were examined and compared.

Results: The average operation duration was 32 minutes. 16 were undertaken as day cases and 16 as 'one-night' stays. No cases required a longer admission. There was a 0% incidence of wound infection and of laparoscopic complications.

Average follow up was 11.4 months. Prior to operation 10 cases had reduction in size of the affected testicle, but all showed improvement after vein ligation. 22 cases had normal testicular size preoperatively and all of these showed no atrophy post-operatively. Post-operatively, 5 cases (16%) developed hydroceles, which required surgical intervention. These were corrected by Lord's procedure.

Conclusions: This experience shows that the results of the laparoscopic approach are comparable to those of the open approach. In this series it was shown that varicocelectomies did not cause testicular atrophy, indeed, all patients in whom there was a reduction in size of the affected testicle pre-operatively showed improvement post-varicocelectomy.

#### **p41. AN ABSOLUTE CONTRA-INDICATION TO LAPAROSCOPIC FOWLER-STEPHENS PROCEDURE**

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Laparoscopic one and two-stage Fowler-Stephens procedure has gained large popularity in the child for the treatment of the high intra-abdominal testis. It's largely debated which is the best technique such as testicular auto-transplant or laparoscopic Fowler-Stephens procedure. We describe a case of three years old child, where a previous bilateral inguinal exploration was negative for testes or testicular remnants. The diagnostic laparoscopy showed two iliac intra-abdominal testes with short spermatic vessels, inguinal rings closed and complete dissociation didime-epididime. A left open orchidopexy was performed and testicular auto-transplant was proposed for the right testes because located at 3 cm from the internal inguinal ring. The long-term follow-up (1,8 year) of the left testis showed the testis in the scrotum with good testicular size (1,5 cm). We believe that there are two main reasons to contra-indicate the Fowler-Stephens technique: it has been showed that when a patient has undergone previous surgery the risk factor for testicular atrophy is higher than patient that has undergone first surgery. Furthermore the showed associated malformation could not permit the development of collateral blood-flow via the vasal artery, necessary for viable testis. Diagnostic laparoscopy was of great value in planning the surgical approach to known location of the testis

#### **p42. NOVEL TECHNIQUE OF CYSTOLITHOTRIPSY FOR LARGE VESICAL CALCULUS IN CHILDREN**

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Objective: Large vesical calculi are difficult to manage endoscopically. We describe our technique of cystoscopically assisted suprapubic removal with minimal urethral manipulation.

Method: A seven year old boy was admitted for removal of a 7cm vesical calculus. Cystoscopy was done with an 8fr ureteroscope. Lithoclasty was attempted but the stone was wobbling around. A 12mm laparoscopic trocar was introduced into the bladder under vision. A laparoscopic grasper was passed and the stone was stabilized against the posterior wall and the stone was fragmented. Once the fragments were small enough to be held with the grasper they were further fragmented until they reached a size that was easy to retrieve the bits through the trocar. Complete removal was achieved and the suprapubic trocar was removed. An 8fr catheter was left urethrally for 2 days. There was no extravasation or other complications. The boy is doing well at 6 months followup.

The same technique has been used in two other similar situations subsequently with success.

Conclusion: We present this to highlight this technique that enables removal of large vesical calculus endoscopically without trauma to the urethra.

#### **p43. LUMBOSCOPY ASSISTED PYELOTOMY AND PYELOPLASTY IN CHILDREN**

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Lumboscopy and laparoscopy are well known techniques that provide minimally invasive access for surgeries involving the renal pelvis (pyelotomy/pyeloplasty) in children. They remain time-consuming procedures even for well-trained endoscopists due the lack of space for



performing any suture. The authors report two cases, a 4 y-old girl with obstruction of the left ureteropelvic junction, and a 3 y-old boy presenting renal staghorn calculi in the right kidney. The dissection and mobilization of the renal pelvis and ureter have been easily performed by lumboscopy and they could be exteriorized through the main trocar (10mm) port. The pyeloplasty and pyelotomy, respectively, were performed in a conventional and faster way. The post-operative follow-up has been uneventful in both cases. This technique associates the advantages of minimally invasive surgery with those of the conventional approach and it can be a valid alternative to renal pelvic procedures in children.

#### **p44. RETROPERITONEOSCOPIC RENAL SURGERY IN CHILDREN: OUR PRELIMINARY EXPERIENCE**

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U.O.A. Urology San Giovanni Battista Torino, Italy ° U.O.A. Paediatric Urology O.I.R.M.-S. Anna Torino, Italy

Introduction: laparoscopic renal surgery has become an accepted approach in adult urology. Major advances in laparoscopic surgery made it possible to perform laparoscopic renal surgery in children too. We report our experience of 12 consecutive children. Methods: from august 1999 to September 2001 12 children 12 months - 13 years old (mean age 53 months) underwent retroperitoneoscopic renal surgery. Mean body weight was 18 kg (range 9-62). All patients had benign disease, 5 multicystic kidney, 6 severe reflux nephropathy with poorly functioning kidney and dilated refluxing ureter, 1 lower pole renal cyst, 11 nephrectomies and 1 cyst marsupialization were performed. Results: all the operations were successfully done laparoscopically, even in 3 cases in which the peritoneum was entered during creation of retroperitoneal space. Mean nephrectomy time was 110 min (range 220 - 55). Cystic marsupialization was performed in 40 minutes. Blood losses were minimal. All the patients but one were discharged on the second postoperative days. Mean follow up was 18 months (range 1-25) cosmetic results were excellent, no long term complications have been noted. Conclusions: laparoscopic retro peritoneal renal surgery is feasible even in children with minimal morbidity, post operative discomfort and short hospital stay. The previously considered disadvantages of this surgery such as operative time and technical difficulties have become less of a concern as we gain experience with this procedure.

#### **p45. RETROPERITONEOSCOPIC PYELOPLASTY FOR PUJ OBSTRUCTION IN CHILDREN. 10 CASES WITH MORE THAN ONE YEAR OF FOLLOW UP**

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PEDIATRIC SURGERY LENVAL FUNDATION NICE, FRANCE

Introduction : The gold standard procedure for treating pyeloureteral obstruction in children is dismembered pyeloplasty by open surgery ; mini-invasive treatments include endourologic section (impossible in infants and contraindicated in case of lower pole crossing vessels) and laparoscopic pyeloplasty. We have developed a retroperitoneal pyeloplasty in order to avoid the drawback of the transperitoneal approach.

Material : 6 girls, 4 boys. Mean age 10 years (3 to 17). All the patients were symptomatic. The diagnosis was confirmed by ultrasound and diuretic renal scann MAG 3. At the beginning of the procedure all patients underwent initial placement of an ureteral stent. The patient was placed in lateral decubitus and the retroperitoneal space entered through a 10 or 5mm incision, for a 30° telescope and two or three operating ports 3 or 5 mm in diameter. The uretero pelvic junction with any redundant renal pelvis tissue was incised and removed. The proximal ureter is spatulated. The pelvis and ureter were anastomosed using 5/0 or 6/0 polyglatin suture thread (intracorporeal knots). An ureteral stent was left in place in all cases (simple stent 5 times, JJ stent 5 times).

In one case of crossing vessels, the dissection and posterior fixation of the pelvis was sufficient to remove the obstruction.

Results : The procedure was successful in 8 patients. Two cases needed a conversion. The mean operative time is 3 hours and a half. The mean hospital stay is 4 days ; ureteral stent was removed at day 3 post op. in case of simple stent (5 cases) and 4 to 8 weeks post op in case of JJ stent (5 cases). We have had one urinoma after ureteral stent removal at day 3 which was treated by JJ stent. All patients have had ultrasound and renal scann with a mean follow up of 16 months (10 to 36) No clinical or radiological failure was recorded.

Discussion : Retroperitoneoscopy gives a good vision of the pathological lesions, specially in case of crossing vessels (3 cases). One of the difficulties is now to present and stabilise the pelvis and ureteral wall for suturing. Some tricks have been described and our preference is to temporarily fix these structures to the psoas muscle. In this preliminary experience an ureteral stent was left in all cases, instead of only 15% of our open pyeloplasties.

Conclusion : Retroperitoneoscopic pyeloplasty is possible and is more logical than the transperitoneal one. But this procedure remains technically challenging and we do not recommend this technique before 6 months of age.

Perhaps in the future, robotic assisted surgery and new tissue sealing technique could allow to perform an ideal pyeloplasty without stent in day surgery.

#### **p46. SEMINAL VESICLE CYST WITH IPSILATERAL RENAL AGENESIS : ANTENATAL DIAGNOSIS AND POST NATAL LAPAROSCOPIC EXCISION**

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PEDIATRIC SURGERY LENVAL FUNDATION NICE, FRANCE

This case report is illustrated by a videotape (3').

Most of the seminal vesicle cyst are reported in adults and treated by conventional surgery through transvesical or perineal or sacral approach. We reported a case of a seminal vesicle cyst which is diagnosed antenatally at 22 weeks and we performed laparoscopic removal of the cyst at 6 months of age.

In this male fetus, the ultrasound exam at 22 week has discovered two anomalies on the left side : renal agenesis and 17mm unilocular paravesical cyst. Following ultrasound before and after birth have confirmed these findings, the baby is healthy, no urinary infection, no other malformation. Retrograde cystography is normal and DMSA scintigraphy has proved left renal agenesis. Two diagnosis are evoked : seminal vesicle cyst and dysplastic multicystic kidney in an ectopic position ; according to the family, so the baby is supervised by serial ultrasounds and 6 months later the cyst has increased to 25mm of diameter and that was an indication for removal which is begun by a cystourethroscopy : bulge of the posterior urethra and uprising of the bladder floor on the left side. Laparoscopy through a 5mm transumbilical port for the 30° telescope and two 3mm operating port allowed to remove the cyst and to preserve the vas deferens by



leaving a narrow strip of the cyst wall along the vas. The recovery was uneventful and the infant discharged home within 48 hours. Three months later the child is asymptomatic.

In conclusion laparoscopic technique could be useful for excision of seminal vesicle cyst as it is the case for mullerian remnants.

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**p47. A MINIMALLY INVASIVE APPROACH TO PELVI-URETERIC JUNCTION OBSTRUCTION IN CHILDREN.**

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Objective: To determine whether balloon-burst pyeloplasty with stenting is a realistic alternative to surgery in pelviureteric junction obstruction in children.

Materials and Methods: 11 children aged between 1.6 years and 10.6 years underwent 12 procedures of balloon-burst pyeloplasty. Three children had undergone failed surgical pyeloplasty, one procedure was performed following recurrence of PUJ obstruction 1 year after balloon-burst pyeloplasty and the others were primary procedures. Approach to the PUJ was antegrade in 7 procedures, retrograde in one procedure and combined in 4 procedures. Balloon sizes ranged from 5mm to 10mm. A variety of stents were placed including double pigtail, straight antegrade and nephroureteric configurations, size 8-12 French.

Results: There were no major complications although 3 children suffered urinary tract infection. All procedures were successful with improvement or normalisation of the dilatation measured on ultrasound and improvement in drainage on Tc99m-MAG3 renography.

Conclusion: Balloon-burst pyeloplasty with temporary stenting is a reliable and safe procedure and is a realistic alternative to surgical pyeloplasty. Considerable reduction in hospital stay is possible in some cases.

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**p48. LAPAROSCOPIC EXCISION OF A PROSTATIC UTRICLE IN A CHILD.**

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We present a successful minimally invasive approach for excision of a prostatic utricle cyst in a child. Prostatic utricle cysts result from incomplete degeneration of Mullerian duct structures and occur most frequently in males with perineal or peno-scrotal hypospadias. Utricular cysts may present with various signs and symptoms including urinary tract infection, pain and post-void incontinence, a palpable abdominal mass or recurrent epididymitis. Treatment is reserved for symptomatic cysts and various techniques have been described including transurethral deroofting, endoscopic incision or surgical excision by suprapubic, posterior and midline transvesical approaches.

METHODS: A 4 years old boy presented with recurrent left epididymitis. At birth he was noted to have agenesis of the corpus callosum and a peno-scrotal hypospadias, repaired at 2 years of age. Micturating cysto-urethrogram demonstrated a large cystic swelling posterior to the bladder, arising from the posterior urethra, which filled on micturition. Following antibiotic therapy, elective excision of the prostatic utricle cyst was performed under general anaesthetic. Initial cysto-urethroscopy demonstrated a small opening on the verumontanum leading into a large utricle cyst; a 9F Wolff cystoscope was left in the utricle to aid identification. A 5mm telescope port was placed at the umbilicus with one 5mm trocar in the left and one in the right flank. A 3mm trocar was placed in the right iliac fossa to act as a bladder retractor. The bladder was emptied by suprapubic puncture to allow its anterior retraction, producing excellent visualisation of the utricle cyst. The cyst was readily dissected to its neck where it was ligated with a 'surgiloop', transected and retrieved via the umbilicus. The child was discharged to home on the second post-operative day without complication. Cystourethroscopy and further MCUG four months after surgery revealed no residual utricle and no further episodes of epididymitis have occurred to date (14 months follow-up).

CONCLUSIONS: Laparoscopic excision is a safe and viable alternative to open procedures in the surgical treatment of symptomatic utricle cysts in childhood. The presence of a cystoscope aids identification of the utricular remnant.

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**p49. ERGONOMIC DIFFERENCES BETWEEN LAPAROSCOPIC INSTRUMENTS DESIGNED FOR PEDIATRIC PATIENTS VS ADULT PATIENTS.**

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Ergonomic issues related to Minimally Invasive Surgery (MIS), have influenced the physical and mental workload for both surgeons and staff. Instruments designed for the adult patient's abdomen may not provide the dexterity or economy of motion required in a delicate neonate. Do we need to change the mentality of one-size fits all? We studied the "manual movement task" in handling adult or standard laparoscopic instruments compared to pediatric laparoscopic instruments.

We constructed a mathematical model based on the assumption of a 3.5 kg neonate abdomen with a pneumoperitonium. We compared the kinematics created by the length of two laparoscopic instruments. The criteria included review of industry standards for shaft lengths of typical laparoscopic instruments for standard and short lengths. Shaft lengths (SL), fulcrum distance and the entire maneuverability of the instruments at a fixed fulcrum were measured and compared. The upper and lower arm movements were noted.

The standard SL was 32cm compared to 21cm for the short SL. The Fulcrum point was 5cm fixed from predicted abdominal wall to tissue target. The excursion ratio of the tip to handle maneuverability in the standard SL was 5.5 : 1, compared to 3.2 : 1 in the short SL. The short SL improved the maneuverability relationship by 42%. Longitudinal axis was 46.5cm for the standard SL and 27.5cm for the short SL for an improved kinematics of 41%

Conclusion: Does one size fit all? No. Pediatric laparoscopic instruments are ergonomically preferred for the smaller patient. The reduction in gross motion to execute the same task is statistically significant, with an overall improvement of economy of motion by 41% and improved excursion ratio of 42%.

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**p50. AN OPERATING THEATRE BASED RADIO NETWORK FOR BROADCASTING LIVE ENDOSURGERY ON A HOSPITAL IT NETWORK**

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Objective- We evaluated the quality and safety of a hospital IT network to broadcast live dual video streams of paediatric endosurgery





via an operating theatre based radio network

**Methods** - A broadcast quality video camera (JVC, MS4) was used to record an external image and a standard video endoscope camera (Karl Storz) for the internal image. Two PCs (Tiny 1.4 GHz Pentium 4 ) were used to digitise the images (Windows Media Encoder, Microsoft). Signals were relayed via a 10 Mb radio network (Enterasys) to a further PC (Tiny 450 MHz Pentium III) at another location. A media server set up to accept live streaming video (Windows 2000 Media Services, Microsoft) and customised media software (Windows media player, Microsoft) was used to allow two simultaneous views on the screen from the two separate cameras. The output was viewed on a networked PC and a 42 inch Plasma screen (Sony).

**Results** - Use of a radio network within the operating theatre can be reliable without interference with other medical equipment. Each image was of 320x240 pixel size and found to be smooth and of good quality with an approximate time delay of five seconds.

**Conclusions** - Live endosurgery can be relayed via a radio network from within the operating theatre using standard network components, PC based media stations and plasma screen without the need for expensive wideband cabling. This offers the potential of archiving and viewing live endosurgery for minimal cost and effort.

#### **p51. THE NEXT GENERATION MINIATURE ACCESS PYLOROMYOTOMY SPREADER**

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**Purpose.** The original Ramsted pyloromyotomy and Benson spreader are time tested. Miniature access pyloromyotomy for infants with pyloric stenosis have comparable operative times and rate of complications with open pyloromyotomy. Surgeons are always striving to improve miniature access surgery by developing new techniques and instruments. We describe our use of a unique miniature access pyloromyotomy spreader. **Methods.** A miniature access pyloromyotomy spreader modeled after the Benson spreader was used in 8 infants with pyloric stenosis. The spreader has the following unique features; it is slim, it opens with double action, it is serrated on the outside, and can be used trocarlessly. **Results.** The use of the miniature access pyloric spreader facilitated the performance of the pyloromyotomy procedure. Operative time was improved and complications avoided. Its slim size allowed the spreader to easily fit into the myotomy incision. Serrations on the outside of the spreader permitted enough friction to prevent the instrument from sliding. The double action mechanism allowed equal distribution of force on both sides of the myotomy. Trocarless introduction decreased abdominal wall trauma and improved cosmesis. **Conclusions.** The miniature access pyloromyotomy spreader is a very useful instrument in miniature access pyloromyotomy. Use of the spreader improved surgical precision, operative time, and avoided complications.

#### **p52. SUPRASellar ARACHNOID CYST: ENDOSCOPIC TREATMENT**

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Arachnoid cysts account for only 1 % of all intra-cranial space-occupying lesions in adults supra-sellar cysts represent 9 % of all the arachnoid cysts while in pediatric population this percentage reaches 15 %. The authors present a series of seven consecutive patients with diagnosis of suprasellar arachnoid cyst membranes, with or without associated ventriculostomy of the 3rd ventricle. Preoperative symptoms improved in all the patients and five out of seven remain shunt free. 1 patient maintain a cystoperitoneal shunt and another one, previously shunted, remain shunt dependent. In spite of being a problem relatively common in daily neurosurgical practice there are still a number of questions to be solved concerning pathogenesis and evolution, natural history and treatment. Located in the suprasellar cistern and closely related to the ventricular system, suprasellar arachnoid cysts conform a perfect indication for endoscopic treatment.

The development and spreading of neuroendoscopic techniques have surpassed the standard micro-surgical approaches as an elective treatment. However there are still controversy on the management of associated hydrocephalus, need for cysto-peritoneal shunt after endoscopic fenestration of superiority of ventriculocystocisternostomy over simple ventriculocystostomy. The clinical presentation and postoperative evolution are commented with discussion.

#### **p53. VENTRICULOPLEURAL SHUNT - THOROSCOPIC PLACEMENT OF THE DISTAL CATHETER: TECHNICAL CASE REPORT**

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**Introduction:** Ventriculopleural shunting is usually reserved for patients with limited options for shunt revisions, when conventional sites like the peritoneal cavity and the right atrium are used up or unavailable.

**Methods and Procedures:** We report the case of a 16 year old boy with a posthemorrhagic hydrocephalus, who required numerous shunt procedures. At the age of 6 years a ventriculopleural shunt was inserted by a intercostal thoracotomy, 4 years later a replacement of the distal catheter was necessary. Recently he was presented again with shunt malfunction due to displacement of the pleural catheter. Placement of the distal catheter was performed under direct thoroscopic vision by a peel-of-needle into the unscarred pleural cavity despite two previous pleural procedures.

**Conclusions:** Ventriculopleural shunting is an alternative option for problematic patients. Thoroscopic placement of the distal catheter is a safe and efficient technique even in patients with prior surgical interventions.

#### **p54. NEUROENDOSCOPIC THIRD VENTRICULOSTOMY AS A FIRST-CHOICE APPROACH FOR HYDROCEPHALUS IN CHILDRE**

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Neuroendoscopic third ventriculostomy (NTV) is a method of treatment of hydrocephalus in children. The technique can be used in hydrocephalus of any aetiology. NTV may be secondary or primary, depending on whether the patient had been previously treated with



shunt, or not.

Since 1999, NTV (either primary or secondary) has been performed in thirty-six children, aged from 3 days to 14 years. Non-functioning shunts were removed during secondary NTV.

The following criteria for NTV were met, based on the MRI scans:

1. the foramen of Monro and the third ventricle greater than 5 mm;
2. no scarring of subarachnoid space below the third ventricle;
3. the tip of basilar artery situated close to mammillary bodies.

The access to the ventricular system for NTV is the right pre-coronal burr-hole. A canula for endoscope is then insert into the lateral ventricle. Using flexible, 3.5-mm endoscope with working channel and the ME2 monopolar, 0.9 mm wide electrode, the floor of third ventricle is perforated in order to create a new passage for the CSF from ventricular system into basal cisterns.

More than 50% of patients treated with NTV did not require any further operation. Implantation or reimplantation of shunt was done between 8 and 20 day after NTV failure.

NTV is a single procedure for at least half of the children with hydrocephalus. It does not preclude eventual shunt implantation in the case of failure.

#### p55. LAPAROSCOPIC OESOPHAGOPLASTY IN CHILDREN:A CASE REPORT

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Laparoscopic replacement of the esophagus is reported in adult surgery but not in pediatric's. The aim of this report is to show that it's possible technically to replace laparoscopically the esophagus by the colon. The patient is a 9 old boy with an esophageal extending caustic stricture. The patient is in supine position, the surgeon between the legs, assistant in right and left side We used a 7 mm telescope with 30° vue, and 4 operative trocars. First the esophagus is dissected through the mediastin, then resected from the cervicotomy. The colon is exposed to be resected: selection of the left colic artery. The transverse and descending colon is resected with stapler and passed through the mediastin. The colon is anastomosed to proximal esophagus isoperistaltically. The cologastric and colocolic anastomosis are performed using resorbable running suture. We finished the procedure by a pyloromyotomy and gastrocolique antireflux. Operative time was 10 hours without peroperative complication.

#### p56. LAPAROSCOPIC TREATMENT OF EXTRALUMINAL DUODENAL DIVERTICULUM IN CHILDREN

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A 14 year old boy was referred to our hospital with a history of intermittent abdominal pain of 4 months evolution. Gastrointestinal barium upper series demonstrated a duodenal diverticulum located at external of the 3rd duodenal portion. At duodenoscopy, a duodenal diverticulum was detected. Laparoscopic approach was decided. The boy was placed in supine, in a head-up position slightly rotated to the left. Insertion of a 5mm 30degrees telescope through the superior umbilical fold was performed. A 12mmHg pneumoperitoneum was established. 2 working ports were inserted, 1 in the left flank and 1 on the right at the umbilical level. A 4th port was placed under the xiphoid for a liver elevator. Mobilization of the transverse colon and the lateral wall of the 2nd and 3rd portions of the duodenum were necessary in order to localized the diverticulum. The diverticulum was completely dissected from the surroundings structures and divided by means of an endoGIA. The patient returned to full activity within 3 days and has remained asymptomatic during a 1 year follow-up. Duodenal diverticulum are malformations rarely described in children. They can cause abdominal pain, obstruction, ulcers, and hemorrhage and may perforate. Diagnosis is made by endoscopy or upper gastrointestinal series, and surgical treatment is indicated in symptomatic patients. Laparoscopy can be a safe approach in the treatment of extraluminal duodenal diverticulum.

#### p57. LAPAROSCOPIC DUODENODUODENOSTOMY FOR TREATMENT OF ANNULAR PANCREAS IN CHILDREN

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Annular pancreas is a congenital disorder usually diagnosed in newborns as an intestinal obstruction. When occurs in older infants or adults symptoms may mimics those of peptic ulcer. The standard operative approach for the treatment of annular pancreas is laparotomy with duodenal by-pass. We report one case of laparoscopic duodenoduodenostomy as the definitive treatment of annular pancreas in children. An 10-year old boy with a suspect diagnosis of annular pancreas was prepared for surgery. The patient was placed in supine position, and a 12 mm fourth laparoscopic ports were required to perform a duodenoduodenostomy. The patient did well postoperatively. An endoscopy revealed a narrowing at the level of the anastomosis, requiring dilatation. He was subsequently discharged home on a regular diet and remained asymptomatic during one year follow-up. Laparoscopic duodenoduodenostomy is a viable approach to treat duodenal obstructions. It provides definitive treatment while preserving the benefits of minimally invasive surgical techniques in the pediatric patient.

#### p58. POST-LAPAROSCOPIC SPLENECTOMY THROMBOCYTOPENIA

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The advantages of a minimal access approach to haematological disease in children have been well established with reduced analgesic requirements, rapid mobilization and quick convalescence. Doubts have been raised about the efficacy of detecting accessory spleens and its impact on natural history of haemolytic disorders such as Idiopathic Thrombocytopenic Purpura (ITP) postoperatively. We present our experience of Laparoscopic Splenectomy (LS) for ITP in children

From June 1993 to June 2001 one surgeon has performed 89 LS. 42 children had recalcitrant ITP as the indication for surgery. The age range was 9 m to 15 years (mean 8.5 yrs) and preoperative weight of 11 kg to 97 kg (mean 47kg). LS was performed as a 4 port approach with visualization at the umbilicus (30 degree scope), epigastric and left dorsal/flank 5mm ports and a 5/12mm retrieval port in the left



iliac region or higher depending the size of the child.

There were no conversions The operating times were ranging from 55 to 120 min (mean 75 min). One misfire of the linear stapler at the splenic hilum was retrieved laparoscopically. 4 children had complications ( pneumonia, umbilical port site infection,

Ilioinguinal nerve hypoaesthesia, retrieval site hernia). With a minimum follow-up of 6 months the lowest postoperative platelet count was recorded. 38 had count > 100,000 + . 2 were totally asymptomatic with counts of 65,000 and 89,000 and 2 children had < 50,000 platelets. Both of these children were symptomatic : one spontaneously after 2.5 yrs and the other with viral illness within 6 months post-operatively. The first child was found to have accessory splenic tissue in the greater omentum successfully removed laparoscopically with follow up to 1.5 years with count of > 150,000. The second child had 5 accessory spleens at LS and counts fluctuate but she remains asymptomatic to 4 years postoperatively

LS for ITP secures a >90% reversal of thrombocytopenia but longterm followup is required to detect any residual symptomatic accessory spleens

#### p59. MINIMAL-INVASIVE ADHESIOLYSIS USING ONE-TROCAR-TECHNIQUE

Ulf Buehligen

In spite of every possible effort postoperative adhesions after surgical interventions haven't lost their immense importance. In many cases even multiple revisions have to take place. The slighter the operating trauma and the wound, the smaller is the probability of fresh adhesions.

Due to this reason the one-trocar-technique in 5mm was tested at laparoscopic re-interventions. These technique used optics with integrated working channel in 3,5mm device. The access with this combined trocar takes place through the navel by mini-laparotomy. It is possible to investigate the abdomen and to work at the same time and to carry out an adhesiotomy if necessary. The use of 3,5mm instruments under laparoscopically circumstances allows a subtle hemostasis. Other entrance ways and trocars can be economized.

Conclusions

The 5mm technique can be used in combination with 3,5mm instruments. The option to enlarge the intervention by extra trocars is kept further on. Other possible usages exist in diagnostical explorative laparoscopy. Punctures, excisional biopsy and gain of abdominal fluid are also easily made possible without additional arrangements.

#### p60. DIRECT VISUAL RETROPERITONEAL ACCESS TECHNIQUE USING AN OPERATIVE LAPAROSCOPE

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Introduction: Different retroperitoneoscopic accesses have been described. They all imply blind retroperitoneal dissection. We describe a technique that allows to create a good retroperitoneal working space under direct vision.

Methods and procedures: From January 1999 to July 2001 we performed 56 retroperitoneoscopic procedures (50 varicocelectomies, 3 nephrectomies, 1 nephroureterectomy, 2 renal biopsies). Mean age was 11,9 years (range 3-18). The patient is placed in flank position; a 1,5cm transverse incision is made below the apex of the 12th rib. Muscles are bluntly dissected and the Gerota's fascia is opened. A 10mm ballooned Hasson trocar is inserted and CO2 insufflated to the pressure of 15mmHg. The retroperitoneal dissection is performed under endoscopic vision by an endoscopic blunt tip dissector introduced through a 10 mm operative laparoscope.

Results: In 49 (87.5%) patients retroperitoneoscopic procedure was performed successfully. In 4 patients out the varicocelectomy group, there was a peritoneal tear, that needed conversion to laparoscopy in 2 cases, as well as in 5 other patients in whom spermatic vessels were not identified, at the beginning of the learning curve.

Conclusions: Our technique allows to create a good retroperitoneal working space under direct vision ensuring safe and accurate identification and dissection of retroperitoneal organs with minimal complication rate related to the access technique, even for major urological procedures

#### p61. ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY IN CHILDREN

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Introduction: A retrospective review of the indications, success rates and the complications of endoscopic retrograde cholangiopancreatography (ERCP) in Paediatric age group.

Methods: Charts for patients who had ERCP performed at our unit between 1990 and 2001 were all reviewed. Patients demographic, clinical presentation, indications, ERCP findings, complications, and follow up were recorded and analysed.

Results: Thirty three ERCP procedures were attempted in 28 patients. It included 14 boys and 14 girls, whose age ranged from 2 to 16 years (median = 10 years). All procedures whether diagnostic or therapeutic were performed by an experienced endoscopist. The indication for ERCP was either for Hepato-biliary or pancreatic pathology. Findings included Choledocal cyst (n=5), Sclerosing cholangitis (n=5), duodenal duplication (n=2), normal anatomical findings (n=15) and one patient had therapeutic stenting due to lymphoma involving the head of the pancreas. Radiographs of the relevant ducts were achieved in 29 patients (88%). Post ERCP complications consisted of pancreatitis (n=3). Follow up ranged between 2-60 months with no morbidity or mortality related to the ERCP procedure.

Conclusions: We conclude that, ERCP is a useful diagnostic tool in the paediatric age group. The complications rate post ERCP is comparable to adults. ERCP is a safe diagnostic procedure if the patients are carefully selected and if the procedure is performed by an experienced endoscopist.



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**p62. WHAT IS THE TRUE CLINICAL INCIDENCE OF BILATERAL PRESENTATION IN INGUINAL HERNIAS?**

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Diagnostic video-endoscopic evaluation of the contralateral patent processus vaginalis (cppv) is believed to lessen the risk of a probable iatrogenic cord injury, by decreasing the number of unnecessary inguinal explorations. In the present study, the search for the true incidence of bilateral presentation in inguinal hernias, repaired with and without diagnostic laparoscopy is evaluated.

In a randomized, prospective study we evaluated and treated 319 consecutive inguinal hernia cases (M: 257, F: 62), 1 mo-14 y (mean, 3.4 year) since March 1998. 42 bilateral and 161 unilateral presentations were treated using conventional technique. Diagnostic laparoscopy was performed through the ipsilateral hernia sac in the remaining 116 (M: 86, F: 30). All of the detected cppv underwent open exploration.

An overall evaluation illustrates a 21 % bilateral presentation rate with 67 cases. The incidence of initial clinical bilateral presentation is 13 %. Six cases (4 %) out of 161 presented later with a metachronous hernia. Thus, we may speak of a cumulative 15 % clinical incidence. We found a cppv in 19 (16 %) cases.

The difference in between our metachronous hernia and positive cppv incidence numbers (4 -16 %) shows that we may be over-correcting some of the cases that might never present later as a clinical hernia. According to our study speaking in terms of true clinical presentation, our estimation of 21 % bilateral presentation rate seems far from being correct.

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**p63. LAPAROSCOPIC HELLER ESOPHAGOMYOTOMY IN A 7 YEARS OLD WITH ACHALASIA**

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Achalasia is a rare motor disorder of the esophagus presenting with esophageal obstruction, usually accompanied by defective esophageal peristalsis and uncoordinated tertiary nonpropulsive waves. Surgical treatment is based upon relaxation of the lower esophageal sphincter. We report a seven-year old, suffering from achalasia treated with laparoscopic Heller esophagomyotomy without simultaneous fundoplication.

A 7-years old girl was admitted with dysphagia, vomiting, coughing, weight loss and substernal pain. The diagnosis of the pediatrician was confirmed by repeat barium swallow and esophageal manometry. Defective esophageal peristalsis with elevated pressure and incomplete relaxation of the lower esophageal sphincter was present during swallowing. Patient was fed via NG tube for two weeks prior to surgery. The procedure was completed successfully using minimally invasive technique without any complications.

Patient was relieved of symptoms and tolerated oral feedings on the third postoperative day and was discharged on the fourth. Postoperative screening has shown that the patient is free of gastroesophageal reflux.

Laparoscopic Heller esophagomyotomy is a complex and difficult operation, but can safely be performed. The need for a simultaneous antireflux procedure remains to be seen.

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**p65. NEW TECHNIQUE OF KNOTTING IN PAEDIATRIC LAPAROSCOPIC SURGERY.**

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Introduction: Equipped with laparoscopic suturing and knotting is invaluable for any paediatric laparoscopic surgeon since there is very limited space in abdominal cavity in children to overcome the difficulty in knotting, a new method, the CIRCLE LOOP-TECHNIQUE has been tried and found to be very useful.

Materials and methods: In all cases of Paediatric laparoscopic surgery where suturing and knotting was applicable, CIRCLE LOOP-TECHNIQUE was applied. In C-LOOP-TECHNIQUE, c-loop is formed to make part of the circle initially and the completing the circle with the other instrument. Such knotting involves wide range of movements and it is difficult when there is limited space. Instead, a circle loop is formed with long thread and other instrument is introduced through the circle to catch the small end of the suture material to form the knot. Here no necessity for rotatory movements to make a knot.

Results: The time taken to complete the knotting is considerably reduced with circle loop-technique. In addition the cumbersome nature and sometimes, helpless situations in performing knotting is overcome with circle loop-technique.

Conclusion: The knotting is a cumbersome one in paediatric laparoscopic surgery. The difficulty due to limited space in children. Any technique which involves least range of movements is definitely advantageous in knotting. In that way, circle loop-technique is highly useful in performing easy knotting.

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**p66. SURGICAL ROBOTICS: CREATING A NEW PROGRAM**

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Objective: To share our recent experience in developing and implementing a program for computer assisted robot-enhanced surgery.

Methods and Procedures: Minimally invasive surgery has revolutionized our approach to the surgical patient in the last decade. Our vision is that robotic surgery will allow us to do more complex minimally invasive procedures on smaller patients. We defined a core of individuals who shared our vision: pediatric surgeons, our research director, a biomedical engineer and physicist, and our chief executive officer. We identified those who were presently working with robotics. After comparisons and site visits we chose a single corporate partner, not just to purchase instrumentation but to continue research and development of equipment and surgical techniques. Short term and long term educational, research, and business plans were developed. Our business and research plans were shared with our hospital



administration and our hospital board of trustees to garner support.

Results: Hospital and private donor support have allowed creation of a robotic minimally invasive surgical suite in our operating room and our research building. Our pediatric subspecialty colleagues have begun utilizing our suites.

Conclusions: The key elements in developing a new program are to define a core group of committed individuals, define your vision, and create partners and garner financial support with a sound educational, research, and business plan.

#### **p67. LAPAROSCOPIC REPAIR OF DIAPHRAGMATIC DEFECTS**

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OBJECTIVE: To report that surgical correction of congenital or acquired diseases of the diaphragm in children may be performed with video-assisted techniques.

METHODS: Patients: 12 children from 1 day to 7 years treated consecutively in a 2 years period. Indication: a) Congenital Eventration in 4 patients (2 left and 2 right ) b) Congenital Diaphragmatic Hernia in 4 patients c) Paraesophageal Hernia d) Hiatus Hernia e) Morgagni Hernia f) Phrenic nerve paralysis; all with one patient each.

Technique: Approach was laparoscopic, using three to five ports depending on the etiology of the defect. In most of the cases no chest tube was left.

RESULTS: All patients were successfully treated using a laparoscopic approach. No complications were observed. One patient (CDH) was converted to an open procedure. Mean operative time was of 155.5 minutes (120 to 300 minutes). Mean hospital stay was of 6.4 days (2 to 20 days).

CONCLUSIONS: Laparoscopic approach of the diaphragm seems to be an easy and reliable procedure that has all the benefits of these techniques. We believe that in a near future, almost all of the diaphragm-related pathologies will be liable to laparoscopic or thoracoscopic repair.

#### **p68. LAPAROSCOPIC GASTROPEXY WITH ESOPHAGOCARDIOPEXY FOR THE SURGICAL TREATMENT OF GASTRIC VOLVULUS IN CHILDREN**

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The aim of this study was to evaluate the results of a laparoscopic gastropexy (GP) with esophagocardiopexy (ECP) in children with gastric volvulus. The files of all children with gastric volvulus being operated laparoscopically with a GP and ECP in our institution were analyzed. Nine children were included in our study. Range of age was between 1 and 11 months. Symptoms included sudden postprandial abdominal pain, vomit and in 2 patients apneic episodes associated with cyanosis, pallor and hypotonia. Diagnosis was established with upper GI series. Organo-axial gastric volvulus was found in all cases. Laparoscopic GP with ECP was performed with a 8-mmHg CO<sub>2</sub>-pneumoperitoneum using 3-mm instruments and a 4-mm scope (25 degrees). Time of surgery was between 60 and 180 minutes. One conversion was performed. Postoperative antireflux treatment was continued for 1 month in all children. Follow-up ranged between 1 month to 3 years. To date, 6 patients are free of symptoms without antireflux treatment and 3 are still under antireflux treatment. Parents of all children are very satisfied with postoperative esthetics. Laparoscopic GP with ECP is a good option for the surgical treatment of organo-axial gastric volvulus in children.

#### **p69. PEDIATRIC OMENTAL INFARCTION**

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Objective Primary segmental infarction of the omentum is an infrequent cause of acute abdominal pain in children. We describe our experience with 7 children.

Methods A retrospective chart review at a tertiary referral center for 2001.

Results Seven patients, 5 boys and 2 girls, presented at age 4 to 13 years old (average 8.7 years). Four patients' weights were > 95%, with the lowest being 73%. All experienced right lower quadrant pain of 18 to 96 hours duration. WBC counts were 7,800 to 16,200, and one child had fever. Two ultrasounds were performed for appendicitis, with one false positive and one non-visualized appendix. In one case, CT scan revealed non-mesenteric intra-abdominal fat streaking suggesting omental infarction. Six of seven patients' preoperative diagnoses were acute appendicitis. All underwent partial omentectomy and incidental appendectomy. Four cases were laparoscopic, two open, and one converted to open for concern of bowel injury. Pathology revealed normal appendices and acute hemorrhagic omental infarction. Two cases of umbilical port site cellulitis resolved with antibiotics. Patients were discharged home on the first or second postoperative day and were doing well at final follow-up of one to three weeks.

Conclusions Primary omental infarction is a rare cause of acute abdominal pain in children that is often misdiagnosed as acute appendicitis. Laparoscopy is an excellent diagnostic and therapeutic approach for these often overweight patients.

#### **p70. SELECTIVE USE OF LAPAROSCOPIC APPENDECTOMY IN PEDIATRICS**

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INTRODUCTION Laparoscopic appendectomy(LA) has gained wide spread acceptance as a safe and effective treatment for appendicitis. Little evidence exists regarding selective use of LA on length of hospital stay(LOS) and operative time(OT).

METHODS Retrospective review of 165 charts for pediatric appendectomies in 1989(before our use of LA) and 1999 by one group of



pediatric surgeons.

**RESULTS** In 1989, 72 appendectomies were performed (31 females, 41 males). Mean age and weights were 10.3 years and 41 kg. 46(64%) of appendices were acute, 15(21%) were ruptured, and 11(15%) were normal. Mean LOS was 5.0 days. Mean OT was 66 minutes. In 1999, 93 appendectomies were performed (47 females, 46 males). Mean age and weights were 11.8 years and 38.4 kg. 54(58%) LA were performed in 1999. 48(52%) were acute, 27(29%) were ruptured, and 18(19%) were normal. Mean LOS was 5.2 days. Mean OT was 81 minutes. In 1999, perioperative complications were seen in 8/39(20%) OA and 2/54(4%) LA (all ruptured). There was no significant difference in the mean LOS ( $p=0.82$ ), but an increase in mean OT of 15 minutes ( $p=0.00078$ ). For ruptured appendixes in 1999, complications with LA were decreased ( $P<0.05$ ), mean LOS was decreased from 11 to 6 days ( $p=0.06$ ), and mean morphine requirements were decreased from 1.5 to 0.6 mg/kg/LOS ( $p=0.03$ ).

**CONCLUSIONS** The selective use of LA in our practice has significantly decreased our complications, while it has increased our mean operative time negligibly.

#### p71. DEVELOPING MINIMALLY INVASIVE SURGERY

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**Introduction.** Our 300 bed hospital performs 8000 operations per year with extreme pressure on operating time. Modern endoscopic equipment became available in January 2001. Training was obtained from short endoscopic courses without on site mentorship

**Material and methods.** We review our experience in endoscopic surgery since 1999 to identify the initial use, difficulties and changes of indications in these operations.

**Results.** Fifty procedures were performed. (8/1999, 14/2000, 28/2001) Types of surgery were; assessment of undescended testes (18), appendectomy (4), diagnostic endoscopy and biopsy(6), Tenckhof catheter re-positioning (3), trauma (diagnostic 2, bowel repair 1), thoracoscopic sympathectomy (3), cholecystectomy (3), other (10). The conversion rate was 20% of which 4 were converted to laparoscopic assisted mini-laparotomies, 5 were found to be difficult cases for our endoscopic experience and one distal oesophageal perforation occurred during Nissen fundoplication.

**Conclusion:** Since January 2001 there has been more than 100% increase in endoscopic surgery. With careful selection of patients and procedures and increased experience endoscopic surgery is becoming established in our institution. A high conversion rate was expected as more complex procedures were attempted. Our major problems are lack of mentorship and operating time.

#### p72. PAED - LAP MANIA !! SIGNIFICANCE OF HANDS - ON ENDOSURGERY COURSES FOR PAEDIATRIC SURGEONS?

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Currently there are no certified Hands-On course specific for Paediatric Endosurgery in India. Nevertheless Hands-On course in endoscopic surgery for paediatric surgeons is being held at various centres in India; throughout the year almost at monthly intervals. What is the real significance of these courses and what are their objectives? What is the likely outcome?

It is imperative that an in-depth assessment of the requirements and contents for a Hands-On course be conducted; preferably by a responsible unbiased authority. This could be achieved by surveying the vast number of participants of the course. The survey should consist of:

- Length of the Course
- Contents/Syllabus
- Safety Aspects - both Anaesthetic & Surgical
- Live Demonstrations/Videotapes
- Invivo/Invitro Procedures
- Instrumentation
- Fees and so on

**CONCLUSION:** Strict guidelines should be observed while undertaking such courses.

#### p73. LAPAROSCOPIC RESECTION OF BILIARY CYSTS IN CHILDREN: ABOUT TWO CASES

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**Aim of the study.** Biliary cystic hamartoma are rare in childhood. Surgical resection allows to prevent complications and represents the only way to bring histological diagnosis. The aim of this study is to report two cases of biliary cysts in infancy treated by laparoscopy.

**Case reports.** Diana, a six-month-old girl, presented a sixty-millimetre hepatic cyst prenatally diagnosed. Morgane, a two-year-old girl, presented a forty-millimetre hepatic cyst localized in the fourth segment and accidentally detected on abdominal sonography performed for hyperthermia. Nuclear magnetic resonance study was carried out. Both children underwent laparoscopic resection. Histology confirmed biliary cysts. Follow-up was uneventful with a four months passing.

**Discussion.** Biliary cystic hamartoma are generally asymptomatic and discovered fortuitously into ante or postnatal. Complications were reported for bulkiest. Current radiology (sonography, nuclear magnetic resonance) allows to confirm the diagnosis by eliminating the differential diagnoses. Preventive resection makes it possible to confirm the histological diagnosis. It is as well as possible carried out by laparoscopy, technique seldom brought back in the paediatric literature.

**Conclusion.** Early diagnosis, possibly prenatal, of the biliary cysts in children must lead to their resection. Laparoscopy represents a very advantageous technique, not very aggressive and reliable in these generally asymptomatic children.

#### p74. LAPAROSCOPIC ASSISTED ABDOMINAL - PERINEAL PULL THROUGH PROCEDURE FOR HIGH IMPERFO-



### **RATED ANUS IN A BOY - SIX YEARS FOLLOW-UP.**

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Introduction: Imperforated anus is a challenging situation in ped. surgery. The aim is the construction of a neo anus and positioning the bowel in the midline of the pelvic muscle complex through the center of the sphincter muscle sling with minimal damage to nerves and muscles. We describe a Pat. operated 1995 and the late follow-up results at the age of 7 yrs. Patient and Method: A boy (high imperated anus, sacral displasia, Down Syndr., heart failure) had a lap.- assisted abdominal-perineal pull-through (Rehbein's technique) at the age of 14 m. after a prior colostomy. The colostomy was closed 3 mo. later. 4 trocars were used, the perineal procedure done over an inverse y-shape incision. Using the diaphanoscopic view from the perineum an ideal anal position could be found and the pull through passing through the mucosetomized rectal muscle tube was performed. Regular dilatations were performed for 3 mo. Results: The post op course was uneventful, discharge at day 7. At the age of 7 the cosmetic result is perfect, the anus well positioned. A manometry revealed a circular muscle complex with voluntary contractions. The child has regular bowel movements (1-2/d). No soiling. Conclusion: This experience in our first case shows excellent and very encouraging post op cosmetic, anatomic and functional results. It confirms the opinion of the authors and others that the minimal invasive approach should be regarded as an alternative to established procedures for imperated anus.

### **p75. EARLY EXPERIENCE WITH MINIMALLY INVASIVE SURGERY IN A PAEDIATRIC AND UROLOGIC SURGERY DEPARTMENT.**

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Aims: to evaluate indications and complications of laparoscopy in urologic and general surgery in children.

Methods: we reviewed our last 5 years experience. 167 procedures were performed. Patients age ranging from 2 months to 18 years. According to the procedure, patients were divided in 4 groups: Group1: 140 operative laparoscopies; Group2: 16 retroperitoneoscopic renal surgery; Group3: 1 thoracoscopy; Group4: 10 diagnostic laparoscopies. Major procedures in group 1, 2 and 3 were performed with an experienced laparoscopic surgeon.

Results: Group1: 80 appendectomies (61 one-trocar; 15 intraabdominal; 4 mixed); 23 cholecistectomy; 22 bilateral varicocelectomy; 8 biopsies; 1 right adrenalectomy; 1 Heller myotomy and fundoplication; 1 intestinal adhesion resection, 1 lymphocele fenestration; 1 hysterovagnectomy and left gonadectomy; 1 first stage Fowler-Stephens.

Group2: 15 nephroureterectomy; 1 lower pole cyst marsupialization. Group3: 1 Esophagectomy. Group4: 7 non palpable testicles, 2 intersexes, 1 neoplastic staging. Two intraabdominal appendectomies were converted to open surgery (1%). Twelve complications (7%) have been encountered: Group1: 5 trocar intraoperative site haemorrhage, 2 intraabdominal gallbladders ruptures, 2 umbilical infections; Group2: 3 peritoneal tearing.

Conclusions: laparoscopy is a feasible and safe procedure in an ever-increasing variety of procedures. An experienced laparoscopic surgeon is mandatory in complex cases and at the beginning of the learning curve.

### **p76. AN ADVANCED LAPAROSCOPIC REPAIR FOR LARGE GROIN HERNIA INTO THE SCROTUM OF INFANTS**

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Laparoscopic percutaneous extraperitoneal closure (LPEC) had been reported as a new procedure for children with groin hernia at IPEG 1999 Congress. Although LPEC showed good results for usual cases of groin hernia, it seemed to be not enough to repair with LPEC for large groin hernia eviscerating into the scrotum. We present an advanced procedure with suturing the transverse abdominal fascial arch to the ileopubic tract laparoscopically adding LPEC. In order to reduce the large orifice of the internal inguinal ring with 3 ports (3mm) technique, an U-state suture was placed on from the fascial arch to the ileopubic tract avoiding the spermatic vessels and duct. An Endo-suture (19-gauge), that can be used to make a purse-string suture around the internal inguinal ring, was punctured on the midpoint of the inguinal line. The purse-string suture was placed on extraperitoneally around the internal inguinal ring. The Endo-suture was then removed from the abdomen together with these suture materials. The purse-string suture and the U-state suture were tied extracorporeally, respectively, and the internal ring was completely closed with double ligations. Of 150 cases treated with LPEC, 4 with large groin hernia have been added U-state suture. The advantages of this procedure are not only cosmetic, but also unnecessary dissection or reconstruction of the inguinal canal. Consequently, there is lower risk of injury to the spermatic duct or vessels than the conventional herniorrhaphy.

### **p78. LAPAROSCOPIC TREATMENT OF INTRAABDOMINAL AND RETROPERITONEAL LYMPHANGIOMAS**

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Introduction: Lymphangiomas are rare congenital vascular malformations. They cannot always be excised completely and are associated with high recurrence, complication and morbidity rates. Therefore an alternative concept of treatment is used since 1996.

Patients and Methods: Laparoscopic excision of the lymphangioma has been performed in 10 children using Nd:YAG laser 1064 nm. The bare fiber is introduced via puncture cannula or a special instrument, which allows angulation of flexible light conductor. Cyst wall is resected as much as possible, but avoiding the damage of adherent structures. The cyst ground was devitalised with non contact irradiation. With the fibertom mode, the temperature at the fiber tip is measured and adapted by optical feedback. This keeps the laser knife sharp at all times and ensures a more reliable laparoscopic excision.

Results: We excised 8 lymphangiomas complete and two subtotal. Operation time was 50-150 min. Hospital stay was 2-5 days. MRI control studies 3 month after the procedure showed small residual cysts after subtotal excision, which was treated by percutaneous ILT and in one case by relaparoscopy.

Conclusion: Minimal invasive laser treatment takes part in the treatment protocol of intraabdominal and retroperitoneal lymphatic



vascular malformation.

#### **p79. LAPAROSCOPIC TRANSPERITONEAL ADRENALECTOMY IN CHILDREN**

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Background: Benign adrenal pathology is rare in children. The authors report 2 cases of transperitoneal adrenalectomies.

The first patient is a 14 years old female, weight 80 kg, with a food-induced Cushing syndrom caused by an adrenal adenoma in the left adrenal gland of 2,5 x 2 cm. The second patient is a 12 years old female with an adrenogenital syndrom in which both adrenal glands needed to be removed.

In both cases a transperitoneal adrenalectomy in lateral position was performed. In the case of the both sided adrenalectomy, half-way the operation, the patient was changed on the other side. We used 4 trocars. The 10 mm telescope was introduced umbilical by the Hassan procedure. After mobilisation of the colon, the upper-pole region of the kidney is explored. After visualisation of the v. renalis, the vena surrenalis is located and ligated with clips, even as the artery. Then Adrenalectomy is performed and extracted in a bag.

Operative time was 150 minutes in case 1 and 250 minutes in case 2. Postoperative discharge after 3 days.

Transperitoneal adrenalectomy in the lateral position is maybe a preferable method above retroperitoneal adrenalectomy for surgeons who are more familiar with the intraperitoneal anatomy compared with the retroperitoneal anatomy. Compared with the open procedure, patients have less postoperative pain and discomfort and shorter hospital stay.

#### **p80. LAPAROSCOPIC EXCISION OF CHOLEDOCHAL CYSTS WITH HEPATICOJEJUNOSTOMY IN INFANTS AND CHILDREN**

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Objectives: We report our initial experience of using minimally invasive surgical techniques in the management of type I choledochal cysts.

Patient & Methods: Three patients had undergone laparoscopic excision of choledochal cysts with hepaticojejunostomy. Patient 1: A 1-year old boy had a choledochal cyst first detected on antenatal screening. This progressively increased in size after birth from about 1 cm in diameter initially to 7.5cm at the time of surgery. Patient 2: A 17-year old girl presented with recurrent cholangitis and the size of the choledochal cyst at surgery was about 1cm in diameter. Patient 3: A 5-year old boy presented with recurrent abdominal pain secondary to an obstructing biliary stone lodged at the end of a 1.5 cm choledochal cyst, which required endoscopic retrieval. Surgical Techniques: The patient was in supine position with the surgeon either standing between the legs or on the right side. A 5mm 30o laparoscope was introduced via a 5mm port. Three more 3-5mm ports were inserted at right lower quadrant, right upper quadrant and left upper quadrant and another 5 mm port was inserted at right subcostal margin for the insertion of a liver retractor. The cyst was mobilised from the portal vein and hepatic artery to above the level of portal vein bifurcation at the porta hepatis, and from the pancreas distally. A 40cm Roux loop was fashioned extracorporeally via the enlarged umbilical port site and then re-routed back into the abdominal cavity and brought to the hilum in a retrocolic manner. End-to-side hepatico-jejunosomy was fashioned with interrupted 5 zero polydioxanone sutures with extracorporeal knot-tying techniques.

Results: Post-operative recovery of the 1-year old boy was complicated by a small infected collection at the hilum at 1 week after surgery. This settled on percutaneous drainage and antibiotic treatment. The girl and the 5-year old boy recovered uneventfully from surgery. On recent follow-up, all patients had remained asymptomatic and well.

Conclusions: Laparoscopic excision of choledochal cysts with re-constitution of bilio-enteric continuity can be safely and effectively performed in infants and young children. The long-term results using this minimal access approach will need to be further evaluated.

#### **p81. ANGIOCATHETER AS PERCUTANEOUS PROBE TO ASSIST TRANSINGUINAL LAPAROSCOPIC EXAMINATION DURING HERNIA SURGERY IN CHILDREN**

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BACKGROUND: Transinguinal laparoscopy during herniotomy in children has been widely accepted to avoid unnecessary contralateral groin exploration. Different methods have been described to improve the accuracy of those indeterminate cases. We report an easy method making use of inexpensive material to improve the accuracy of the examination of those cases.

MATERIAL AND METHOD: During herniotomy the hernia sac was opened and transinguinal laparoscopy performed. In our last 50 cases of children aged 1 month to 14 year-old, a membranous fold was present over the contralateral ring in 5 of the cases and all other tests for contralateral hernia was negative. In those patients a 20 gauge angiocatheter was inserted percutaneously into contralateral lower abdominal cavity under laparoscopic guidance. The metallic stent of angiocatheter was receded and the Teflon sleeve acted as a 'probe' to retract away any membranous structure and test the patency of processus vaginalis.

This percutaneous probing method helped to identify a hernia in two of the cases. No complication was resulted.

CONCLUSION: Percutaneous probing using angiocatheter is safe, easy and does not require any additional expensive instrument and it is a useful tool to assist transinguinal laparoscopy in indeterminate cases.

#### **p82. LAPAROSCOPIC ROUX-EN-Y PORTOENTEROSTOMY FOR BILIARY ATRESIA**

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Conventional surgery for extrahepatic bile duct atresia (EHBDA) usually requires a large laparotomy, with possible complications which may harm postoperative evolution and liver transplantation. Although laparoscopy has been used for diagnosis in EHBDA, the advantages of the minimally invasive access and the excellent visibility may favor laparoscopic surgical treatment. The authors present the first 4 cases





of successful videolaparoscopic portoenterostomy for EHBDA, showing a new approach for enteroanastomosis. Methods: Laparoscopic hilar dissection and portojejunostomy was accomplished in 4 infants with biliary atresia, mean age 2 months at surgery, using 4 trocars. The umbilical site was used for extracorporeal Y-en-Roux enteroenterostomy, using a laparoscopic stapler in 2 cases and hand-sewn suture in the others. Results: Mean operative time was 190 minutes and no operative complications were observed. All but one became anicteric, with a mean follow up of one year. Esthetics has been excellent. Cholangitis occurred in 2 infants, one presented an umbilical hernia, and only one has shown signs of hepatic failure, being considered for liver transplantation at the moment. Conclusion: Laparoscopic portoenterostomy for EHBDA can be done safely in infants, helped by extracorporeal transumbilical enteric anastomosis, with some advantages compared with open surgery. The role of laparoscopic portoenterostomy in facilitating liver transplantation is yet to be defined in future.

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**p83. LAPAROSCOPIC SPLENECTOMY IN THE MANAGEMENT OF CHRONIC IDIOPATHIC THROMBOCYTOPENIC PURPURA IN THE PEDIATRIC PATIENT**

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Objective: To assess the safety and efficacy of treating children with chronic idiopathic thrombocytopenic purpura (ITP) with laparoscopic splenectomy (LS). Material and Methods: A retrospective review of the medical records was performed of patients who underwent LS for ITP during the last five years. Results: Since 1997, 62 consecutive pediatric patients have undergone chronic LS for hematological disease at our institution. Sixteen (26%) were for chronic ITP and none required conversion to an open procedure. All were safely removed using a 4 port lateral approach and endocatch bag with manual morcelation. No intraperitoneal spillage occurred. Six patients had accessory spleens removed. The average operative time was 166 minutes. No patient required transfusion and the average estimated blood was 75cc. Fifteen patients (94%) were discharged home in less than 24 hours and one required a three day stay for postoperative nausea. This same patient was readmitted within 30 days of discharge and required percutaneous drainage of a sterile subphrenic fluid collection and subsequently recovered without problems. Thirteen patients (81%) are disease free at last follow-up and 3 patients have chronic ITP but have not required platelet transfusion since surgery. Subsequent liver-spleen scans have shown no evidence of residual splenic tissue. Conclusion: ITP is safely treated with LS in the pediatric patient and has similar success rates as open splenectomy. It appears to be effective in identifying and removing accessory splenic tissue. LS safely and effectively removes splenic tissue in the pediatric patient with chronic ITP. Accessory splenic tissue is accurately identified and morbidity is minimized.

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**p84. EARLY LAPAROSCOPIC SPLENECTOMY IN INFANTS WITH SICKLE CELL DISEASE APPEARS TO LOWER DISEASE-RELATED MORBIDITY**

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HYPOTHESIS: Laparoscopic splenectomy (LS) in infants with sickle cell disease (SCD) reduces disease-related morbidity, transfusions, and hospitalizations. METHODS: Records of children having LS from August 1, 1996 to August 1, 2001 were reviewed for perioperative complications, length of operating time (LOT), length of hospital stay (LOS), pre-splenectomy transfusions and hospitalizations, pain medication, and overwhelming post-splenectomy sepsis (OPSS). T-test was used for analysis. RESULTS: 27 children had LS for hematologic disease, 12 with SCD (6 of these as infants; mean age, 19 months). There were no complications in infants (n = 6), and only 3 minor in those over 2 years (n = 21). LOT was 99.7 +/- 11.6 min for infants, 193.3 +/- 24 min for those over 2 with SCD (p < 0.01), and 160.2 +/- 12.9 min for all children over 2 (p = 0.003). LOS was 1.6 +/- 0.3 days for infants, 3.7 +/- 0.9 days for those over 2 with SCD, and 2.4 +/- 0.3 days for all patients over 2. Transfusions before LS were less in infants, 1.2 +/- 0.5 total units, versus those over 2, 14 +/- 7 units. Hospitalizations were fewer in infants, 1.5 +/- 1.5 versus 5.9 +/- 3. Utilization of pain medication was not different. No case of OPSS occurred. CONCLUSIONS: LS in infants is technically feasible and safe, reduces LOT, LOS, transfusions, and hospitalizations, while not increasing the risk for OPSS. As a result, LS for infants with SCD may reduce disease-related morbidity and health-care costs.

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**p85. LAPAROSCOPIC SPLENECTOMY MADE EASY: THE USE OF THE PLASMAKINETIC TISSUE MANAGEMENT SYSTEM**

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Objective: To evaluate the PlasmaKinetic (PK) Tissue Management System [Gyrus Medical] in laparoscopic splenectomy. The aim was to determine whether the PlasmaKinetic cutting forceps could enable the whole mobilisation of the spleen without the need for a change of instruments.

Method: 3 children aged 9, 10 and 14 years with spherocytosis required splenectomy. The 9 yr old also had gallstones so required a concurrent cholecystectomy. All procedures were performed laparoscopically facilitated by the use of 5mm PK Cutting Forceps.

Results: In all cases the splenic mobilisation was achieved using the forceps to grasp, dissect, coagulate, and transect. There was no requirement to change instruments to cut, clip or dissect, thus shortening the operative time to less than 1 hour. The PK L-hook was used in the cholecystectomy to mobilise the gallbladder and divide the cystic artery although 5mm clips were used in division of the cystic duct.

Conclusion: The PK instrument surpasses all other currently available dissecting and tissue sealing instruments with its ability to coagulate and also to cut even the major splenic vessels. This significantly reduces the operative time.

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**p86. DIFFICULTIES WITH THE STARTING OF PEDIATRIC LAPAROSCOPY IN A SERVICE OF PEDIATRIC SURGERY**

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Introduction: Budgeting difficulties, Hospital organisation, and problems related with training can slow down the starting of laparoscopy



in a Service of Pediatric Surgery (PS)

Material and Procedures: From 07/1997 to 07/2001, in our Service of PS, 160 pediatric laparoscopies (PL) were performed (age range 24 h.-15 y.). All clinical cases and the detected problems are reviewed (PL material, training, pediatricians, surgical team, results)

Results: Great difficulties in the purchase of material for PL, a low resistance from the surgical team and pediatricians, and a difficult previous training in PL were experienced. The principal surgeon has remained the same in 150/160 PL. Assistants have mainly been 4 trainee doctors in PS (anyone is performing PL now). Mainly, our series includes 31 appendicitis, 28 chronic abdominal pain, 20 gastroesophageal reflux, 17 cryptorchidism and 15 gallbladder lithiasis. The duration of PL, Hospital stays and training has presented a gradual improvement. No mortality

Conclusions: 1) Our Service of PS have had a great series of obstacles in PL to be overcome at first (training, purchase of material, experience curve). 2) Is mandatory to increase the specialisation and practical training of those specialising in PS and other interested staff (official courses, with practices on animals and relevant theoretical content). 3) Expansion of the PL to other pathologies and the usefulness of the acute appendicitis as a source of PL training are emphasised.

#### **p87. PITFALLS IN LAPAROSCOPIC DECAPSULATION FOR SPLENIC CYSTS: CASE REPORT AND REVIEW OF THE LITERATURE**

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Introduction: Splenic cysts occur infrequently. While total splenectomy should be avoided, there is no consensus as to the treatment modality that offers the best preservation of splenic function, lowest morbidity and lowest recurrence rate. We report a case of recurrent splenic cyst after laparoscopic decapsulation, and identify potential pitfalls in the application of this technique.

Case Report: A 12-year-old male presented 2 months after a laparoscopic decapsulation of a large splenic cyst at another institution. A CT scan confirmed reaccumulation to its original size. The initial operative report described a partial deroofting of the cyst near the hilum, with placement of omentum in the defect. Repeat laparoscopy was performed, showing extensive adhesions to the liver and diaphragm, with approximately 50% of the spleen replaced by the cyst. An open partial splenectomy with a TA-90 stapler was performed. There were no complications and no recurrence at 18 months.

Conclusion: Laparoscopic decapsulation for splenic cysts has been safely and successfully performed. Large multiloculated splenic cysts that occupy more than half the spleen however, are potential pitfalls to adequate management by this technique. Omental packing of the defect impairs drainage and should be avoided. Splenic cystectomy, especially for true epithelial cysts, is preferable to partial decapsulation, which has a higher recurrence rate.

#### **p88. LONG TERM EVALUATION OF CHILDREN WITH HEMATOLOGIC DISORDERS AFTER LAPAROSCOPIC SPLENECTOMY IN OUR INITIAL EXPERIENCE DURING 1995-1996**

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BACKGROUND: Laparoscopic splenectomy is presently accepted as the intervention of choice to treat children affected by hematologic diseases. Although various techniques have been described, the learning curve period has been found to be challenging. We analyze the experience and long term results of our first 10 laparoscopic splenectomies.

METHODS: From 1995 to 1996, 10 children underwent laparoscopic splenectomy with ages ranging between 4 and 14 years. In all the patients the spleen was captured and inserted into an extraction bag, fragmented, and then removed through the umbilical orifice.

RESULTS: Since the refinement of pediatric laparoscopic instruments was ongoing during our series reported and taking into account our learning curve, the mean operating time was 170 minutes (range 120 to 240 minutes). In the evaluation of the patients after 5 years, ultrasound examination along with scintigraphy studies were successful in ruling out the presence of splenosis in these patients. Also wound related as well as hematologic parameters were found to be within acceptable limits and have been presented.

CONCLUSIONS: Despite the technical difficulties, the patients had a shorter hospital stay, lower requirement of analgesics as well as extremely low gastrointestinal morbidity. Late evaluation of the patients from our initial series, after a period of 5 years, have shown no increase in morbidity in these patients operated as we gained our experience.

#### **P89. LUNG SEQUESTER/CYST-LUNG ADENOMATOSIS: THORACOSCOPY VS MINI-THORACOTOMY VIDEO-ASSISTED**

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1st Case: We present the case of a 15 month old male child with a double extra left lung lobe sequester. The sequester, which had an independent supply direct from the aorta with venous drainage into the portal vein, was diagnosed by TAC with contrast medium. The history of the child presented 3 times pneumonitis on the basis of the left lung. Extirpation of a small sequester (2X2cm) and a larger sequester (4X3cm) was performed using thoracoscopy after application and dissection of the aberrant vascular supply using clips. The child was discharged after 72 hours with an uneventful postoperative course.

2nd Case: A 17 month old male child who presented with a left lung lobe malformation was prenatally diagnosed to have a cystic adenomatosis.

The thoracic TAC with contrast medium confirmed the diagnosis without the presence of abnormal vascular supply. A video assisted mini-thoracotomy was employed to resect the bronchus of the inferior lobe using the Endo-GIA stapler.

The chest tubes placed during the procedure were removed after 24 h and 48 h and the child was discharged on the 5th day without any complication

The thoracoscopic approach presents the advantages of a reduction in postoperative pain, decrease in the period of hospital stay as well



as a better

chance to avoiding thoracic and vertebral deformities that may occur due to the adhesions following large scale thoracotomies.

**p90. ARGON BEAM COAGULATOR AND VIDEO-ASSISTED THORACIC SURGERY IN CHILDREN**

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INTRODUCTION: From January 2000 and March 2001, 4 children (median age 6 years) affected by thoracic diseases were treated by Video-Assisted Thoracic Surgery (VATS) and Argon Beam Coagulator (ABC). All patients were successfully treated without recurrence, except one.

METHODS: 3 patients were referred for liver transplantation and they presented postoperatively a copious right chilothonax drained for respiratory symptoms. We observed persistency of pleural effusion for up to 2 weeks after tube thoracostomy. 1 young girl was referred for dyspnea due to right pneumothorax from ruptured pleural blebs treated by tube thoracostomy for several days without relieve of symptoms. All the patient underwent VATS. Subpleural blebs were resected and pleurodesis was performed by ABC. All the patients with chilothonax received extensive pleurodesis by ABC and in 1 patient the procedure was repeated for persistency of chilothonax. There were no mortality and no intraoperative complications. The median postoperative hospital stays was 9 days (range 6-30 days). The median follow-up is 10 month (range 8 month-1 year).

CONCLUSIONS: The minimal chest injury resulting from VATS makes this approach feasible. In the future VATS and ABC will give better results as the technique is refined. Although this is a small series with a limited follow-up we were delighted that the procedure was able to provide clinical improvement in our patients.

**p91. ECHINOCOCCUS GRANULOSIS CYST OF THE LUNG : TREATMENT BY THORACOSCOPY**

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The hydatidosis is, in our country, at the endemic state. The lung location is the most frequent in the childhood. Conservative treatment of this pathology is possible by thoracoscopy.

In this study 20 patients with hydatidosis cyst of the lung have benefited from the video surgery at the children's hospital of RABAT (MOROCCO) between September 1998 and September 2001.

Three ports are used : a 10mm port for the endoscope and two operative ports.

The hydatid fluid is aspirated via percutaneous way under control of the view to reduce the tension within the cyst. Hypertonic saline solution (15%) is injected within the cyst cavity as a sclerosing agent. The proligere membrane is isolated in a plastic bag and taken out from the 10mm trocar incision. A capsectomy is realized.

Bronchial fistulas are closed and the cyst cavity is padded. A drain is left into the pleural cavity. The average hospitalization duration is about three days.

There is no diet in our Seri and there is no recurrence with a follow up of 6 to 36 months .

Conclusion : Video surgery achieves satisfactory results in the treatment of the hydatidosis cyst of the lung in children.

**p92. VIDEOSURGERY PPLICATION OF THE DIAPHRAGM IN INFANT (ABOUT THREE CASES)**

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Infants with an elevated hemidiaphragm secondary to eventration or paralysis from birth trauma may have significant pulmonary compromise. Plication of the diaphragm has been considered a therapeutic adjunct to improve pulmonary function but often necessitates a thoracotomy or a laparotomy. This report describes a videosurgery technique of plication that avoids the morbidity of an open surgery. Two patients aged 6 and 18 months who had eventration of the left hemidiaphragm were treated by laparoscopy. One patient, 8 months old, who had elevation of the right hemidiaphragm was treated by thoracoscopy. The surgery was performed under general anesthesia using 3,5-mm trocars and a 4mm endoscope.

The laparoscopic procedure required three trocars and the thoracoscopic procedure required four trocars. The operative time ranged from 45 to 60 minutes. There were no operative complications. The hospitalization duration is about 3 days. The follow up is from 8 to 12 months

This report demonstrates that laparoscopic plication of the left hemidiaphragm is a safe and effective technique. A thoracoscopic approach of the right hemidiaphragm eventration give a better exposure of the diaphragm and avoids the morbidity of a thoracotomy.

**p93. PEDIATRIC EMPYEMA- AN ALGORITHM FOR EARLY THORACOSCOPIC INTERVENTION**

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INTRODUCTION- The management of pediatric empyema remains controversial. We contend that early thoracoscopic intervention results in shorter hospital stays, decreased morbidity and superior outcomes. We propose an algorithm using early image-guided thoracoscopy as an effective treatment of pediatric empyema. METHODS AND PROCEDURES- Consecutive pediatric empyemas treated from 11/1997 to 4/2001 using a prospective management algorithm were reviewed. Demographic data, days to diagnosis, days to surgery, length of stay, chest tube days, complications, and follow-up were recorded. RESULTS- Twenty-two children with 24 empyemas were treated using this algorithm. Their mean age was 49 months. Mean days to diagnosis was 11 and from diagnosis to surgery was three. Imaging included CXR in all, ultrasound in 15 (68%) and CT scan in 13 (59%). One thoracoscopy was converted to a mini-thoracotomy because of difficulty in ventilation. Chest tube removal averaged 3 days with an average

length of stay of 13 days. One patient with an immune-deficiency required a second thoracoscopy for recurrent empyema and one patient developed a contra-lateral empyema. There were no other complications or deaths. Follow-up in 19 of 22 children (86%) at 5 months revealed no recurrences or mortality. CONCLUSION- Our treatment algorithm, using early image-guided thoracoscopy, is a safe and



effective means of managing pediatric empyema, while shortening hospital stay and avoiding the morbidity of thoracotomy.

#### **p94. THE CHALLENGE OF THORACOSCOPIC OESOPHAGEAL ATRESIA REPAIR**

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Objective: Oesophageal atresia repair remains one of the challenges of minimally invasive surgery. Since the first successful repair by Lobe and Rothenberg in Berlin in 1999, a handful of cases have been prepared in the USA and a few in Europe and elsewhere. Our aim was to divide the distal tracheo-oesophageal fistula and achieve a primary repair of oesophageal atresia in patients using the thoracoscopic approach.

Method: We describe the approach and operative technique in two cases.

Results: The first patient was a 1.6 kg female. Unfortunately the anatomy proved unfavourable with a right sided aortic arch and vascular ring. Division of the azygos vein and distal tracheo-oesophageal fistula were successfully achieved however. The second case, a 2.25 kg female infant had favourable anatomy and the operation was successfully completed thoracoscopically. At five days post-operatively a contrast swallow showed a widely patent anastomosis with no leak. Feeding was commenced and she progressed well, being discharged home on the twelfth post-operative day.

Conclusion: The thoracoscopic approach to oesophageal atresia repair can be performed safely with a favourable outcome.

#### **p95. SPOT -SINGLE PORT THORACOSCOPY- FOR TREATMENT OF EMPYEMA IN CHILDREN**

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OBJECTIVE: To report that thoracoscopic surgical debridement of pleural space in children with empyema can be performed through a unique port and using standard scopes and instruments.

METHODS: Patients: 10 children of 2 to 13 years treated consecutively in 2 years operated between 5 to 26 days from the beginning of symptoms. Indication: a) Initial diagnosis of empyema with multiple septa, or b) 72 hours after the placement of a chest tube with persistence of fever and pus collection in the pleural cavity.

Technique: A 11.5 mm thoracoport was inserted at the site where the thickest collection of empyema was observed. In cases previously drained, access was achieved using the same chest tube wound. Standard 3 or 5 mm scopes and instruments were introduced simultaneously through the same port and a complete pleural debridement was achieved. After conclusion, a 24 to 32 french Argyle chest tube was placed using the same unique wound in all cases.

RESULTS: SPOT empyema debridement was successfully achieved in all 10 cases. Mean operation time was 70 minutes (60 to 140 minutes). No intraoperative complications were observed. Mean hospital discharge after SPOT was of 4 days (3 to 7 days). In all cases cosmetic results were excellent.

CONCLUSIONS: SPOT is a safe and useful technique for treatment of empyema in children. Besides presenting similar results than conventional multi-port technique, this approach seems to be less expensive and cosmetically better.

#### **p96. VIDEO-ASSISTED THORACIC SURGERY FOR CYSTIC ADENOMATOID MALFORMATION OF THE LUNG; REPORT OF TWO CASES**

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Introduction: We report two cases with congenital cystic adenomatoid malformation of the lung (CCAML), which underwent lung resection by VATS.

Case 1: A two years old boy. Antenatal diagnosis of the right lung cysts had been made at 30 weeks of the gestation. He was followed up for two years, because he showed no subjective symptoms. By computerized tomography, cysts were confirmed to be localized in S6 and S10 of the right lung. Segmentectomy of S6 and S10 was performed by VATS.

Case 2: A two years old girl. She had repeated pneumonia of right lower lobe. CT examination showed cystic lesions. Right lower lobectomy was performed by VATS, although the adhesions of the lobe to pleura were seen.

Both cases were uneventful postoperatively and discharged within a week. Histological examination of the resected tissue showed CCAML (Type I and II, each) in both cases.

Conclusion: The video-assisted approach is a feasible alternative to thoracotomy in the treatment of congenital lung cysts, even if the patient is an antenatally diagnosed case or an infected case.

#### **p97. THORACOSCOPY IN CHILDREN WITH DIAPHRAGMATIC PARALYSIS AND BOCHDALEK HERNIA**

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Introduction: In newborns with congenital eventration of the diaphragm the conventional repair of the lesion has to be done transabdominally after completion of the preoperative management. In elder infants it is possible to choose alternative techniques.

Operative procedure: Three point standard thoracoscopy in contra-lateral position is used. We produce an artificial pneumothorax with a pressure of 8mm mercury after introducing the Veress cannula through the 4th ICR of the mid axillar line. The edges of the diaphragmatic defect are good visible and can be grasped by an endoscopic forceps. The plication and fixation at the thoracic wall with large interrupted sutures follows. In cases with paralysis of the diaphragm the procedure is the same.

Cases: Since 1997 five children underwent this procedure in our hospital. Three times with Bochdalek hernia, two times with diaphragmatic paralysis.

Results: All children are alive. In one case recurrence occurred, a second intervention was necessary. No other complication. Were seen



late results in these five children are excellent.

Discussion: In infants with Bochdalek hernia and diaphragmatic paralysis the minimal invasive repair by thoracoscopy is a reliable and gentle operative technique. In agreement with Y.Suzuma et al (1997) and I. NIETO-ZERMENO (1998) the thoracoscopy has special advantages over laparoscopic procedure.

Keywords: thoracoscopy, diaphragmatic hernia

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**p98. THORACOSCOPIC LUNG BIOPSIES IN CHILDREN WITH THE ENDOLOOP**

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Background: For good diagnosis of parenchymal disease of the lung, often a lung biopsy is needed. However an open lung biopsy was often seen as too invasive. Now with the introduction of minimal invasive techniques, thoracoscopic lung biopsy was introduced in our centre. Methods: The procedure consisted of introduction of three 5 mm ports, insufflation with CO2 till a pressure of 4 was used to create a good view. Lung biopsy was taken after ligation of the lung tissue with 2 endoloops PDS 4.0. The first 7 cases are reviewed here.

Results: In the period april - september 2001 we performed 7 thoracoscopic lung biopsies, the age ranged from 1 till 11 years, the average operation time was 28 minutes, the postoperative stay in the hospital was 1 day. Only 1 patient had a pneumothorax postoperatieve and needed for 24 hours a thoraxdrain. Conclusion: Thoracoscopic lung biopsy with an endoloop and low pressure CO2 insufflation is an easy and save procedure. Especially when starting thoracoscopic surgery in children this procedure is recomendable.

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**p99. SYRINGOCELE: OUR EXPERIENCE IN CLINICAL APPROACH AND ENDOSCOPIC TREATMENT**

See SIVI Abstract: page 64  
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## SIVI Meeting Abstracts

### HAS LAPAROSCOPY A ROLE IN PAEDIATRIC SURGERY ? CONSIDERATIONS AFTER TEN YEARS OF EXPERIENCES IN CHILDREN.

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**Introduction:** In last ten years laparoscopy has been developed also in the matter of paediatric surgery, becoming a gold standard for several pathologies. Laparoscopic surgery is well established in a number of surgical specialities for a variety of indications and is especially in vogue in current surgical practice. The treatment of acute abdomen in childhood represents a challenge for the paediatric surgery. Recent literature suggests that laparoscopic appendectomy may increase the risk for post-operative infection complications cases, including abdominal abscesses. Otherwise is still discussed the application of laparoscopic technique in management of several disease. Minimal access surgery is rapidly becoming the surgical approach of choice for a variety of surgical disorders.

**Aim of the study:** the aim of this study was to review our experiences of seven years in the use of laparoscopy and to compare data of follow-up referred to patients treated in the Dept. of Pediatric Surgery of Children's Hospital of Milan for an acute abdomen, comparing patients treated through laparoscopic technique ( LT ) versus conventional technique ( CT ).

**Method** More of 300 laparoscopy were performed since 1994; common application of this approach was used for non palpable testis, recurrent abdominal pain, varicocele, acute intestinal massive bleeding, Meckel's diverticulum, pseudo intestinal obstruction, appendicitis and acute abdomen. Data of follow-up concerning 63 pts. treated for an acute abdomen through LT and 63 pts. treated through CT were collected. The patients of both group were admitted with a diagnosis of acute abdomen; 45 presented a complicated appendicitis, 11 an acute massive intestinal bleeding, 7 a suspicion of torsion of ovaries. All patients were contacted and 32 gave consensus to be checked for the follow-up. The follow-up schema based on the following points: clinical history of the short term follow-up ( intestinal obstruction, post-op. infection complications accurate clinical history of the medium-long term follow-up related to recurrent abdominal pain ( RAP ), casualty access, hospital admissions, return to extracurricular activities aesthetic results stool frequencies

Data were statistical analysed.

**Discussion** The authors believe that laparoscopy is a technique must be well known and used by new generations of Pediatric Surgeons, with good experiences of surgery. LT is a safe procedure in many fields of application, that is superior with regard to exploratory potential, hospitalisation time, rate of return to normal activity and cosmetic appearance. Data concerning complication rate in our study were not statistical significant. Data referred to RAP after laparoscopy must be interpreted: it should be postulated that the incidence of RAP, after a correct clinical evaluation of the symptom, is dramatically reduced in group of LT. Our review of laparoscopy in children illustrates the importance of proper education and training. Once the initial experience is developed, there is minimal morbidity associated with laparoscopy.

### NISSEN LAPAROSCOPIC FUNDOPLICATION IN PEDIATRIC NEUROLOGIC PATIENTS

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**Introduction** Surgical treatment of gastroesophageal reflux disease (GERD) in neurologic patients is a challenge because of many associated morbidities involved. Aim of the study is to assess the outcome in our patients.

**Methods** Between 1995 and 2001 17/44 patients who underwent laparoscopic Nissen fundoplication had neurologic impairment. Age range at operation was 4mos-16yrs, weight range 2,2-30Kg. Most symptoms complained were emesis, bleeding, dysphagia, recurrent pneumonia, growth failure. Diagnosis was based on endoscopy, histology, pH-studies. Average follow up was 33 months. 3 patients had already a PEG in place, 7 had a gastrostomy at the time of fundoplication

**Results** There were no intra-peri-operative complications and no conversion to open surgery. Symptoms subsided in all cases but three (recurrent pneumonia, chronic bleeding and growth failure, respectively); pH-studies were normalized in all patients tested. We had major complications in 4 (23,5%) patients, none of them with a PEG: 2 paraesophageal hernia with no reflux recurrence, 2 partial wrap disruption, 1 with recurrence; one of those died before reoperation. 2 patients required more than 2 operation.

**Conclusions** Antireflux surgery has usually good results but in severe neurologically impaired children can be troubled by significant complications. Gastrostomy for both feeding and decompression can be very useful to improve the outcome.

### PERCUTANEOUS ENDOSCOPIC GASTROSTOMY: A NINE-YEAR EXPERIENCE.

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Percutaneous endoscopic gastrostomy (PEG) placement, a sutureless approximation of the stomach to the anterior abdominal wall, was firstly introduced in children 20 years ago. However, excluding reviews from the inventor, few publications have dealt with results of PEG in pediatric patients. We reviewed our experience of PEG insertion in children. Data from 72 patients, treated with PEG (1992-2000) were collected to assess indication, effectiveness, age at insertion, early and late complications and removal. Excluded were children undergone to PEG placement during other surgical procedures. PEG was successfully performed in all children. Early complications included temporary ileus in 7 and site infection in 5. Late complications were PEG dislocation in 3, and gastro-colic fistula in 2 (one solved with feeding rest and TPN, the other died 3 month after fistula). Five children died from the primary disease. PEG was replaced by button gastrostomy, 3 to 11



months after insertion. Seven PEG, no more necessary, were removed. Five children required fundoplication.

Indications	Patients (#)	Age at operation Months (mean)	Early complications (#)	Late complications (#)	Removal (#)
Inability to swallow	39	3-185 (8.22)	7	4	2
Continuous enteral feeding	27	4-82 (5.11)	3	1	5
Feeding supplementation	16	9-98 (6.10)	2	-	-

We conclude that PEG insertion in children is a safe, well-tolerated technique to support enteral nutrition; the procedure, however, requires right indication and skilful technique.

### L'APPENDICECTOMIA LAPAROSCOPICA IN ETÀ PEDIATRICA: STUDIO MULTICENTRICO SIM

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L'appendicectomia è una delle principali indicazioni della chirurgia laparoscopica in età pediatrica. I Centri di Chirurgia Pediatrica di Pescara e Milano hanno ritenuto interessante proporre uno studio multicentrico nazionale per valutare la diffusione, l'indicazione, l'applicazione, le problematiche emerse, i limiti ed i risultati relativi all'approccio laparoscopico all'appendicectomia.

Materiali e Metodi

È stato inviato un questionario sull'appendicectomia laparoscopica in età pediatrica ai Centri italiani di Chirurgia Pediatrica aderenti alla SIMV e si è ottenuta da 11 Centri l'adesione allo studio.

Nel triennio 1999-2001, su un numero totale di 2256 appendicectomie, 824 (36%) sono state eseguite per via laparoscopica; 429 appendicectomie laparoscopiche sono state eseguite in urgenza (52%), le restanti 395 (48%) in elezione o per DAR. In 9 Centri su 11 l'accesso pelvico o la peritonite diffusa vengono ritenute controindicazioni all'approccio laparoscopico.

In 9 Centri su 11 viene riferito un allargamento dell'indicazione chirurgica in pazienti con DAR. L'appendicectomia transombelicale video assistita (TULAA) è ritenuta la tecnica di scelta in 7 Centri, 3 Centri preferiscono l'appendicectomia "in", 1 Centro non esprime preferenze. Nei Centri che dispongono di ottica con canale operativo la TULAA viene eseguita, se possibile, con un solo Trocar inserendone altri al bisogno. In 5 Centri su 11 viene eseguita l'infiltrazione con anestetico locale nei punti di inserzione dei Trocar. Lo pneumoperitoneo viene ottenuto in tutti i Centri con tecnica open. Nelle TULAA la legatura del meso e del moncone appendicolare si eseguono con tecnica classica "out". Nell'appendicectomia "in" il meso appendicolare viene trattato nei vari Centri in pari misura con coagulazione monopolare o bipolare, mentre il moncone appendicolare viene legato in tutti i Centri con endoloop.

Si sono avute in totale 28 complicanze (3,3%), di cui 14 intraoperatorie e 14 precoci. Non viene riferita nessuna complicanza tardiva. In 37 casi (4,4%) si è resa necessaria la conversione per problemi tecnici (12 casi), anatomici (22 casi) o per il riscontro di altra patologia (3 casi). Quasi tutti i Centri riferiscono la riduzione del dolore post operatorio; in tutti i Centri si è avuta una degenza post operatoria ridotta (2 giorni) ed una netta migliore ripresa delle normali attività. L'approccio laparoscopico trova crescente accettazione e gradimento presso tutti i Centri, a parte le ovvie considerazioni positive sul risultato propriamente estetico.

Conclusioni

Pur considerando la non omogeneità dei dati pervenuti, è possibile esprimere una valutazione positiva sull'approccio laparoscopico all'appendicectomia in termini di risultati immediati e a distanza, vista la percentuale accettabile di complicanze e conversioni (peraltro in netta riduzione con la crescente esperienza dell'operatore). Sono del tutto evidenti i vantaggi per l'esplorazione degli annessi, l'identificazione di aderenze congenite ceco parietali specie nei DAR, la possibilità di eseguire appendicectomie quasi senza esiti cicatriziali (questo discorso vale a maggior ragione nei pazienti obesi). Il limite della TULAA risiede essenzialmente nella non agevole ricerca del diverticolo di Meckel, possibile peraltro con l'inserzione di altri canali operativi.

### LAPAROSCOPIC SPLENECTOMY IN HEMATOLOGIC DISEASES

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Introduction Some pediatric hematologic diseases require elective spleen removal. We reviewed our experience of laparoscopic splenectomy to assess its safety.

Material and methods From January 1996 to November 2000, nineteen laparoscopic splenectomies were performed at the Department of Pediatric Surgery, University of Brescia, Italy. Indications were: spherocytosis (8 cases), Wiskott-Aldrich Syndrome (5 cases), chronic idiopathic thrombocytopenic purpura (3 cases) and dyserythropoietic anemia, maior thalassemia and splenic hemangioma (1 case each). Patients' age ranged from 6 months to 16 years.

Laparoscopic splenectomy required four trocars placement. Abdominal and epiploon retrocavity exploration was always associated to look for lesser spleens.

One case at the beginning of our experience required conversion to open surgery due to technical problems.

Results Total procedure time varied from 260min, in the initial cases, to 130min thereafter with a median time of 180min. The spleen was removed through a bag in the last 8 patients; in the first 10 cases through an auxiliary small laparotomy. Lesser spleens were found and removed in ten patients. One patient with sferocytosis and cholelithiasis had also cholecystectomy at the same time with an added access. Feeding was restarted in first postoperative day in all patients.

Conclusion Our experience support the benefits and safety of laparoscopic splenectomy for hematologic indications.

### EPIDERMOID SPLENIC CYSTS IN PEDIATRIC AGE: LAPAROSCOPIC DECAPSULATION AND PRELIMINARY RESULTS

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Objective of the study: Congenital epidermoid cysts are exceptional representing only 2.5% of all splenic cysts in childhood. Touloukian et al. (J. Ped. Surg., 1997, 32: 272) have shown that splenic decapsulation in open surgery is an effective treatment for epidermoid cyst, which both preserves splenic function and prevents recurrence despite retention of hilar cyst lining.

Methods and procedures: Two successful laparoscopic decapsulation of an epidermoid splenic cyst in an 10-year-old and 15-year-old boys using UltraCision Laparoscopic Coagulating Shears have been reported.

Results: Follow-up at six months and twelve months confirms no recurrence.

Conclusions: Laparoscopic splenic decapsulation provides minimal access and small surgical trauma for treating the cyst while preserving splenic function. The laparoscopic splenic decapsulation can be performed safely, expeditiously, with minimal blood loss and with a short hospital stay. The Authors conclude that laparoscopy guarantees the best approach because the surgical trauma is smaller than laparotomy and in case of recurrence a further laparoscopic treatment could be easily performed.

#### LAPAROSCOPIC SURGERY OF ANORECTAL MALFORMATIONS

Lima M, Domini M, Ruggeri G, Libri M, Bertozzi M, Pelusi G, Tekie F.

Introduction. The surgical treatment of high and intermediate anorectal malformations includes, as a brand-new technique, the anorectal video-assisted pull-through according to Georgeson. This procedure is performed with a mini-invasive perineal approach, also in newborn, if general conditions permit it, without colostomy. Our experience is at the present based on the following four cases.

Material and methods. Since March 2001 in our Institute, 4 children with high anorectal malformations have been treated with anorectal video-assisted pull-through. This procedure consists of two surgical steps: 1) laparoscopically dissection of the rectal "cul de sac" after suture of the fistula. Three trocars are used (two of 3 mm and one of 5 mm); 2) perineal pull-through, after identifying the external sphincter with electrical stimulator, and final anorectal anastomosis.

Results. All the patients had a colostomy but the laparoscopically mobilization was easily realized. The fine localization of the external sphincter permitted the symmetrical constriction. None of the four cases needed laparotomy. The short term follow-up is satisfying: neither incontinence nor stenosis are observed.

Conclusions. In expert hands, this technique offers less traumatism, smaller scars, precocious canalization and quicker psychophysical recovery.

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#### MINIINVASIVE SURGERY IN A CASE OF EHLERS-DANLOS SYNDROME TIPE IV

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Ehlers-Danlos syndrome (E-D) type IV is an uncommon form of connective tissue disorder which usually results in premature death. Patients affected are at high risk of spontaneous visceral and arterial perforation, the sigmoid colon being the most frequent site of intestinal disruption. Because of the tissue fragility and poor wound healing, surgical management is often troublesome. In case of sigmoid perforation, after a temporary colostomy, sigmoidectomy and colo-rectal anastomosis is considered the preferred therapy. To our knowledge, the laparoscopic approach as a method of choice to positively influence surgical healing, has not yet been reported. We present such a case.

A 20 years-old girl, with a diagnosis of E-D type IV and symptoms of chronic abdominal pain, presented with a spontaneous sigmoid perforation which required a colostomy. Six months later, she underwent, through a laparoscopic approach, to sigmoidectomy and to mechanical, colo-rectal anastomosis.

Postoperative course was uneventful. At 1 year follow-up, colonoscopy showed a normal anastomosis; bowel movements were referred regular.

Surgical management by a minimal invasive technique should be considered in the treatment of patients affected with E-D type IV. The effects of this technique may positively influence the clinical course, the immediate and late postsurgical complications of this disease.

#### VIDEOASSISTED REMOVAL OF LARGE OMENTAL CYST IN 2-YEAR-OLD CHILD

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Omental cyst is rarely reported in pediatric age. We report a two-year-old child with a large omental cyst that was removed by videoassisted technique.

Because of vague abdominal complaints a 2-year-old male child undertook an abdominal ultrasound that showed a multilocular cystic lesion of the upper abdomen. Possible diagnosis were mesenteric or peritoneal lymphangioma, and omental cyst.

A laparoscopy was performed through transumbilical route and a large multilocular cyst involving the omentum was seen. Through another 5mm port the cyst was gently grasped and, after removal of the umbilical trocar, it was exteriorized through the umbilicus. Then it was totally resected from the omentum without opening its wall. Its larger diameter was about 12cm.

At 1 year follow-up abdominal ultrasound was normal

This is the youngest patient reported in whom an omental cyst was diagnosed and treated by laparoscopy.

#### MODIFIED TITANIUM POLIUSE TROCAR FOR SMALL PATIENTS

D. Falchetti MD, F. Torri MD, S. Benvenuti MD, D. DePrevide MD, F. Braga MD, B. Morelli MD, G. Ekema MD

Introduction. The technological development and experience in laparoscopy is bringing its practice more and more to very early age and small patients. This fact is not always paired with development of adequately sized and effective equipment, owing to industrial and commercial policy, especially in case of single-use instruments. Most of the now available 5mm trocars are designed to fit an adult thick and





tough abdominal wall but are often heavy, jutting out and easily displacing in a small cavity. Moreover, even when threaded, their distal part is usually smooth, so they must be inserted too far in the cavity thus impeding a safe opening of tools.

**Methods** We designed a custom-made 5mm trocar that is shorter, to prevent heavy weighing and overhanging on long outstanding shaft; light, as it is almost entirely titanium made; poli-use, apart from the valve. The trocar is also threaded to the tip to prevent displacement when barely put in the peritoneum, in order to allow safer tool action and surgical handling also in small peritoneal cavities.

**Results** We employed these trocar initially in smaller patients, the least weighing 3Kg, and since then we experienced their benefits in every procedure (including anti-reflux operation, splenectomy, colonic pull-through, cholecystectomy) without any adverse effect related to their special design.

**Conclusion** Our custom-made trocar appears to be a good option in laparoscopic surgery mostly on small patients.

## LAPAROSCOPIC GONADAL BIOPSY FOR CRYOCONSERVATION

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**Introduction.** This study is to evaluate the laparoscopic approach for the collection of gonadal specimen with the scope of tissue preservation for later use. Laparoscopy in adenexal pathology is a widely accepted surgical procedure. Urologic endoscopy, RMI, laparoscopy and biopsy make part of the work-up of patients with intersex conditions like true hermaphroditism, pseudohermaphroditism and Morris syndrome. Moreover, laparoscopic gonadectomy, being a simple and safe procedure with minimal scars, has gained great success.

Recently, storage and conservation of ovarian and testicular tissue for future autologous gonadal grafting has triggered interest in harvesting germ cells from patients before they undergo sterilising cancer treatment. To reduce the prevalence of infertility there is, at experimental level, consensus over research in testicular biopsy with the aim of harvesting single sperm necessary for intracytoplasmic sperm injection.

Since the child or the family are not going to benefit from the research immediately, and the technological advancement of preservation and possible future fertility being too young to evaluate the results, thus it becomes difficult to guarantee valid outcome with certainty. Thus one needs to pursue the dialogue with fair and clear ideas to develop a valid informed consent. Cryoconservation is an experimental method that is being used in our cases. In animals the survival of follicles upon reversal defreezing of the cryoconserved tissue goes from 72 up to 80 %, while in humans from 72 up to 89 %. This technique is useful in young patients in order to preserve the gametogenesis and thus fertility, and steroidogenic activity for the production of hormones after autotransplant of the tissue.

**Materials and methods** In one year period from Jan. 2001 up to Jan. 2002 2 patients with childhood tumors are treated in such manner that later required radiotherapy for the underlying disease condition.

**Case 1.** M.M., 5 years of age, patient affected with ruptured Wilms' tumor on the right side; **Case 2.** D.G., 3 years of age, who presented with rhabdomyosarcoma of left thigh; both cases were subjected to laparoscopic specimen collection. We used the "open laparoscopy" approach to introduce the camera into the peritoneal cavity, then 2 trocars of 5 mm, were introduced in the lower abdominal quadrants. Once the ovary is identified, exteriorization is carried out through one of the trocars and biopsy materials are obtained. The specimen harvested were sent to the department of Gynecology for cryoconservation.

**Conclusions.** Laparoscopy being a minimally invasive, with low post-op surgical risk and minimal scars formation, makes it the best technique for the diagnosis and the specimen collection of normal and pathologic gonads before being subjected to cancer therapy.

## RETROPERITONEOSCOPY IN CHILDREN: THE VISIPOINT TECHNIQUE

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**INTRODUCTION:** Retroperitoneal procedures were initiated in 1992 by the balloon-dissection of Gaur. More recently Kavoussi describe a new technique by entering the retroperitoneum directly using a Visiport trocar (Auto Suture, US Surgical Corporation, Norwalk, CT, USA), through one cm incision rather than performing a larger balloon dissection. In this video we present our initial experience, our pediatric indication and describe this easy and novel technique.

**MATERIALS AND METHODS:** 31 children underwent retroperitoneal laparoscopy: twenty-two renal biopsy, five varicocele, three renal cyst ablation and one pyelolithotomy for staghorn stone. The patients are placed in the full flank position, a maximum of 3 ports is used and the initial trocar is placed under direct vision. The laparoscope is then used to bluntly dissect the retroperitoneal space.

**RESULTS:** All procedures were successfully performed, blood loss was minimum, operating time was 4 hours for the pyelolithotomy and no more than one hour for the other. The mean hospital stay was 1.5 days and all patients were back to usual activity in a mean of 6 days. A minor intraoperative complication occurred; the peritoneum was inadvertently entered in one patient, no further treatment was necessary and the post-operative period was uneventful and as short as for the other patients.

**CONCLUSION:** The technique is simple, safe and does not require extensive laparoscopic experience.

## SYRINGOCELE: OUR EXPERIENCE IN CLINICAL APPROACH AND ENDOSCOPIC TREATMENT

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We re-evaluated 64 cases of syringocele observed in the period 1986-2000, considering anamnestic, clinical and anatomical aspects: type of syringocele, age at diagnosis, symptoms and patients' age at onset, concomitant or secondary lesions of the urinary tract, treatment, and follow up.

We found 2 "simple" syringoceles, 23 "closed", 30 "open", 8 "ruptured". A severe obstruction was found in 8 cases, all "ruptured" (VUR in 11 out of 16 ureters, dilatation alone in other 3 cases). Ten patients had monolateral VUR of lesser degree.

Infections were found in 24 out of 30 open syringoceles, along with moderate signs of obstruction. Micturial problems were observed in 14 out of 23 closed syringoceles, and in 18 out of 30 "open" cases. Five cases "closed" were diagnosed at birth, 3 other cases had severe recurrences of post-micturial hematuria. Diagnosis was accidental in all the other patients.

As for the age at onset, besides the 6 cases with neonatal diagnosis, those cases with infection-related symptoms were usually diagnosed in



infancy, while the ones with mictural troubles were usually diagnosed later.

Treatment included:

1. 9 cases of "ruptured" syringoceles with bilateral hydro-ureteronephrosis and VUR had a bilateral reimplantation, along with resection of the posterior and anterior fornices

2. "closed" syringoceles underwent distal opening

3. "open" syringoceles underwent resection of the anterior fornix in 25 cases

4. "simple" syringoceles required no treatment

Follow up examination was made after 3, 6 and 12 months with voiding cystourethrography and urodynamics.

A complete recovery of normal cystographic and urodynamic parameters, along with progressive disappearing of subjective symptoms, was obtained in 90% of patients.

In conclusion, we should consider the syringoceles as a spectrum of lesions, ranging from a minimal form, of no interest to the surgeon, to severe forms which can greatly impair upper urinary tract and renal function, much alike the posterior urethral valves in this regard: in fact the clinical findings and long-term evaluation of ruptured syringoceles do not differ much from the ones we observe in severe urethral valves. In the middle of the spectrum one can observe several cases in which the mictural troubles (with or without infection) are prominent, such as urge incontinence or frequent voiding, less frequently dysuria: in our series syringoceles are found in approximately 30% of cases of males with mictural troubles with organic causes. We can't but stress the importance of inspecting the whole urethra during endoscopy for a broad spectrum of urological problems.

### LAPAROSCOPIC RIGHT ADRENALECTOMY FOR ANDROGEN-SECRETING ADENOMA IN A 3-YEAR OLD GIRL

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Objective of the study: Although adrenal surgery in children is uncommon, adrenalectomy is occasionally indicated for neuroblastoma, pheochromocytoma and rare adrenocortical pathologies as primitive nodular dysplasia and adrenocortical neoplasm. In adults, laparoscopic adrenalectomy is an established technique, since in children this approach is only recent there are less than 20 cases reported in literature.

Methods and procedures: The Authors present the case of androgen-secreting adenoma resected successfully by right laparoscopic adrenalectomy in a 3-year old girl using UltraCision Laparoscopic Coagulating Shears.

Results: Follow-up at six months confirms no recurrence.

Conclusions: This minimally invasive surgical technique seems to be a promising option for the treatment of pediatric adrenocortical neoplasm. The Authors believe that the advantages of laparoscopic adrenal surgery should be applied to pediatric patients. From this point of view and in these exceptional circumstances, the experience of an adult surgeon with laparoscopic adrenalectomy is of crucial importance. The Authors conclude that the best surgical result will be achieved only if the pediatric and adult surgeon collaborate with their different experiences.

### THORACOSCOPIC MANAGEMENT IN THORACO-PULMONARY SUSPECTED NEOPLASTIC DISEASE IN CHILDREN

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Introduction. The specificity of conventional radiological researches for studying thoraco-pulmonary diseases is not always satisfying, in particular for those of suspected neoplastic kind. We refer the experience of our Clinic in the use of thoracoscopy in diagnosis and treatment of thoraco-pulmonary suspected neoplastic diseases in children.

Patients and technique. In the Pediatric Surgery of Bologna University, from October 1995 to April 2001, 16 patients with thoraco-pulmonary suspected neoplastic disease were treated with video-thoracoscopy. The age of patients goes from 8 months to 16 years. The average is 7,5 years. The thoracic access was performed in all the cases with "Open" technique. Once the camera was inserted, we explored the thoracic cavity that is always the first surgical time. In operative thoracoscopy we placed two more trocars of 3 or 5 mm for the instruments. In only one case we used a thoracoport of 10 mm for the introduction of a trans-thoracoscopic Eco Color Doppler for the research of deep pulmonary metastasis not found with the simple exploration.(1).

Outcome. In these small patients thoracoscopy was used for the following reasons: in nine cases, to obtain exhaustive informations about injured organ and visualize the connection with bordering organs: in fact these information were not obtained with traditional radiological exams (Thoracic Rx, TC, RMN); in seven cases to obtain an histological diagnosis of the tumor or so suspected, using a mini-invasive biopsy.

The thoracoscopies performed in patient with suspected neoplastic disease gave the definitive histological diagnosis in all the cases. We found: 4 pulmonary metastasis (1 Wilms tumor, 1 Ewing Sarcoma, 1 bone Sarcoma, 1 alveolar Rbdomiosarcoma); 2 Ganglioneuroma; 1 embryonal Rbdomiosarcoma; 3 Lymphoma; 1 Hodgkin Lymphoma; 2 pulmonary flogistic infiltrations; 1 pulmonary necrosis infarct; 2 tyctic iperplasia. Thanks to thoracoscopy, the radiological diagnosis was confirmed in 4 cases and the diagnosis was correct in 12 cases. We have to underline that in 5 patients the suspected disease was not neoplastic. In 3 cases we performed a video-assisted exeresis of metastatic lesions.

Conclusions. Thanks to the excellent visualization of pleuric cavity, thoracoscopy is the best technique for diagnosis and treatment of thoracic, mediastinic and pleuro-pulmonary neoplastic diseases. Using thoracoscopy is possible to avoid or reduce the extension of painful thoracotomy (VATS) with all the consequences on breathing mechanic and on the muscle-nervous component of the thoracic wall. We found particular benefits in patients with reduced pulmonary reserve, deficits in cicatrization and immunodepressed.

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### THORACOSCOPY: A SIX YEAR-EXPERIENCE IN TWO ITALIAN CENTRES

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Introduction. Thoracoscopy is an important option in the treatment of many thoracic pathologies; its use in children is, however, limited due to anaesthesiological technical difficulties. We retrospectively evaluated the thoracoscopic activity of two paediatric centres in the last six years.

Methods and Procedures. Video-Assisted Thoracoscopy (VATS) has been routinely adopted in our institutions since 1996. The data of 121 patients who have undergone VATS were reviewed and analysed.

Results. There were 53 males and 68 females. Mean age at surgery was 66,08 (SD: 58,23) months. Mean body weight at surgery was 21,85 (SD: 16,26) Kg.

The patients were divided in five groups according to the pathologies.

	Pts	Males	Age (months)	Weight (kg)	Conversion (pts)	Hospital stay (days)
PDA*	95	35	51,25	18	15	2,89
Pleural Empyema	14	8	66,21	20,46	4	17,36
Mediastinal Mass	3	2	94,39	34,67	0	4,33
Lung Disease	3	2	169,96	46	0	6,33
Chest Wall Anomalies	6	6	200	62	0	11,44

PDA\*: Patent Ductus Arteriosus

Complications were seen in two patients in the PDA group (one laryngeal nerve paralysis and one chylothorax) and one in the pleural empyema group (post-operative bleeding which required blood transfusion).

Conclusions. VATS can be performed safely and with minimal morbidity. In our experience, early and late complications turned out to be quite low. This survey would support on-going development of thoracoscopy in children.

### LAPAROSCOPIC SPLENECTOMY IN HEMATOLOGIC DISEASES

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Introduction Some pediatric hematologic diseases require elective spleen removal. We reviewed our experience of laparoscopic splenectomy to assess its safety.

Material and methods From January 1996 to November 2000, nineteen laparoscopic splenectomies were performed at the Department of Pediatric Surgery, University of Brescia, Italy. Indications were: spherocytosis (8 cases), Wiskott-Aldrich Syndrome (5 cases), chronic idiopathic thrombocytopenic purpura (3 cases) and dyserythropoietic anemia, maior thalassemia and splenic hemangyoma (1 case each). Patients' age ranged from 6 months to 16 years.

Laparoscopic splenectomy required four trocars placement. Abdominal and epiploon retrocavity exploration was always associated to look for lesser spleens.

One case at the beginning of our experience required conversion to open surgery due to technical problems.

Results Total procedure time varied from 260min, in the initial cases, to 130min thereafter with a median time of 180min. The spleen was removed through a bag in the last 8 patients; in the first 10 cases through an auxiliary small laparotomy. Lesser spleens were found and removed in ten patients. One patient with sferocytosis and cholelithiasis had also cholecystectomy at the same time with an added access. Feeding was restarted in first postoperative day in all patients.

Conclusion Our experience support the benefits and safety of laparoscopic splenectomy for hematologic indications.

### LARYNGOTRACHEAL STENOSIS:TREATMENT

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The treatment of laryngotracheal stenoses should be based on multidisciplinary experts. There is no standard system. Each case of laryngotracheal stenoses must be individualized.

From January 1985 to July 2001, we treated 157 paediatric patients, 89 males and 68 females. 15 patients were treated in the 1st month, 49



patients were treated in the first six months, and 71 patients were treated in first year.

#### Eziology

CONGENITAL	No
Laryngeal Saccular Cysts	9
Laryngeal Web	24
Subglottic Haemangioma	24
Pharyngo-Laryngeal Linfangioma	5
Laryngeal Stenoses	9
Tracheal Stenoses	4
Miscellaneous	4
<b>TOTAL</b>	<b>79</b>

ACQUIRED	No
Inflammatory	8
Post Caustic Ingestion	4
Post Surgery	4
Post Intubation	55
Fibro sarcoma	2
Post Tracheotomy	1
Post Trauma	4
<b>TOTAL</b>	<b>78</b>

#### Treatment

OPEN SURGERY	No
Grafts	14
Termino-terminal	5
T.tube + Termino-terminal	1
Laser + T.tube + Surgery	1
T.tube + Surgery	1
Dilatations + T.tube + Surgery	2
Dilatations + Laser + Surgery	1
Laser + Surgery	3
<b>TOTAL</b>	<b>28</b>

ENDOSCOPIC SURGERY	No
Pneumatic Dilatations	12
Dilatations + T.tube	2
Steroids Infiltrations	9
Laser	90
Laser + T.tube	2
Laser CO2	1
T.tube	2
<b>TOTAL</b>	<b>118</b>

OTHER APPROACHES	No
Medical treatment	3
Wait and see	3
Tracheotomy	5
<b>TOTAL</b>	<b>11</b>

RESULTS	No
Without disease	130
Under treatment	23
Died	4
<b>TOTAL</b>	<b>157</b>

The degree of stenoses and the length of extension, the general medical condition of the patient, and the patient's age and weight will all enter into the decision making process with regard to reconstruction. The goals of laryngotracheal treatment are to achieve an adequate airway and to restore or improve the voice, without inhalation problems.

#### INFANTILE FIBROSARCOMA OF THE LARYNX: REPORT OF 2 CASES

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The aim of this study has been to describe the problems related to the treatment of 2 infantile fibrosarcoma (IF) of the larynx and to plan a minimally invasive therapeutic approach. Case 1: a 2-year-old female child with a prior diagnosis of laryngeal saccular cyst of the left aryepiglottic fold. Because of this diagnosis at first we performed an endoscopic excision with diode laser assisted video-laryngoscopy. As histological evaluation referred to an IF, the patient had undergone chemotherapy (protocol RMS 96- IVA), then having been none response we carried out a left partial pharyngo-laryngectomy and a tracheostomy. Case 2: a 4-month-old male infant. Since the diagnosis of IF was obtained following a laser excision of a laryngeal cyst as well, we performed a partial right pharyngo-laryngectomy combined with chemotherapy. After the operation both patients have been submitted to a videolaryngoscopy every 2 months and a spiral TC every 5 months. By now, at 20 months in the first case and at 16 months in the second case, neither of them has presented any relapse yet. In both of them the tracheostomy was closed and they feed, grow up normally and have achieved normal language skills with a good quality of voice. IF is a paediatric tumour of the soft tissues that usually presents before the age of 2 years. Although these tumours display histological features of malignancy and frequently recur, they have a relatively good prognosis and only rarely metastasise. Sometimes, especially in infants and young children, the characteristic infiltrative margins of these lesions make a radical surgical approach functionally impairing. In particular we chose a combined endoscopic-surgical-chemotherapeutic treatment in order to preserve the organ functions and avoid a total laryngectomy.

#### FLEXIBLE VERSUS RIGID VIDEOENDOSCOPY IN PAEDIATRIC AGE

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The management of laryngotracheal diseases in paediatric age depends on many aspects such as progression of the disease, worsening or mitigation of the stenosis in relation to the body growth and associated pathology. Thanks to storing of images Videoendoscopy ensures multidisciplinary consults avoiding repeated narcosis. Flexible Videoendoscopy is considered the best solution for many disorders. Conversely better quality of endoscopic views, the possibility of collecting data such as distances and lengths of a stenotic tract, the safe control of upper airways and the allowance to perform simultaneous therapeutic manoeuvres are in favour of rigid endoscopy. Starting from June 1985 until June 2001 we have studied endoscopically 736 paediatric patients.

Stridor was the main symptom in 140 and between them we identified 57 cases of laryngomalacia and 17 case of tracheomalacia (52%



positives). In the remaining 596 we met mayor pathological findings in 254 (42% positives).

CONGENITAL PATHOLOGY	No	ACQUIRED PATHOLOGY	No
Laryngeal Cysts	15	Papillomas	6
Laryngeal Webs	24	Post Caustic Ingestion	4
Subglottic Haemangioma	24	Post Surgery	4
Pharyngo-Laryngeal Linfangioma	5	Post Intubation Stenoses	55
Laryngeal Stenoses	9	Prolonged intubations lesions	24
Tracheal Stenoses	4	Post Tracheotomy	1
Subglottic Chondroma	1	Post Trauma	9
Laryngeal Atresia	1	Vocal cord Paralysis	17
Laryngomalacia	57	Idiopathic Laryngitis	5
Laryngeal Clefts	5	Fibrosarcoma	2
Tracheo-sophageal Fistulas	17		
Tracheo-biliar Fistulas	2		
Piriform Sinus Fistulas	3		
Bilateral Vocal Cord Paralysis	17		
Tracheomalacia	17		
TOTAL	201	TOTAL	127

In our experience flexible Videoendoscopy is beneficial when studying dynamic aspects under spontaneous breathing, searching laryngeal palsy, laryngomalacia and tracheal malacia, but due to the little dimensions of paediatric structures, with frequently misdiagnosed malformations, rigid endoscopy must complete any investigations in the first 5 years of life.

### ENDOSCOPIC MANAGEMENT OF CHOANAL ATRESIA

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Objective of this study is to present our experience in the endoscopic management of the choanal atresia and to evaluate the effectiveness of the diode laser employment in the transnasal surgery of this rare congenital malformation.

A retrospective review of children treated for unilateral and bilateral choanal atresia at the Airway Endoscopic Surgery Unit of Padua Hospital is presented.

From 1985 up to 2000, 43 patients affected by choanal atresia were treated in our department. Of these 21 were males and 22 were females, with ages ranging from 1 day to 6 years (mean 10.2 months). In 34 cases (79%) the malformation was bilateral. We have observed associated anomalies in 10 patients (23.2%). Of these 6 presented a clinical picture of CHARGE association. All of our patients have been treated through a trans-nasal approach, under general anaesthesia and endoscopic control with Hopkins telescope. In the first 10 years of our experience a trocar was used in order to perforate the bony atresia in 33 patients. From 1995, a contact-diode laser was employed in the treatment of this malformation. In 4 cases this laser was used to enlarge the choanal lumen after trocar surgery. In 32 patients, all affected by bilateral atresia, an intranasal stent (Portex endotracheal tube) has been positioned and maintained from 3 to 6 weeks. Six patients, with a prevalent membranous plate underwent the resection of the atresia only by contact-laser without any further stent. Of the patients treated only by trocar, 14 (42.4%) developed partial recurrences that were repaired by progressive dilations in 6 cases and by diode laser in 8 cases.

Only 2 (20%) of the children treated from the beginning with diode laser required a subsequent session to repair a partial and unilateral recurrence.

All the patients on our series were followed up for at least 6 months.

Forty patients are asymptomatic with satisfied choanal patency. Two patients are still in treatment. One patient dropped out of our follow up. Transnasal endoscopic approach provides a minimally invasive method to treat unilateral and bilateral choanal atresia offering an excellent visualization of the plate. In particular it is useful in emergency surgery during the first days of life. The employment of diode laser improves the outcomes reducing the intraoperative risk and the postoperative complications and recurrences.

### CONTACT DIODE LASER SURGERY IN PEDIATRIC LARYNGOTRACHEAL LESIONS

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Laser surgery for the treatment of laryngo-tracheal lesions in paediatrics has accurate indications. In the last 10 years, with the development of minimally invasive surgery and especially the new contact lasers, like diode lasers, endoscopic surgery has become the treatment of choice in children. In the present study a series of 106 patients, 58 males, and 48 females were seen during the period June 1995 to June 2001. Their ages ranged from one day to 15 years. 11 patients were treated in the 1st month, 30 patients were treated in the first six months, and 48 patients were treated in first year.

CONGENITAL PATHOLOGY	No	ACQUIRED PATHOLOGY	No
Laryngeal Saccular Cysts	7	Inflammatory	6
Laryngeal Web	18	Post Caustic Ingestion	4
Subglottic Haemangioma	19	Post Surgery	6
Pharyngo-Laryngeal Linfangioma	5	Post Intubation	27
Laryngeal Stenoses	7		
Laryngeal Clefts	2		
Subglottic Chondroma	1		
TOTAL	59	TOTAL	47

The postoperative follow-up showed that 88 patients are living without disease, 18 patients are still under treatment.

After introducing the contact diode laser, which can be used with both rigid and flexible endoscopes, the light weight of the instrument and



low cost when compared with other lasers, and the very low thermal damage, the indications for use have been increased in paediatric pathology. It often doesn't need tracheotomy. Laser surgery should not be used more than three times in the same pathology. Laser surgery is not indicated for severe laryngo-tracheal stenoses. (Cotton III\* - IV\*). The laser is not the instrument of choice for all endoscopic laryngo-tracheal surgery however; improper or ill-judged application can cause very severe complications.

### APPENDICECTOMIA LAPAROSCOPICA: UN TROCAR O TRE TROCARS ?

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In molti Centri di Chirurgia Pediatrica la tecnica laparoscopica è riconosciuta come tecnica di scelta nell'approccio della appendicite acuta, anche nelle forme complicata. Dal 1994 al 2001, nel Reparto di Chirurgia Pediatrica dell'Ospedale dei bambini V. Buzzi di Milano, 272 casi di appendicite sono stati trattati con tecnica laparoscopica, 45 dei quali in situazione di appendicite complicata. La tecnica tradizionale prevedeva il posizionamento di tre Trocars, uno in sede di cicatrice ombelicale con approccio TUOL, uno in sede sovrapubica ed uno in FIS. In 22 casi, dopo introduzione del primo Trocar (ottica operativa da 10 mm), constatata la situazione anatomica della appendice e dell'angolo ileo-cieco colico, si è proceduto ad estrazione dell'appendice attraverso la porta ombelicale ed appendicectomia tradizionale, con legatura del meso appendicolare e confezionamento di borsa di Tabacco. Tale tecnica ha consentito comunque l'esplorazione di tutta la cavità addominale prima dell'appendicectomia, nonché una invasività chirurgica estremamente ridotta.

Da tale esperienza gli autori ritengono che:

- in caso di flogosi acuta dell'appendice con angolo ileo-cieco colico mobile, sia indicato procedere ad appendicectomia "one - Trocar" con estrazione dell'appendice attraverso la porta ombelicale.
- in caso di cieco o meso fisso alla doccia parietocolica dx, sia indicato procedere a liberazione delle aderenze del cieco ed eventuale preparazione del meso appendicolare per via laparoscopica con posizionamento di secondo Trocar, ed appendicectomia esterna attraverso la porta ombelicale.
- in caso di flogosi severa del verme appendicolare, con eventuali segni di peritonite, sia indicato proseguire la tecnica con posizionamento di altri due Trocars ed appendicectomia per via laparoscopica.

### LA CHIRURGIA LAPAROSCOPICA DEL COLON IN ETA' PEDIATRICA

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Introduzione - La chirurgia laparoscopica del colon in età pediatrica è stata proposta sin dal 1994 per il trattamento delle patologie congenite nel bambino. Presentiamo la nostra esperienza preliminare nel trattamento videochirurgico della malattia di Hirschsprung (mdH) e delle malformazioni anorettali (mar).

Pazienti e metodi - Dal dicembre 2000 al dicembre 2001 abbiamo trattato in laparoscopia 6 bambini affetti da malformazioni congenite del colon. 5 pazienti con mdH, età media 16.1m (intervallo 6g-5a), maschi/femmine=3/2, (diagnosi radiologica e istologica tramite biopsia rettale per suzione o chirurgica) sono stati sottoposti a laparoscopia e a biopsie intestinali sieromuscolari multiple per esame estemporaneo; 2 pazienti con aganglia rettosigmoidea e 1 con aganglia rettale sono stati quindi sottoposti ad abbassamento colico in un tempo sec Soave-Georgeson; mentre nei 2 neonati con aganglia colica sinistra è stata praticata trasversostomia ad ansa. Un paziente con mar alta e fistola retto-uretrale è stato sottoposto a colostomia alla nascita ed abbassamento sec Georgeson ed anoplastica a 4 mesi.

Risultati - I 3 pazienti sottoposti ad abbassamento colico in un tempo hanno defecazioni regolari, ano di calibro normale, eccellente risultato estetico. I due neonati con aganglia colica sinistra sottoposti a colostomia sono in attesa di raggiungere dimensioni adeguate per essere sottoposti all'intervento definitivo. Il bambino con mar ha ano di morfologia e calibro regolare.

Conclusioni - Anche dalla nostra esperienza preliminare emerge che la chirurgia laparoscopica consente di trattare la mdH e alcune mar con minore invasività rispetto alla chirurgia convenzionale e con risultati estetici e funzionali eccellenti.

### STUDIO COMPARATIVO SULLA FORMAZIONE DI ADERENZE INTRAPERITONEALI DOPO LAPAROSCOPIA E DOPO CHIRURGIA OPEN

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Scopi: La formazione di aderenze intraperitoneali rappresenta una delle complicanze più temibili della chirurgia a cielo aperto. La laparoscopia per la sua natura miniinvasiva sembra ridurre notevolmente questa complicanza.

Metodi: Per determinare la reale incidenza della formazione di aderenze dopo laparotomia, rispetto alla laparoscopia, gli autori hanno esaminato i dati clinici ed i videofilmati di 55 pazienti operati in laparoscopia, i quali nei 3 anni precedenti avevano già subito un intervento in laparotomia[28] od in laparoscopia[27].

L'indicazione al primo intervento è stata variabile nei due gruppi. 5 dei 28 pazienti operati in laparotomia presentavano dolori addominali ricorrenti.

Risultati: Dei 27 pazienti operati la prima volta in laparoscopia, solo 5 (18%) presentavano delle aderenze tra le anse intestinali e/o l'epiploon e la parete addominale, ma nessuno presentava aderenze tra le anse. Al contrario nel gruppo operato in laparotomia, 24/28 pazienti (85%) presentavano delle aderenze tra anse e/o epiploon e la parete addominale, e 26/28 (92.8%) presentavano aderenze tra le anse intestinali.

Conclusioni: Sulla base della nostra esperienza preliminare, e sulla base di un'accurata review della letteratura, gli autori ritengono che la laparoscopia comparativamente alla laparotomia riduce notevolmente l'incidenza di aderenze post chirurgiche e le loro conseguenze.

### CONTINUOUS THORACIC EPIDURAL ANESTHESIA IN PEDIATRIC THORACOSCOPIC SURGERY

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Introduction. Pediatric regional anesthetic techniques have gained interest and their use is constantly growing. Thoracic epidural block is not frequently performed in the pediatric population, but the increasing interest and diffusion of minimally invasive procedures in children lead



to a new interest in these techniques.

We report of our anesthetic protocol for pediatric thoracoscopic surgery.

**Methods** 15 continuous thoracic epidural blocks were performed in children undergoing thoracoscopic surgery for different diseases (see table 1). Median age was 5 years (range 6 months-9 years). Median body weight was 13.5 Kg (range 7-25 Kg).

Atropine at the dose of 0.01 mg/Kg and Midazolam at the dose of 0.5 mg/Kg was administered as preoperative medication by endorectal route.

In the operating room the epidural block was performed under general anesthesia and the tip of the epidural catheter was positioned up T3-T4. Ropivacaina 0.2% at the dose of 0.5 ml/Kg was injected in patients less than one year of age, patients over one years of age received Ropivacaina 0.375% at dose of 0.25 ml/Kg, 90 minutes later a halfdose of the starter was administered. General anesthesia was maintained with Sevoflurane 1.5% in air/O<sub>2</sub> and muscle relaxants boli. Postoperative analgesia was performed for 48 hours via an epidural continuous infusion of Ropivacaine 0.2% at the dose of 0.3 mg/Kg/h.

**Results** Epidural anesthesia was successful in all patients. Postoperative analgesic therapy was adequate and patients did not need any additional drugs. All the patients were extubated at the end of the procedures. We did not registered postoperative complications.

**Conclusions** Thoracic epidural anesthesia is a safe and efficient technique if performed by skilled anesthesiologists. Postoperative continuous epidural infusion in adequate doses prevent pain and improves outcome.

DESEASES	SURGICAL PROCEDURES
10 PLEURAL EFFUSION	DECORTICATION
2 CHILOTHORAX	PLEURECTOMY
3 PNEUMOTHORAX	PLEURECTOMY + RESECTION OF PLEURAL BLEBS BY ARGON BEAM

## I COSTI DELLA CHIRURGIA LAPAROSCOPICA PER LA MALATTIA DA REFLUSSO GASTROESOFAGEO

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**Introduzione:** Scopo dello studio è dimostrare la riduzione dei costi nel trattamento, con tecnica laparoscopica, dei pazienti pediatrici affetti da malattia da reflusso gastro-esofageo (RGE) primitiva.

**Materiali e metodo:** Lo studio comprende i pazienti sottoposti ad intervento di plastica antireflusso nel periodo 1/93-12/00. Indicazione all'intervento era RGE primitivo non rispondente a terapia medica protratta; criteri di esclusione erano l'età inferiore all'anno o superiore ai 14 anni, e/o le patologie neurologiche concomitanti. Tutti i pazienti nel preoperatorio sono stati studiati tramite Rx transito gastro-intestinale, phmetria esofagea a doppio canale delle 24 ore, endoscopia esofago-gastrica, e manometria esofagea. I bambini sono stati suddivisi in due gruppi, entrambi sottoposti a funduplicatio a 360°. Nel primo gruppo, 17 pazienti sono stati operati tramite una laparotomia xifo-ombelicale nel periodo gennaio 1993 - dicembre 1997. Nel secondo gruppo, 49 pazienti sono stati operati con approccio laparoscopico nel periodo novembre 98 - dicembre 00. I dati clinici intraoperatori e postoperatori sono stati valutati. Tutti i pazienti hanno avuto controlli a 7, 30, 90, e 180 giorni. La valutazione dei costi (tempo di sala operatoria, dello strumentario, della degenza e della somministrazione di farmaci) è stata fatta individualmente.

**Risultati:** L'età media dei pazienti era 5 anni nel gruppo 1 e 6.3 anni nel 2; il peso medio 28 kg e 25 kg. Il tempo medio d'intervento è stato 100 minuti (75-120) nel gruppo 1 e 78 (40-150) nel gruppo 2. Non vi sono state complicanze maggiori. Nelle prime 24 ore postintervento il dolore ha richiesto trattamento farmacologico in tutti i pazienti del gruppo 1 ed in 1 del gruppo 2. Questi pazienti hanno necessitato di solo una dose di analgesico in 24 ore contro le sei dosi necessarie in 48 ore per i pazienti del gruppo 1 ( $p < 0.05$ ). La rialimentazione è iniziata dopo 96 ore per il gruppo 1 e dopo 10 ore per il gruppo 2 ( $p < 0.05$ ). I bambini del gruppo 1 hanno ricominciato a giocare dopo 5 giorni e l'ospedalizzazione media è stata di 7 giorni (5-11), mentre quelli del gruppo 2 hanno ricominciato a giocare nella prima giornata postintervento e la degenza media è stata di 2 giorni (2-20) ( $p < 0.05$ ). Tutti i pazienti hanno avuto lo stesso "Diagnosis Related Group" (DRG 156) e il rimborso regionale all'ospedale è stato di 5009 Euro per ogni paziente. I costi intraoperatori erano aumentati dallo strumentario riutilizzabile: 1 forbice (641 Euro), 2 portagli (1195 Euro), 2 pinze (1374 Euro), 1 aspiratore (492 Euro), 1 uncino (198 Euro), 4 ports (601 Euro), e per l'utilizzo della colonna video e del sistema d'insufflazione al costo di 25000 Euro totale. Il costo legato all'utilizzo della sala operatoria era simile per entrambi i gruppi (open 87 Euro, laparo 62 Euro). L'aumento totale per ognuno dei 49 pazienti è stato 500 Euro. I costi postintervento erano direttamente correlati alla durata dell'ospedalizzazione e sono stati significativamente maggiori nel gruppo operato con tecnica open (media ricovero 7 giorni contro 2  $p < 0.05$ ). Il costo del processo di apprendimento, inteso come curva di apprendimento, stage di formazione, corsi e sperimentazione su animali, non sono stati considerati.

**Discussione:** L'approccio laparoscopico è caratterizzato da riduzione della morbilità e dei problemi connessi all'invasività, da migliore risultato finale grazie ad un rapido ritorno alle normali attività e da una riduzione del costo globale.

## EFFETTI DELLA LAPAROSCOPIA SULL'IMMUNITÀ LOCALE INTRAPERITONEALE. STUDI SPERIMENTALI.

Romeo C, Antonuccio P, \*Altavilla D, Impellizzeri P, \*Passaniti M, Turiaco N, Cifalà S e Gentile C

*Dipartimento di Scienze Pediatriche Mediche e Chirurgiche, U.O. di Chirurgia Pediatrica Miniinvasiva \*Dipartimento di Medicina Clinica e Sperimentale e Farmacologia, Sez. di Farmacologia*

**Obiettivi.** Valutare l'effetto del pneumoperitoneo sulla immunità locale peritoneale attraverso lo studio dell'attività dei macrofagi.

**Metodi.** Sono stati utilizzati ratti suddivisi in 3 gruppi: a) solo anestesia per 60', controllo; b) laparotomia, per 60'; c) pneumoperitoneo con CO<sub>2</sub> alla pressione di 4-6 mmHg sempre per 60'. I macrofagi peritoneali (MP) sono stati prelevati dopo 24 hr. Lo studio comprende la



produzione di nitriti/nitrati (NOx) e l'espressione del mRNA dell'Ossido nitrico sintetasi (iNOS) nei MP in condizioni basali e dopo stimolo con Lipopolisaccaride (LPS).

Risultati. La produzione basale di NOx era significativamente più alta nel gruppo laparoscopia rispetto alla laparotomia e al controllo. Di contro la stimolazione con LPS aumentava significativamente la produzione di NOx nel gruppo laparotomia e controllo, rispettivamente del 200% e del 221%, mentre era significativamente ridotta negli animali sottoposti a laparoscopia (45%) ( $p < 0.01$ ). Analogamente l'espressione del mRNA per la iNOS era significativamente più alta nel gruppo laparoscopico in condizioni basali ma dopo stimolazione questa espressione aumentava del 102% e del 125% nel gruppo laparotomico e controllo raggiungendo solo il 51% nel gruppo laparoscopico ( $p < 0.01$ ).

Conclusioni. La risposta immunitaria di base nei MP dopo laparoscopia è superiore rispetto alla laparotomia. La stimolazione con LPS, però, comporta una minore produzione di NOx ed una ridotta attivazione di iNOS rispetto al gruppo laparotomia. I MP dopo laparoscopia sarebbero quindi meno reattivi a rispondere ad uno stimolo flogistico nel post-operatorio.

#### EFFETTI DELLA INSUFFLAZIONE DI CO2 ED ARIA SUL PERITONEO: STUDIO SPERIMENTALE.

Noviello C., Vessella A.

DIPARTIMENTO DI PEDIATRIA - CHIRURGIA PEDIATRICA - Napoli

Le tecniche laparoscopiche prevedono l'induzione di un pneumoperitoneo, che si ottiene insufflando CO2 in addome. Recenti studi riportano l'effetto dannoso sul peritoneo esercitato da tale gas. Questo lavoro sperimentale si propone di verificare l'effetto dell'anidride carbonica e dell'aria ambientale sul peritoneo di ratti prepuberi.

Materiali e metodi: 30 ratti Spraug-Doley prepuberi divisi in modo random in 3 gruppi: S1 (n° 18, pneumoperitoneo con CO2), S2 (n° 7, pneumoperitoneo con aria), C1 (n° 5, solo anestesia), sacrificati a 2 h e 24 h dall'induzione dell'anestesia generale (ketamina: 10 mg/kg). Il pneumoperitoneo è stato tenuto per 30' ad una pressione di 10-12 mmhg.

Risultati: non è stata notata nessuna alterazione macroscopica tra i vari gruppi. Nei ratti S1 sacrificati dopo 2 h si osservava, a carico del peritoneo parietale, un modico infiltrato di cellule infiammatorie (granulociti eosinofili e mastociti). Nel peritoneo viscerale, oltre all'infiltrato infiammatorio, era caratteristico l'aspetto delle cellule mesoteliali (cubiche, con nucleo ben evidente e citoplasma vacualizzato). Nel gruppo S2 sacrificati a 2 h l'infiltrato di cellule infiammatorie sembrava essere più consistente. Nel ratti S1 sacrificati a 24 h si osservavano anche macrofagi, linfociti ed aspetti reattivi del mesotelio. I vasi peritoneali erano congesti. Tutte queste lesioni erano più accentuate nel gruppo dei ratti S2 sacrificati dopo 24 h, mentre non erano presenti nei ratti C1 sacrificati a 2h e 24 h.

Conclusioni: la presenza di lesioni simili sia nel gruppo S1 che S2 depone per un meccanismo fisico piuttosto che chimico dei due gas sul peritoneo dei ratti. Questo limita le indicazioni laparoscopiche a quei pazienti che non abbiano già in atto una sofferenza peritoneale, e induce ad un maggiore sviluppo delle tecniche gasless anche nei pazienti pediatrici.





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## Appendix A: Index of Abstracts - By Author

### A

Aceti, M.G.R. [24]  
 Aceti, M.R.G. [20]  
 Acierno, C. [21]  
 Albanese, Craig [24]  
 Al-Bassam, Abdulrahman [35]  
 Alberti, Daniele [58]  
 Aldridge, R. [45]  
 Allal, H. [32], [39]  
 Allal, Hossein [49]  
 Al-Mashat, N. [38]  
 Almohaidly, M. [28], [46]  
 Altavilla, D. [70]  
 Alvarez Muñoz, V. [56]  
 Amici, G. [25], [43], [45]  
 Amoroso, S. [21]  
 Antonellini, C. [64]  
 Anton-Pacheco, Juan [28]  
 Antón-Pacheco, Juan [57]  
 Antonuccio, P. [70]  
 Arai, Mari [21], [37]  
 Auner, Greg [51]  
 Avtan, Levent [51]

### B

Bachmann de Santos, Mariana [36]  
 Bahr, M. [29], [42]  
 Bailey, Deborah [49]  
 Bailez, M. [33], [42]  
 Banever, Gregory [52]  
 Banks, Russell [47]  
 Bariani, Cesar [35]  
 Barion, U. [67]  
 Bartoli, F. [41]  
 Bartsch, Leah [43]  
 Bawab, F. [39]  
 Bax, Klaas [21]  
 Bax, N. [31], [32], [39]  
 Bealer, JF [20]  
 Bealer, John [25]  
 Becmeur, F. [32], [39]  
 Beltrán, Jorge [36]  
 Benavent, Maribel [28], [49]  
 Benhammou, M. [58]  
 Bensard, Denis [23]  
 Benvenuti, S. [36], [62], [63], [66]  
 Berchi, F. [32], [39]  
 Berchi, Francisco [28], [48], [49], [57]  
 Bertani, Alessandro [58]  
 Bertozzi, M. [63], [64], [65]  
 Betalli, Pietro [65]  
 Bianchi, M. [54]  
 Bignon, Horacio [19], [52], [59]  
 Bliss, David [47]  
 Borsellino, Alessandro [69]  
 Borwankar, Shyam [53]  
 Borzi, P. [30]  
 Borzi, Peter [27], [49]  
 Boulanger, Scott [36]  
 Braga, F. [22], [36], [40], [61], [62], [63], [66]  
 Bregante, Juan [57]  
 Brisseau, G. [48]  
 Brisseau, Guy [20], [21], [36], [39]

Brisson, Paul [41]  
 Brito, Patricia [35]  
 Broggi, Giuseppe [43]  
 Brown, Rob [53]  
 Buehligen, Ulf [50]  
 Burke, Mark S. [21]  
 Bywater, David [47]

### C

Caillot, Daniel [23]  
 Caione, P. [64]  
 Caione, Paolo [29]  
 Campus, R. [70]  
 Canavese, F. [20], [54]  
 Canazza, L. [61], [69]  
 Cano, Indalecio [49]  
 Capozza, N. [64]  
 Capozza, Nicola [29]  
 Carfagna, L. [38]  
 Carfagna, L. [28], [46]  
 Cargill, Guillaume [23]  
 Carlini, C. [70]  
 Cartal, M. [53]  
 Castagnetti, M. [22]  
 Caty, M. [48]  
 Caty, Michael [20], [21], [36], [39]  
 Centonze, Antonella [69]  
 Ceriati, Emanuela [43]  
 Chahine, A. Alfred [23]  
 Chang, J [20]  
 Chang, Jack [25]  
 Cheli, M. [62]  
 Cheli, Maurizio [58], [69]  
 Cholewa, D. [54], [59]  
 Cifalà, S. [70]  
 Clarizia, Sergio [69]  
 Clarke, Simon [36]  
 Cobellis, G. [24], [25], [32], [43], [50], [69]  
 Cohen, Zahavi [30]  
 Colusso, Mara [58]  
 Cosgriff, Ned [25]  
 Courtney, Richard [52]  
 Crea, Gastone [23]  
 Crocetti, Rosemary [35]  
 Cruccetti, A. [25], [43], [50], [69]  
 Cuadros, Jesus [28], [57]  
 Curran, Tom [47]  
 Cutrone, C. [67], [68]

### D

D'Alessio, A. [62]  
 Damiano, Rocco [69]  
 Darani, Alexandre [52]  
 De Biagi, L. [65]  
 De Peppo, Francesco [43]  
 Debacker, A. [32]  
 DeGrazia, E. [21]  
 Del Monaco, C. [45]  
 DePrevide, D. [63]  
 Derosas, F. [66], [67], [68]  
 Devanir, José [55]  
 Di Benedetto, V. [33]  
 Di Benedetto, Victor [52]  
 Di Rovasenda, E. [64]  
 Díaz, R. [38]  
 DiLollo, Simonetta [63]  
 DiPace, M. [21]  
 Dixey, Laramie [19]  
 Domini, M. [63], [64], [65]



Donaldson, Sarah [43]  
 Dronov, A. [38]  
 Duarte, Gabriela [59]  
 Durand, C. [53]  
 Dyon, J. [53]  
 Dzakovic, Alexander [19]

## E

Eder, H. [48]  
 Ekema, G. [22], [36], [40], [61], [62], [63], [66]  
 Ekingen, Gulsen [51]  
 Elmalik, K. [39]  
 Elmo, G. [33]  
 Elmo, Gaston [19], [28], [52], [59]  
 Endo, Masao [43]  
 Esparza, Javier [48]  
 Esposito, C. [24], [27], [32], [41], [62]  
 Esposito, Ciro [69]  
 Esposito, G. [27]  
 Esteves, Edward [35], [55]  
 Ettayebi, Fouad [58]

## F

Falchetti, D. [22], [24], [36], [40], [61], [62], [63], [66]  
 Falquier, Sabrina [23]  
 Farmer, Diana [24]  
 Fauza, Dario [19]  
 Fava, G. [69]  
 Feins, Neil [41]  
 Ferretti, S. [64]  
 Ferrucci, E. [40]  
 Fleischman, Lawrence [51]  
 Forgues, Dominique [49]  
 Fuchs, Julie [19]  
 Fujishiro, Jun [21], [37]

## G

Gabra, H. [50]  
 Gabra, Hany [47]  
 Galifer, René Benoît [49]  
 Galiotto, M. [66], [68]  
 Gamba, PierGiorgio [65]  
 Gan, Yao [37]  
 Ganey, Michael [52]  
 Garcia, Araceli [49], [57]  
 García-Aparicio, Luis [30]  
 Garrone, C. [20]  
 Garzi, A. [40]  
 Gatto, M. [46]  
 Geissler, G. [56]  
 Gentile, C. [70]  
 Georgeson, Keith [40]  
 Georgeson, Ketih [26]  
 Gesmundo, R. [20], [54]  
 Giannotta, Antonio [63]  
 Giard, Hervé [45]  
 Giest, H. [59]  
 Glick, P. [48]  
 Glick, Philip [20], [21], [36], [39]  
 Godbole, P. [44]  
 Gollin, Gerald [26]  
 Gomasca, A. [69]  
 Gorsler, C. [44]  
 Gössler, Roswitha [31]  
 Gres, Pascal [49]  
 Grewal, Harsh [58]  
 Guibal, Marie Pierre [49]  
 Gunaltay, Necati [51]  
 Gutierrez, V. [42]

Gutmann, Anton [31]  
 Guvenc, B. Haluk [51]

## H

Haddad, Munther [22], [36]  
 Halsband, H. [44]  
 Harmon, Carroll [26], [40]  
 Harrison, Michael [24]  
 Heloury, Y. [32], [39]  
 Herreman-Suquet, Karen [23]  
 Hinojosa, José [48]  
 Holcomb, George [24]  
 Hollands, Celeste [19]  
 Höllwarth, Michael [31]  
 Hoover, J. [56]  
 Houseknecht, Eileen [31]  
 Huebner, U. [44]

## I

Imaizumi, Satohiko [21], [37]  
 Impellizzeri, P. [70]  
 Ishibashi, H. [54]  
 Iwanaka, Tadashi [21], [37]

## J

Jacquier, C. [53]  
 Jasonni, V. [22], [24], [27], [70]  
 Jesus Muñoz, Maria [48]  
 Jiansheng, Liang [37]  
 Juliá, Victoria [30]  
 Justin, Christiana [31]

## K

Kabeer, Mustafa [51]  
 Kane, Timothy [40]  
 Kapuller, Vadim [30]  
 Kashid, Yatindra [53]  
 Kaviani, Amir [19]  
 Kawashima, Hiroshi [21], [37]  
 Kenyon, Trudy [47]  
 Keys, Charles [37]  
 Klein, Michael [51]  
 Knudtson, Jason [58]  
 Kolberg-Schwerdt, A. [24]  
 Konefal, Stanley [52]  
 Korkmaz, Mevlit [51]  
 Korman, L. [33]  
 Korn, St [29]  
 Korn, St. [42]  
 Krishnasamy, Selvarajan [44]  
 Kubota, Akio [59]  
 Kudou, Sumi [21], [37]  
 Kumar, Rajendra [27]  
 Kurschel, S. [48]

## L

La Cava, Gregorio [69]  
 La Riccia, A. [20]  
 Lalla, M. [64]  
 Langenburg, Scott [51]  
 Lavor, Stella [40]  
 Lee, Hanmin [24]  
 Lee, K. [55]  
 Leggio, S. [22], [41]  
 Lelli Chiesa, P. [62]  
 Lemb, M. [38]  
 Lembo, M. [28], [46]  
 Lempe, M. [24]  
 Leva, E. [61], [69]



Levitt, M. [48]  
 Levitt, Marc [20], [21], [36], [39]  
 Li, M. [55]  
 Libor, Janecek [37]  
 Libri, M. [63], [65]  
 Lima, M. [24], [27], [32], [39], [62], [63], [64], [65]  
 Liu, K. [55]  
 LiVoti, G. [21]  
 Lobe, Thom [56]  
 LoCascio, M. [21]  
 Locatelli, Bruno [69]  
 Locatelli, Chiara [69]  
 Locatelli, Giuseppe [58]  
 Lohse, R. [39]  
 Lonati, L. [20], [54]  
 Lopez, Manuel [49]  
 Lovvorn, Harold [56]  
 Lyman, William [51]

## M

Mackay, Athol [27]  
 MacKinlay, G. [35], [45]  
 MacKinlay, Gordon [25], [32], [37], [47], [56], [59]  
 Mackinnon, A. [47]  
 Maddenini, Shaker [23]  
 Marchetti, Paola [43]  
 Marina, Neyssa [43]  
 Martelli, Helène [25]  
 Martínez Ferro, Marcelo [19], [28], [52], [59]  
 Martínez-Almoyna Rullán, C. [56]  
 Martino, A. [25], [43], [50], [69]  
 Marven, S. [39], [50]  
 Marven, Sean [47]  
 Mastoianni, L. [24]  
 Mastroianni, L. [25], [32], [43], [50], [62], [69]  
 Matarazzo, E. [64]  
 Mattei, R. [65]  
 Mattei, Roberto [62]  
 Mattioli, G. [22], [24], [27], [32], [62], [70]  
 Mazzola, C. [70]  
 Mendoza-Sagaon, Mario [23], [52]  
 Messina, M. [24], [27], [40], [62]  
 Messineo, Antonio [63], [65]  
 Meyer-Junghaenel, L. [39], [54]  
 Micali, F. [64]  
 Micali, S. [64]  
 Milan, G. [46]  
 Milas, Zvonimir [35]  
 Milianti, S. [36]  
 Millar, Alastair [53]  
 Miller, Kelly [24]  
 Minocha, Ashish [22]  
 Mirri, L. [66], [67], [68]  
 Monai, Margherita [63]  
 Monguzzi, G. [27], [61], [62], [69]  
 Montinaro, L. [24], [27], [41], [62]  
 Montobbio, G. [22]  
 Montupet, Philippe [23], [25]  
 Moog, R. [32]  
 Moores, Donald [26]  
 Morales, Luis [30]  
 Morelli, B. [22], [36], [40], [61], [62], [63], [66]  
 Moretti, L. [38]  
 Moriarty, Kevin [52]  
 Morino, M. [20]  
 Mott, Rachel [57]  
 Moudar, Mahfoud [49]  
 Mulet, Jaume [57]  
 Muñoz, Angel [48]

Munro, F. [35], [45]  
 Munro, Fraser [25], [32], [37], [56], [59]  
 Muratore, Christopher [19]  
 Muzz, G. [25]

## N

Naar, David [41]  
 Najmaldin, A. [44]  
 Nance, Michael [31]  
 Nano, Therese [49]  
 Narne, S. [66], [67], [68]  
 Neri, Anna Silvia [65]  
 Neto, Eriberto [55]  
 Neumann, C. [24]  
 Ngerncham, Monowat [40]  
 Niewold, T. [31]  
 Noccioli, B. [65]  
 Noccioli, Bruno [62]  
 Nogami, Takashi [23], [59]  
 Noordam, Cees [55]  
 Nose, Keisuke [23], [59]  
 Noviello, C. [45], [71]  
 Nugues, F. [53]  
 Numanoglu, Alp [53]

## O

Ohshita, M. [54]  
 Ohyanagi, Harumasa [23], [59]  
 Oliveira, Elecy [35]  
 Orizio, P. [22], [40], [61]  
 Ottaiano, Miguel [55]

## P

Pai, M. [44], [51]  
 Pai, M.G. [28]  
 Pampaloni, A. [65]  
 Pampaloni, Angiolino [63]  
 Pampaloni, F. [65]  
 Pampaloni, Federico [62]  
 Pansini, A. [69]  
 Pansini, L. [61], [69]  
 Pappalepore, N. [32], [62]  
 Papparella, A. [32], [45], [62]  
 Paradies, G. [41]  
 Parmeggiani, P. [32], [45]  
 Partrick, David [23]  
 Pasquier, D. [53]  
 Passaniti, M. [70]  
 Patankar, Jahoorahmad [53]  
 Patel, Haroon [41], [57]  
 Pavel [29]  
 Pedersini, P. [40]  
 Pelizzo, Gloria [63]  
 Pelusi, G. [63]  
 Pereira, Ruy [55]  
 Philippe, P. [32], [39]  
 Piaggio, Lisandro [28]  
 Pignata, Giusto [63]  
 PiniPrato, A. [22], [70]  
 Pintus, C. [27]  
 Piolat, C. [53]  
 Pisani, A. [42]  
 Poddoubnyi, I. [38]  
 Podestà, E. [64]  
 Polliotto, S. [38]  
 Poplauski, Maurice [23]  
 Porreca, A. [63]  
 Porreca, Aurelio [19]  
 Portela, Elena [49]



Presbury, Gerald [56]  
 Presenti, Luigi [62]

## Q

Qingtang, Yang [37]  
 Quiros, D. [38]

## R

Ramadwar, Ravindra [22], [36]  
 Ramalingam, M. [28], [44], [51]  
 Ramalingam, Manickam [44], [45]  
 Ramos, Lina [56]  
 Randisi, Francesco [43]  
 Ratta, A. [65]  
 Rauf Khan, Abdul [35]  
 Reinberg, O. [32], [39]  
 Reinberg, Olivier [25], [52]  
 Repetto, L. [46]  
 Repetto, P. [22], [70]  
 Ribó, Josep [30]  
 Riccipetiotoni, G. [27]  
 Riccipetioni, G. [20]  
 Rieu, Paul [55], [60]  
 Rivosecchi, Massimo [43]  
 Robert, M. [32], [39]  
 Roberts, J. [47]  
 Rode, Heinz [53]  
 Rodríguez, J. [42]  
 Rogon, Jacek [48]  
 Romeo, C. [70]  
 Rossi, L. [43]  
 Rothenberg, Steven [20], [25]  
 Rovira, Jordi [30]  
 Rozenblit, Grigori [23]  
 Ruggeri, G. [63], [64], [65]

## S

Sabharwal, Atul [25]  
 Sachs, Barry [52]  
 Saetti, R. [66], [67], [68]  
 Salakos, C. [32]  
 Salakos, Christos [45]  
 Salti, Roberto [65]  
 Salucci, P. [22], [61]  
 Santoro, R. [67], [68]  
 Saxena, A. [54]  
 Saxena, Amulya [57]  
 Scarsi, P. [64]  
 Schaarschmidt, K. [54]  
 Schaarschmidt, Klaus [24], [57]  
 Schier, F. [29], [32], [42]  
 Schleef, J. [32], [48], [54]  
 Schleef, Jürgen [57]  
 Schleef, Jürgen [31]  
 Schropp, Kurt [56]  
 Schwindak, C. [35]  
 Selvarajan, K. [28], [44], [51]  
 Selvarajan, Krishnasamy [45]  
 Senel, Ufuk [51]  
 Settimi, A. [27], [62]  
 Severijnen, Rene [55], [60]  
 Shah, Hemanshi [53]  
 Sihoe, J. [55]  
 Silvestrini, M. [66], [68]  
 Silvestrinim, M. [67]  
 Simms, Carrie [19]  
 Slim, Michel [23]  
 Smirnov, A. [38]  
 Smith, Baird [43]

Smith-Whitley, Kim [31]  
 Solana, J. [42]  
 Sozubir, Selami [51]  
 Sprigg, A. [50]  
 Stafford, Perry [31]  
 Staltari, J. [38]  
 Stefanutti, Giorgio [65]  
 Stellin, Giovanni [65]  
 Steyaert, H. [28], [38], [46]  
 Stockenhuber, Andrea [31]  
 Stranieri, G. [32]  
 Strom, Karl [23]  
 Swanström, Lee [47]  
 Sydorak, Roman [24]

## T

Tadini, B. [46], [54]  
 Takehara, H. [54]  
 Tam, P. [55]  
 Tam, Y. [55]  
 Tantoco, J. [20], [21], [48]  
 Tantoco, Joselito [39]  
 Tarrado, Xavier [30]  
 Tashiro, S. [54]  
 Tashjian, David [52]  
 Tekie, F. [63]  
 Thomas, W. [50]  
 Thompson, John [19]  
 Thompson, Lewis [47]  
 Thourani, Vinod [41]  
 Tirabassi, Michael [52]  
 Tonegatti, L. [36], [62], [66]  
 Torre, M. [70]  
 Torri, F. [22], [36], [40], [61], [62], [63], [66]  
 Tozzini, Silvia [62]  
 Tramontano, A. [19], [63]  
 Tsao, Kuojen [24]  
 Tugay, Melih [51]  
 Tuma, Jiri [29]  
 Turiaco, N. [70]  
 Tuzlaci, Ayse [51]

## U

Ubertazzi, M. [62], [66]  
 Ukiyama, Etsuji [43]  
 Ure, B. [31]

## V

Valeri, A. [65]  
 Valeri, Andrea [62]  
 Valla, J. [38], [46]  
 Valla, J.S. [39]  
 van Baren, Robertine [26]  
 van der Staak, Frans [55], [60]  
 Van Der Zee, D. [31]  
 van der Zee, David [21]  
 Van Essen, G. [31]  
 Van Gemert, Wim [26]  
 Vanderzee, D. [32], [39]  
 Varlet, F. [39]  
 Vasudevan, Sanjeev [41]  
 Verney, Yvelise [45]  
 Vessella, A. [45], [71]  
 Vida, Vladimiro [65]  
 Videla Rivero, L. [42]  
 Viglioco, J. [42]  
 Vittinghoff, Maria [31]  
 von Allmen, Daniel [31]



**W**

Waldschmidt, J. [39], [54], [59]  
Walker, J. [50]  
Wang, Winfred [56]  
Watson, Kenneth [19]  
Watts, Adam [32]  
Wells, Paul [47]  
Wijnen, Marc [55], [60]  
Wijnen, Rene [55], [60]  
Wilcox, Jason [56]  
Wilkinson, A. Graham [47]  
Willetts, I. [39], [47]  
Willital, G. [54]  
Willital, Gunter [57]  
Wilson, Jay [19]  
Wulkan, Mark [35], [41]

**Y**

Yagi, Makoto [23], [59]  
Yagmurlu, Aydin [26]  
Yamauchi, Katsuji [23], [59]  
Yaroustovsky, P. [38]  
Yeung, C.K. [30], [55]  
Yip, P. [55]  
Yntema, Bart-Jan [60]  
Yoshida, Fumiko [43]  
Yoshida, Hideki [23], [59]  
Yuzhou, Li [37]

**Z**

Zagordo, L. [40]  
Zamparelli, M. [25], [43], [50], [69]  
Zangari, A. [25]  
Zerhau, Pavel [29]  
Ziegler, Moritz [19]  
Zoia, E. [61]



## Appendix B: Index of IPEG Abstracts - By Topic

### CANCER

- LAPAROSCOPIC RESECTION OF PARARENAL TUMOURS [35]
- LAPAROSCOPIC STAGING FOR HODGKIN'S DISEASE IN CHILDREN [35]

### COLON/BOWEL

- EXPERIENCES ON 19 CASES LAPAROSCOPE-ASSISTED SWENSON OPERATION [37]
- IS LAPAROSCOPY SAFE AFTER MAJOR BLUNT TRAUMA OF THE ABDOMEN IN CHILDREN? [38]
- LAPAROSCOPIC ADRENALECTOMY IN CHILDREN [24]
- LAPAROSCOPIC APPENDICECTOMY - A SUITABLE CASE FOR THE TRAINEE? [25]
- LAPAROSCOPIC ASSISTED SURGERY FOR CROHN'S DISEASE [26]
- LAPAROSCOPIC CECOSTOMY BUTTON PLACEMENT FOR MANAGEMENT OF FECAL INCONTINENCE IN CHILDREN [26]
- LAPAROSCOPIC DRAINAGE AND EXCISION OF INTRA-ABDOMINAL CYSTS [37]
- LAPAROSCOPIC MECKEL'S DIVERTICULECTOMY [37]
- LAPAROSCOPIC PROCEDURES FOR MECKEL'S DIVERTICULUM PATHOLOGY IN CHILDREN [38]
- LAPAROSCOPIC RECTOPEXY - A NEW APPROACH IN CHILDREN [36]
- LAPAROSCOPY ASSISTED ANORECTAL PULL-THROUGH FOR RECTOCLOACAL FISTULA - A CASE REPORT [37]
- LAPAROSCOPY FOR INTESTINAL BLEEDING IN INFANCY [39]
- LAPAROSCOPY IN DISEASES INVOLVING THE GREATER OMENTUM [39]
- MINIATURE ACCESS CHAIT CECOSTOMY - A NEW APPROACH TO THE MANAGEMENT OF FECAL INCONTINENCE [39]
- OMENTAL INFARCTION IN CHILDREN - A TWISTED 'TAIL' OF A NOT SO INFREQUENT PROBLEM [36]
- ONE-TROCAR VIDEOASSISTED APPROACH TO MECKEL'S DIVERTICULUM IN CHILDREN [25]
- RETROPERITONEAL TUMOR TREATED BY LAPAROSCOPIC WAY [38]
- SURGICAL PROCEDURE FOR VIDEO-ASSISTED COLONIC PULL-THROUGH WITH SECTION OF INFERIOR MESENTERIC ARTERY [36]
- TWO-PORT VERSUS 3-PORT LAPAROSCOPIC APPENDECTOMY IN CHILDREN WITH UNCOMPLICATED APPENDICITIS [35]
- VIDEO-ASSISTED TREATMENT FOR A CASE OF ATRESIA DUODENAL [38]
- WHY PEDIATRIC SURGEONS CAN'T AFFORD NOT TO PERFORM LAPAROSCOPIC APPENDECTOMY [36]

### FOREGUT

- COMPLICATION AVOIDANCE IN MINIATURE ACCESS PYLOROMYOTOMY [20]
- ENDOSCOPIC SURGERY OF DIAPHRAGMATIC ANOMALIES - A MULTICENTRIC STUDY OF THE GROUPE D'ETUDE EN COELIOCHIRURGIE INFANTILE (GECI). PART 1 - POSTEROLATERAL HERNIAS (BOCHDALEK) AND EVENTRATIONS [39]
- ENDOSCOPIC SURGERY OF DIAPHRAGMATIC ANOMALIES - A MULTICENTRIC STUDY OF THE GROUPE D'ETUDE EN COELIOCHIRURGIE INFANTILE (GECI). PART 2 - MORGAGNI'S HERNIAS [32]
- FOLLOW-UP OF VLS TREATED GERD THROUGH A NEW PARAMETER - AREA UNDER H+ [40]
- FUNDOPLICATION IS RARELY NECESSARY FOLLOWING LAPAROSCOPIC GASTROSTOMY EXCEPT IN THE NEUROLOGICALLY-IMPAIRED CHILD [23]
- ITALIAN MULTICENTER SURVEY ON LAPAROSCOPIC GASTRO-ESOPHAGEAL REFLUX SURGICAL TREATMENT [24]
- LAPAROSCOPIC ASSISTED GASTRIC TRANSPOSITION IN INFANT- CASE REPORT [41]
- LAPAROSCOPIC CARDIOMYOTOMY WITHOUT FUNDOPLICATION FOR ACHALASIA CARDIA IN CHILDREN [22]
- LAPAROSCOPIC EXTRACTION OF A GIANT GASTRIC BEZOAR [20]
- LAPAROSCOPIC GASTROSCOPY ASSISTED VENTRAL THAL HEMIPLICATION AS REDO-PROCEDURE IN RECURRENT GASTROESOPHAGEAL REFLUX [24]
- LAPAROSCOPIC GASTROSTOMY TUBE PLACEMENT- IS THERE A BEST TECHNIQUE? [40]
- LAPAROSCOPIC INTERVENTION OF INTRA-THORACIC STOMACH IN INFANTS [23]
- NISSEN FUNDOPLICATION FOR RESPIRATORY SYMPTOMS [22]
- PRELIMINARY COMPARISON OF LAPAROSCOPIC VS. OPEN NISSEN FUNDOPLICATION IN PATIENTS WITH CONGENITAL HEART DISEASE [41]
- RECANALIZATION OF AN ESOPHAGEAL ATRESIA ANASTOMOSIS BY AN INTERVENTIONAL RADIOLOGICAL TECHNIQUE [23]
- THE LEARNING CURVE FOR LAPAROSCOPIC PYLOROMYOTOMY - IMPACT ON GENERAL SURGICAL RESIDENCY EXPERIENCE [41]
- THREE TROCARS NISSEN FUNDOPLICATION IN A CHILD WITH LIMITED ACCESS [40]
- VENTILATORY AND HEMODYNAMIC MODIFICATIONS DURING LAPAROSCOPIC FUNDOPLICATION [22]

### GENITO-URINARY

- A MINIMALLY INVASIVE APPROACH TO PELVI-URETERIC JUNCTION OBSTRUCTION IN CHILDREN. [47]
- AN ABSOLUTE CONTRA-INDICATION TO LAPAROSCOPIC FOWLER-STEPHENS PROCEDURE [45]
- AN AUDIT OF THE FIRST SEVEN YEARS EXPERIENCE IN EDINBURGH OF LAPAROSCOPIC LIGATION OF TESTICULAR VESSELS FOR VARICOCELE [45]
- COMBINED HISTEROSCOPIC AND LAPAROSCOPIC TREATMENT OF OBSTRUCTED UTERINE DUPLICATIONS [42]
- COMPARISON OF LAPAROSCOPIC AND OPEN NEPHRECTOMIES IN CHILDREN [29]
- DEXTRANOMER ENDOSCOPIC INJECTION FOR URINARY INCONTINENCE [29]
- DIAGNOSTIC LAPAROSCOPY IN RECURRENT ABDOMINAL PAIN IN CHILDREN - MILIARY T.B.ABDOMEN IN RARE CAUSE FOUND [44]
- ENDOSCOPIC TREATMENT OF VESICoureTERAL REFLUX IN CHILDREN - HAVE 505 PROCEDURES WITH COLLAGEN TM BEEN WORTHWHILE ? [44]





- HOW THE PROCESSUS VAGINALIS OBLITERATES [42]  
 HOW TO MANAGE THE VANISHING TESTIS DIAGNOSED LAPAROSCOPICALLY? RESULTS OF AN HISTOLOGICAL STUDY. [20]  
 INTRAVESICAL URETERAL REIMPLANTATION ACCORDING TO COHEN AND USING LAPAROSCOPIC TOOLS PRELEMINARY  
 EXPERIENCE IN CHILDREN [28]  
 LAPAROSCOPIC ANDERSON-HYNES PYELOPLASTY IN CHILDREN [29]  
 LAPAROSCOPIC APPROACH OF A CLOACAL ANOMALY ASSOCIATED WITH VAGINAL AGENESIS [42]  
 LAPAROSCOPIC CLOSURE OF PATENT PROCESSUS VAGINALIS AND TRANS-SCROTAL ORCHIOPEXY FOR UNDESCENDED  
 TESTIS [43]  
 LAPAROSCOPIC EXCISION OF A PROSTATIC UTRICLE IN A CHILD [47]  
 LAPAROSCOPIC MANAGEMENT OF IMPALPABLE TESTES - A MULTI-INSTITUTIONAL STUDY OF THE ITALIAN SOCIETY OF VIDEO  
 SURGERY IN INFANCY [32]  
 LAPAROSCOPIC NEPHROURETERECTOMY- A MODIFIED TECHNIQUE [44]  
 LAPAROSCOPIC OVARIAN TRANSPOSITION TO PRESERVE FERTILITY IN PEDIATRIC PATIENTS PRIOR TO PELVIC IRRADIATION  
 [43]  
 LAPAROSCOPIC PYELOURETEROSTOMY [44]  
 LAPAROSCOPIC SIGMOID VAGINAL REPLACEMENT [33]  
 LAPAROSCOPIC VERSUS OPEN NEPHRECTOMY IN PEDIATRIC POPULATION [30]  
 LUMBOSCOPY ASSISTED PYELOTOMY AND PYELOPLASTY IN CHILDREN [45]  
 MINI-LAPAROSCOPIC PALOMO'S PROCEDURE BY BIPOLAR COAGULATION FOR VARICOCELE IN CHILDREN AND  
 ADOLESCENTS [43]  
 NOVEL TECHNIQUE OF CYSTOLITHOTRIPSY FOR LARGE VESICAL CALCULUS IN CHILDREN [45]  
 ONE-TROCAR RETROPERITONEOSCOPIC VARICOCELECTOMY - OUR EXPERIENCE [43]  
 OUR EXPERIENCE IN THE MANAGEMENT OF PROBLEMS IN LAPAROSCOPIC PYELOPLASTY FOR HYDRONEPHROSIS IN  
 CHILDREN [28]  
 RETROPERITONEOSCOPIC PYELOPLASTY FOR PUJ OBSTRUCTION IN CHILDREN. 10 CASES WITH MORE THAN ONE YEAR OF  
 FOLLOW UP [46]  
 RETROPERITONEOSCOPIC RENAL SURGERY IN CHILDREN - OUR PRELIMINARY EXPERIENCE [46]  
 SEMINAL VESICLE CYST WITH IPSILATERAL RENAL AGENESIS  
 ANTENATAL DIAGNOSIS AND POST NATAL LAPAROSCOPIC EXCISION [46]

## INSTRUMENTATION

- AN OPERATING THEATRE BASED RADIO NETWORK FOR BROADCASTING LIVE ENDOSURGERY ON A HOSPITAL IT NETWORK  
 [47]  
 BIGGER ISN'T ALWAYS BETTER [21]  
 EFFICACY OF LAPAROSCOPIC MUSCLE STIMULATOR IN LAPAROSCOPY ASSISTED ANORECTAL PULL-THROUGH FOR HIGH  
 IMPERFORATE ANUS [21]  
 ERGONOMIC DIFFERENCES BETWEEN LAPAROSCOPIC INSTRUMENTS DESIGNED FOR PEDIATRIC PATIENTS VS ADULT  
 PATIENTS [47]  
 HAND-ASSISTED LAPAROSCOPIC COLECTOMY IN ADOLESCENTS [21]  
 IS PEDIATRIC SURGICAL DEPARTMENT SUITABLE FOR QUALIFIED ENDOSCOPY TRAINING? [21]  
 THE NEXT GENERATION MINIATURE ACCESS PYLOROMYOTOMY SPREADER [48]

## NEONATAL

- INTRATRACHEAL PULMONARY VENTILATION INCREASES THE SAFETY OF PEDIATRIC LAPAROSCOPY IN THE SETTING OF  
 RESPIRATORY FAILURE [19]  
 ROBOTIC ENTEROTOMY REPAIR IN FETAL PIGS [19]  
 THORACOSCOPIC REPAIR OF ESOPHAGEAL ATRESIA WITH FISTULA - OUR INITIAL EXPERIENCE [19]  
 VIDEOASSISTED REMOVAL OF TWISTED NEONATAL OVARIAN CYST [19]

## NEUROSURGERY

- NEUROENDOSCOPIC THIRD VENTRICULOSTOMY AS A FIRST-CHOICE APPROACH FOR HYDROCEPHALUS IN CHILDRE [48]  
 SUPRASELLAR ARACNOID CYST - ENDOSCOPIC TREATMENT [48]  
 VENTRICULOPELURAL SHUNT - THOROSCOPIC PLACEMENT OF THE DISTAL CATHETER - TECHNICAL CASE REPORT. [48]

## OTHER

- AN ADVANCED LAPAROSCOPIC REPAIR FOR LARGE GROIN HERNIA INTO THE SCROTUM OF INFANTS [54]  
 ANGIOCATHETER AS PERCUTANEOUS PROBE TO ASSIST TRANSINGUINAL LAPAROSCOPIC EXAMINATION DURING HERNIA  
 SURGERY IN CHILDREN [55]  
 CERVICO-MEDIASTINOSCOPIC THYMECTOMIES IN CHILDREN [25]  
 COMPLICATIONS AND CONVERSIONS OF PEDIATRIC LAPAROSCOPIC SURGERY - THE ITALIAN MULTICENTRIC EXPERIENCE  
 WITH 2305 PROCEDURES [27]  
 DEVELOPING MINIMALLY INVASIVE SURGERY [53]  
 DIRECT VISUAL RETROPERITONEAL ACCESS TECHNIQUE USING AN OPERATIVE LAPAROSCOPE [50]  
 EARLY EXPERIENCE WITH MINIMALLY INVASIVE SURGERY IN A PAEDIATRIC AND UROLOGIC SURGERY DEPARTMENT [54]  
 ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY IN CHILDREN [50]  
 GETTING RESIDENTS IN THE GAME - AN EVALUATION OF GENERAL SURGERY RESIDENTS' PARTICIPATION IN PEDIATRIC  
 LAPAROSCOPIC SURGERY [26]  
 LAPAROSCOPIC ASSISTED ABDOMINAL - PERINEAL PULL THROUGH PROCEDURE FOR HIGH IMPERFORATED ANUS IN A BOY  
 - SIX YEARS FOLLOW-UP [53]  
 LAPAROSCOPIC DUODENODUODENOSTOMY FOR TREATMENT OF ANNULAR PANCREAS IN CHILDREN [49]



LAPAROSCOPIC EXCISION OF CHOLEDOCHAL CYSTS WITH HEPATICOJEJUNOSTOMY IN INFANTS AND CHILDREN [55]  
 LAPAROSCOPIC GASTROPEXY WITH ESOPHAGOCARDIOPEXY FOR THE SURGICAL TREATMENT OF GASTRIC VOLVULUS IN CHILDREN [52]  
 LAPAROSCOPIC HELLER ESOPHAGOMYOTOMY IN A 7 YEARS OLD WITH ACHALASIA [51]  
 LAPAROSCOPIC OESOPHAGOPLASTY IN CHILDREN - A CASE REPORT [49]  
 LAPAROSCOPIC REPAIR OF DIAPHRAGMATIC DEFECTS [52]  
 LAPAROSCOPIC RESECTION OF BILIARY CYSTS IN CHILDREN - ABOUT TWO CASES [53]  
 LAPAROSCOPIC SWENSON'S PULLTHROUGH FOR HIRSCHSPRUNG'S DISEASE - AN OPTIMAL APPROACH FOR BOTH PRIMARY AND SECONDARY PULLTHROUGH PROCEDURES [27]  
 LAPAROSCOPIC TRANSPERITONEAL ADRENALECTOMY IN CHILDREN [55]  
 LAPAROSCOPIC TREATMENT OF EXTRALUMINAL DUODENAL DIVERTICULUM IN CHILDREN [49]  
 LAPAROSCOPIC TREATMENT OF INTRAABDOMINAL AND RETROPERITONEAL LYMPHANGIOMAS [54]  
 LAPAROSCOPY AND CARBON DIOXIDE VERSUS AIR REDUCE PERITONEAL, SYSTEMIC, AND PULMONARY IMMUNE RESPONSES [31]  
 LONG-TERM FOLLOW-UP AFTER LAPAROSCOPIC TOUPET FUNDOPLICATION IN CHILDREN WITH ATYPICAL SYMPTOMS OF GASTROESOPHAGEAL REFLUX [23]  
 MINIMAL-INVASIVE ADHESIOLYSIS USING ONE-TROCAR-TECHNIQUE [50]  
 NEW TECHNIQUE OF KNOTTING IN PAEDIATRIC LAPAROSCOPIC SURGERY [51]  
 PAED - LAP MANIA !! SIGNIFICANCE OF HANDS - ON ENDOSURGERY COURSES FOR PAEDIATRIC SURGEONS? [53]  
 PEDIATRIC OMENTAL INFARCTION [52]  
 POST-LAPAROSCOPIC SPLENECTOMY THROMBOCYTOPENIA [49]  
 SELECTIVE USE OF LAPAROSCOPIC APPENDECTOMY IN PEDIATRICS [52]  
 SURGICAL ROBOTICS -  
 CREATING A NEW PROGRAM [51]  
 TRANSVESICOSCOPIC CROSS-TRIGONAL URETERIC REIMPLANTATION UNDER CARBON DIOXIDE PNEUMOVESICUM FOR VESICOURETERIC REFLUX - A NOVEL TECHNIQUE [30]  
 WHAT IS THE TRUE CLINICAL INCIDENCE OF BILATERAL PRESENTATION IN INGUINAL HERNIAS? [51]

## SIVI

APPENDICECTOMIA LAPAROSCOPICA - UN TROCAR O TRE TROCARS ? [69]  
 CONTACT DIODE LASER SURGERY IN PEDIATRIC LARYNGOTRACHEAL LESIONS [68]  
 CONTINUOUS THORACIC EPIDURAL ANESTHESIA IN PEDIATRIC THORACOSCOPIC SURGERY [69]  
 EFFETTI DELLA INSUFFLAZIONE DI CO<sub>2</sub> ED ARIA SUL PERITONEO - STUDIO SPERIMENTALE [71]  
 EFFETTI DELLA LAPAROSCOPIA SULL'IMMUNITÀ LOCALE INTRAPERITONEALE. STUDI SPERIMENTALI [70]  
 ENDOSCOPIC MANAGEMENT OF CHOANAL ATRESIA [68]  
 EPIDERMOID SPLENIC CYSTS IN PEDIATRIC AGE- LAPAROSCOPIC DECAPSULATION AND PRELIMINARY RESULTS [62]  
 FLEXIBLE VERSUS RIGID VIDEOENDOSCOPY IN PAEDIATRIC AGE [67]  
 HAS LAPAROSCOPY A ROLE IN PAEDIATRIC SURGERY ? CONSIDERATIONS AFTER TEN YEARS OF EXPERIENCES IN CHILDREN. [61]  
 I COSTI DELLA CHIRURGIA LAPAROSCOPICA PER LA MALATTIA DA REFLUSSO GASTROESOFAGEO [70]  
 INFANTILE FIBROSARCOMA OF THE LARYNX - REPORT OF 2 CASES [67]  
 L'APPENDICECTOMIA LAPAROSCOPICA IN ETÀ PEDIATRICA - STUDIO MULTICENTRICO SIVI [62]  
 LA CHIRURGIA LAPAROSCOPICA DEL COLON IN ETÀ PEDIATRICA [69]  
 LAPAROSCOPIC GONADAL BIOPSY FOR CRYOCONSERVATION [64]  
 LAPAROSCOPIC RIGHT ADRENALECTOMY FOR ANDROGEN-SECRETING ADENOMA IN A 3-YEAR OLD GIRL. [65]  
 LAPAROSCOPIC SPLENECTOMY IN HEMATOLOGIC DISEASES [62], [66]  
 LAPAROSCOPIC SURGERY OF ANORECTAL MALFORMATIONS [63]  
 LARYNGOTRACHEAL STENOSIS - TREATMENT [66]  
 MINIINVASIVE SURGERY IN A CASE OF EHLERS-DANLOS SYNDROME TIPE IV [63]  
 MODIFIED TITANIUM POLIUSE TROCAR FOR SMALL PATIENTS [63]  
 NISSEN LAPAROSCOPIC FUNDOPLICATION IN PEDIATRIC NEUROLOGIC PATIENTS [61]  
 RETROPERITONEOSCOPY IN CHILDREN - THE VISIPOINT TECHNIQUE [64]  
 STUDIO COMPARATIVO SULLA FORMAZIONE DI ADERENZE INTRAPERITONEALI DOPO LAPAROSCOPIA E DOPO CHIRURGIA OPEN [69]  
 SYRINGOCELE - OUR EXPERIENCE IN CLINICAL APPROACH AND ENDOSCOPIC TREATMENT [64]  
 THORACOSCOPIC MANAGEMENT IN THORACO-PULMONARY SUSPECTED NEOPLASTIC DISEASE IN CHILDREN [65]  
 THORACOSCOPY - A SIX YEAR-EXPERIENCE IN TWO ITALIAN CENTRES [65]  
 VIDEOASSISTED REMOVAL OF LARGE OMENTAL CYST IN 2-YEAR-OLD CHILD [63]

## SPLEEN/SOLID ORGAN

DIFFICULTIES WITH THE STARTING OF PEDIATRIC LAPAROSCOPY IN A SERVICE OF PEDIATRIC SURGERY [56]  
 EARLY LAPAROSCOPIC SPLENECTOMY IN INFANTS WITH SICKLE CELL DISEASE APPEARS TO LOWER DISEASE-RELATED MORBIDITY [56]  
 LAPAROSCOPIC POCKET SPLENOPEXY (LAPS) FOR WANDERING SPLEEN A NEW TECHNIQUE [28]  
 LAPAROSCOPIC ROUX-EN-Y PORTOENTEROSTOMY FOR BILIARY ATRESIA [55]  
 LAPAROSCOPIC SPLENECTOMY IN THE MANAGEMENT OF CHRONIC IDIOPATHIC THROMBOCYTOPENIC PURPURA IN THE PEDIATRIC PATIENT [56]  
 LAPAROSCOPIC SPLENECTOMY MADE EASY - THE USE OF THE PLASMAKINETIC TISSUE MANAGEMENT SYSTEM [56]  
 LONG TERM EVALUATION OF CHILDREN WITH HEMATOLOGIC DISORDERS AFTER LAPAROSCOPIC SPLENECTOMY IN OUR



INITIAL EXPERIENCE DURING 1995-1996 [57]  
PITFALLS IN LAPAROSCOPIC DECAPSULATION FOR SPLENIC CYSTS - CASE REPORT AND REVIEW OF THE LITERATURE [57]  
SPLENECTOMY FOR PEDIATRIC HEMATOLOGIC DISEASE [31]

## THORACOSCOPY

ARGON BEAM COAGULATOR AND VIDEO-ASSISTED THORACIC SURGERY IN CHILDREN [58]  
CLINICAL RESULTS IN THORACOSCOPIC SURGERY USING AN ELECTROTHERMAL BIPOLAR VESSEL SEALER [25]  
ECHINOCOCCUS GRANULOSIS CYST OF THE LUNG - TREATMENT BY THORACOSCOPY [58]  
LUNG SEQUESTER/CYST-LUNG ADENOMATOSIS - THORACOSCOPY VS MINI-THORACOTOMY VIDEO-ASSISTED [57]  
MINIMAL INVASIVE OESOPHAGECTOMY AFTER CORROSIVE BURN IN CHILDREN - A CASE REPORT [20]  
PAIN MANAGEMENT AFTER MINIMALLY PECTUS EXCAVATUM REPAIR [31]  
PEDIATRIC EMPYEMA- AN ALGORITHM FOR EARLY THORACOSCOPIC INTERVENTION [58]  
SPOT -SINGLE PORT THORACOSCOPY- FOR TREATMENT OF EMPYEMA IN CHILDREN [59]  
THE CHALLENGE OF THORACOSCOPIC OESOPHAGEAL ATRESIA REPAIR [59]  
THORACOSCOPIC EXCISION OF AN INTRAMURAL OESOPHAGEAL DUPLICATION CYST [32]  
THORACOSCOPIC LOBECTOMY FOR PRENATALLY DIAGNOSED LUNG LESION [24]  
THORACOSCOPIC LUNG BIOPSIES IN CHILDREN WITH THE ENDOLOOP [60]  
THORACOSCOPIC UPPER THORACIC SYMPATHECTOMY FOR PRIMARY PALMAR HYPERHIDROSIS IN CHILDREN AND ADOLESCENCE - A 10 YEARS EXPERIENCE [30]  
THORACOSCOPY IN CHILDREN WITH DIAPHRAGMATIC PARALYSIS AND BOCHDALEK HERNIA [59]  
THYMECTOMY - PURE THORACOSCOPY VS MINI-THORACOTOMY VIDEO ASSISTED [28]  
VIDEO-ASSISTED THORACIC SURGERY FOR CYSTIC ADENOMATOID MALFORMATION OF THE LUNG - REPORT OF TWO CASES [59]  
VIDEOSURGERY PPLICATION OF THE DIAPHRAGM IN INFANT (ABOUT THREE CASES) [58]



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