Amsterdam 2016

63rd International Conference, 20-22 July

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PRESIDENT'S WELCOME

Welcome to the 63rd BAPS International Conference in the historic city of Amsterdam. There can be few more beautiful cities in Europe in which to spend a few days. The network of canals and water ways and the majestic buildings give the city a character that is unique. The newly restored Van Gogh museum and the Rijksmuseum are two stunning examples of what the city has to offer.

This year we have the privilege of co-hosting the conference with the national paediatric surgical societies of the Netherlands (NVKC) and Belgium (BELAPS). We are particularly grateful to Mark Wijnen and Lucas Matthyssens as well as to own team of Mark Davenport, Ian Sugarman, Simon Eaton, Kate Billington and Shan Teo for organising the conference.

The Scientific Committee have had the difficult task of selecting the best clinical and scientific presentations from a large number of high quality submissions and have assembled a stimulating and varied program. As well as the usual large number of oral presentations and posters this year we have two Stortz lectures and two mini symposia, "Genetics of Paediatric Surgical Conditions" on Thursday morning and "Frontiers in Necrotising Enterocolitis" on Friday afternoon involving state-of-the-art presentations.

The congress facilities are excellent and together with the stimulating programme we hope this is going to be an exceptional scientific meeting for all delegates. In addition we hope you will use the opportunity to see the beauty of the city of Amsterdam in free periods and also take part in the social programme culminating on Friday evening with an informal event at the Heineken Experience.

Hopefully you will find the conference a relaxed and informative experience. Please feel free to contribute to discussions and questions both during the formal sessions and informally at other times. I look forward to meeting many of you during the next few days.

David Burge
President of the British Association of Paediatric Surgeons

WELCOME FROM THE LOCAL COMMITTEE

Dear Colleague,

Together with our Dutch colleagues from the NVKC, the Belgian Association of Paediatric Surgery (BELAPS) also welcomes you in Amsterdam, for a very promising 63rd BAPS Annual International Congress.

The Dutch and Belgian paediatric surgeons know each other very well. As Belgium has at present no formal concentration of rare/complex pathologies, congenital anomalies and specialised paediatric surgical care, the majority of the Belgian 'paediatric surgeons' did a paediatric surgical fellowship abroad after general surgical training – with most Flemish surgeons going to the Netherlands for two years. Also, on a regular base, NVKC and BELAPS organize successful scientific meetings together, proving every time how much we have in common – and how much practice can differ, less than 100 km apart.

As BELAPS unites paediatric surgeons from both Belgium and Luxembourg, this 63rd BAPS Annual International Congress indeed joins forces from Britain and the "United Lowlands". Apart from its outstanding scientific content, we believe this congress is an excellent opportunity to consolidate old bonds and to establish new ones between our neighbouring societies and members, in the beautiful setting of summer in Amsterdam.

We wish you a warm welcome – and let's make this together a captivating and successful meeting!

Antoine De Backer, Martine Demarche, Pierre Lingier, Lucas Matthyssens, Marc Miserez, Paul Philippe, Erwin Van der Veken, Board members of BELAPS.

COMMITTEES

63rd Annual International Congress of the British Association of Paediatric Surgeons

President: Mr David Burge
Treasurer: Mr Alex Lee
CEO: Mr Ian Sugarman

Members of the Executive Committee:

Mr David Burge
Professor Mark Davenport
Mr Ian Sugarman
Mr Alex Lee
Professor Paul Johnson
Mr Bruce Jaffray
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Ian Sugarman
Raj Surana
Jonathan Sutcliffe
Dick Tibboel
David van der Zee
Ernst van Heurn
Gregor Walker
Tomas Wester
Robert Wheeler
Mark Woodward

Programme Selection Committee:

Simon Eaton (Chair)
Paul Johnson
Mike Stanton
Ian Sugarman
Jonathan Sutcliffe
Mark Davenport

Local Organising Committee:

The Congress has been arranged with the kind support of BELAPS and NVKC

Congress Secretariat:

Dr Kate Billington
Ms Shan Teo

PROGRAMME AT A GLANCE

TUESDAY 19TH JULY

09.00-18.45	PG course run by Simon Clarke (IPEG): *Stryker HQ*
14.00-17.00	International Society for History of Paediatric Surgery (ISHPS): *Keurszaal, Beurs van Berlage*
15.00-15.30	Refreshment break: *Graanbeurszaal*

WEDNESDAY 20TH JULY

09.00-12.30	BAPS Council Meeting (BAPS Council members only) *Keurszaal*	Post Graduate Lectures: *Effectenbeurszaal*
11.00-11.30	Refreshment break: *Graanbeurszaal*	
12.30-13.00	Lunch: *Graanbeurszaal*	
13.00-13.05	**Opening Ceremony -** *Effectenbeurszaal*	
13.05-14.40	**Session 1:** General and Trauma: *Effectenbeurszaal*	
14.40-15.10	Refreshment break: *Graanbeurszaal*	
15.10-17.15	**Session 2:** Prize Session: *Effectenbeurszaal*	
17.15-17.45	**Storz Keynote Lecture:** *Effectenbeurszaal*	
19.00-20.30	Welcome reception: *Graanbeurszaal*	

THURSDAY 21ST JULY

08.30-09.45	**Session 3:** Upper GI: *Effectenbeurszaal*
08.30-09.45	**Session 4:** Urology: *Keurzaal*
09.50-10.20	**Storz Urology Lecture:** *Effectenbeurzaal*
10.20-10.50	Refreshment break: *Graanbeurszaal*
10.50-12.20	**Session 5:** Symposium 'Genetics of Paediatric Surgical Conditions': *Effectenbeurzaal*
12.20-13.30	Lunch: *Graanbeurszaal*

See http://congress.baps.org.uk for a full programme and abstracts

THURSDAY 21ST JULY CONTINUED...

13.30-15.30	**Poster Walks:** *Graanbeurszaal and Beursfoyer*
15.10-15.40	Refreshments: *Graanbeuszaal*
15.30-16.10	**Video Session:** *Effectenbeurszaal*
16.10-16.50	**Session 6:** Oncology: *Effectenbeurszaal*
16.50-17.20	**JPS Lecture:** *Effectenbeurszaal*
18.00-19.30	**Journal of Pediatric Surgery Reception:** *Topaz Room, Krasnapolsky Hotel* (By invitation only)

FRIDAY 22ND JULY

09.00-10.10	**Session 7:** Thoracic: *Effectenbeurzaal*
09.00-10.00	**Session 8:** Hepatobiliary: *Keurszaal*
10.10-10.40	Refreshments: *Graanbeurszaal*
10.40-11.50	**Session 9:** Lower GI: *Effectenbeurzaal*
11.50-12.10	**Denis Browne Gold Medal Presentation:** *Effectenbeurzaal*
12.10-14.00	Lunch: *Graanbeurszaal*
12.10-14.00	**International Forum:** *Keurszaal*
14.00-14.30	**Hugh Greenwood Lecture:** *Effectenbeurzaal*
14.30-16.10	**Session 10:** Symposium Frontiers in NEC: *Effectenbeurzaal*
16.10-16.40	Refreshments: *Graanbeurszaal*
16.40-17.45	**Session 11:** NEC
17.45-18.00	**BAPS Closing and Prize ceremony**
19.30-12.00	**Evening Event at the Heineken Experience** Ticketed event

GENERAL INFORMATION

From Wednesday all sessions will be at the Beurs van Berlage in Amsterdam. Lunches and refreshments will be served in the Graansbeursval where the industry exhibition and some of the posters are also located.

CONGRESS REGISTRATION:
The registration desk will be situated in the Beursfoyer area of the Beurs van Berlage.

The opening times are:

Wednesday:	08.30-17.30
Thursday:	08.00-18.00
Friday:	08.30-14.00

If you are a registered delegate, the following is included:

- Attendance at each session and entry to the exhibition area
- Delegate bag, name badge and conference material
- Access to the Welcome/ President's reception at the Beurs van Berlage
- On site open access wifi

EXHIBITION:
The industry exhibition will be located in the Graansbeursval, where some of the posters are located and where all refreshments will be served.

SPEAKER PREVIEW ROOM:
The speaker preview room will be clearly signposted in the Beursfoyer. Presenters must check in their presentations at least 1 hour before they are due to be presented. Technical staff will be on hand to assist. It will not be possible to check in presentations in the main auditorium. Presenters do not need to bring a laptop as presentations will be loaded onto a main computer. Presenters should meet their session chairs for 10 minutes at the front of the stage in the refreshment break prior to their session.

POSTERS:
The Poster Exhibition will be held in the Graansbeursval and the Beursfoyer. Posters can be put up from Wednesday morning and must be removed by the end of the congress on Friday. We cannot guarantee the return of any poster left in situ after this time. Material to put up your poster will be available at the registration desk.

GENERAL INFORMATION

SPECIAL REQUIREMENTS:
Please advise the congress secretariat of any special dietary or physical requirements.

LANGUAGE:
The conference language will be English

CONGRESS ETIQUETTE:
Mobile phones should be switched off or placed on silence during sessions. Please also respect speakers and other delegates and refrain from talking during presentations.

INSURANCE:
The conference cannot accept any liability for personal injuries or for loss or damage to property belonging to delegates, either during, or as a result of the meeting. Please check the validity of your own insurance before travelling.

SOCIAL PROGRAMME:
The Welcome reception is open to all delegates, but the Friday night event is by ticket only. Please wear your badge for access to the Welcome reception and bring your ticket for entry on Friday night.

CERTIFICATE OF ATTENDANCE;
All registered delegates will receive their certificate of attendance electronically after the congress. If you need a paper copy or a certificate of your presentation, please ask at the BAPS registration desk during the course of the congress.

KEYNOTE LECTURERS

Journal of Pediatric Surgery State of the Art Lecture

Professor Dick Tibboel
Director of Research, Sophia Children's Hospital, Rotterdam

Professor Tibboel followed his trainingin paediatrics (1980-1984) at the Sophia Children's Hospital.

In 1984 he became head of the pediatric surgical ICU and in 1993 was appointed as Sophia Foundation Professor of Experimental Pediatric Surgery. In August 2005 he was appointed full Professor (Research Intensive Care and Childhood). In 2008 he became the director of the ICU at the Sophia Children's Hospital. He is member of the editorial board of Pediatric Critical Care Medicine and Neonatology.

At present he is section chair of Pharmacology of the European Society of Neonatal and Pediatric Intenstive Care (ESPNIC). In 2002 he was awarded the Edgar Doncker price from the Dutch Pediatric Association for his outstanding contributions in the field of major congenital anomalies. In total 101 PhD students wrote their thesis under his guidance and he is (co-) author of over 610 international peer reviewed articles. His Hirsch index is 52 (ISI).

Storz Lecture

Professor David van de Zee
University Medical Centre, Utrecht

David C. van der Zee MD., PhD., has been a pediatric surgeon since 1991. He has been involved in minimal invasive surgery in children and neonates as of the late 1980's and has published over 150 peer reviewed papers, many of them on endoscopic surgery.

Education in endoscopic surgery has always been an important issue in his career.

He is involved in education and training in IPEG, EAES, the Dutch Society of Endoscopic Surgery and his University Hospital. He has been Chief of the Department of Pediatric

Surgery in Utrecht since 2006 and has been appointed Professor in Pediatric Surgery in 2009.

The Department is an (inter-) national recognized Centre of Expertise for Esophageal Atresia. He gave Keynote Lectures at JSES in Japan, at ELSA in Taiwan and in Buenos Aires in Argentina. He gave lectures and hand-on courses all around the world including Hawaii, Bali, Singapore, Myanmar, Buenos Aires, Sydney and Beijing.

He currently is editor in several international journals and is President of IPEG.

Storz Lecture (Urology)

Prof.dr. Jean de la Rosette
Chairman Department of Urology AMC
Chairman Clinical Research Office Endourology Society
Executive Board Member Société Internationale d'Urologie

Dr de la Rosette is Professor and Chairman of the Department of Urology, at AMC University Hospital in Amsterdam, the Netherlands. He completed his medical degree and urology residency at St Radboud University Hospital in Nijmegen, the Netherlands.

He subsequently was appointed consultant urologist and Director Minimal Invasive Urology at the Department of Urology at the St Radboud University Hospital in Nijmegen.

Dr de la Rosette is the chairman of the committee on Minimal Invasive Treatment of Benign Prostatic Hyperplasia (BPH) of the International Consultation on BPH. He is also chairman of the committee on Renal Stone Disease of the International Consultation on Stone Diseases. Both consultations are patronised by the World Health Organisation (WHO). He is past chairman of the European Society of Uro-Technology (ESUT) and board member of the Society of Endourology.

Professor de la Rosette was chairman of the European Association of Urology (EAU) working party on BPH guidelines from 1996 until 2004. Dr de la Rosette is author of over 300 peer reviewed publications and has authored many book chapters. He is the editor of books in the field of laparoscopy, renal carcinoma, prostate diseases, urological imaging and voiding dysfunction. He is also on the editorial board of the Journal of Endourology and European Urology. Dr de la Rosette is a member of

various urological societies: e.g. the Endourological Society, the American Urological Association (AUA), the European Association of Urology (EAU) and the Société International d'Urologie

Hugh Greenwood International Lecturer

Professor Nobhojit Roy,
Chief of Surgery BARC Hospital,Commissioner on the Lancet Commission for Global Surgery, Professor for Public Health

Nobhojit Roy (MD, MPH) has been a community surgical provider, catering to the burden of disease in urban, rural & tribal populations of India. Roy received his training as a Trauma Surgeon in Mumbai, India & the UK, and holds a MPH from Johns Hopkins University.

His areas of research interests are preventable injury deaths, trauma registries, disasters, conflict, population based surveys for disease burden, access and delivery of healthcare and prehospital care in the resource-poor setting of low-middle income country.

At the international level, he is a regional expert for the Global Burden of Disease 2013 group with the Institute of Health Metrics, Seattle, where he studies non-communicable diseases, with a focus on disability adjusted life years (DALY), to demonstrate effect on the South Asia region. He has previously been the lead Commissioner of the Health and Delivery Management group of the Lancet commission of Global Surgery (www.globalsurgery.info from 2013-2015) and is a Lancet Commissioner for NCDs & Injuries in the poorest billion (www.ncdipoverty.org since 2015).

At the National level for the Ministry of Health, he is leading the task force for developing standard treatment guidelines in Surgery and in the Working Group on Emergency Care & Disasters in India. On the surgical practice front, he is the Professor and Chief of Surgical Services at the BARC Hospital (HBNI University, Govt of India) which is a secondary and tertiary health care provider to a 100,000 population in suburban Mumbai, India.

He is also the Public Health Specialist at the Environmental Health Resource Hub in the School of Habitat Studies, Tata Institute of Social Sciences University, studying environmental and occupational health issues.

DENIS BROWNE GOLD MEDAL 2016

Since 1953, BAPS has awarded the Denis Browne Gold Medal to surgeons deemed to have made a significant contribution to paediatric Surgery. It therefore gives us great pleasure to award the medal in 2016 to **Professor Risto Rintala**, Helsinki, Finland.

Risto Rintala is currently Professor of Surgery at the University of Helsinki, and Chief of General Paediatric Surgery at the Children's Hospital in Helsinki.

BAPS CONGRESS 2016

TUESDAY 19TH JULY

14.00-15.05	**Programme of the International Society for the History of Paediatric Surgery (ISHPS)** – *Keurszaal*
	Opening remarks *Robert Carachi-S.N. Cenk Buyukunal*
	Tale of history of 'History Sessions in BAPS': *S N Cenk Buyukunal, Robert Carachi*
	History of paediatric surgery in Holland *A Vos*
	History of appendicitis *H A Heij*
	The Invisible Man : Sir William Watson Cheyne *by G G Youngson*
15.05-15.20	Refreshment break – *Grannbeurszaal*
15.20-17.00	**History of Paediatric Surgery part 2** – *Keurszaal*
	Hypospadias: Lost in translation *Hadidi AT*
	George Macaulay 18th century physician: *Paul Cullis and Carl Davis*
	Children in history of art : *SNC Buyukunal*:
	Concluding remarks : *J Molenaar*

WEDNESDAY 20TH JULY

09.00-12.30	**IPEG Post- Graduate Lectures** - *Effectenbeurszaal*
	Expert lectures and interactive discussions on topical areas within paediatric MIS • Changing concepts and advances in Neonatal MIS • MIS Hernia repair – the debate goes on • Sleeve gastrectomy for morbid obesity • Safety issues in Paediatric MIS • Training models in neonatal MIS • MIS Management of adnexal masses
09.00-12.30	**BAPS Council Meeting** - *Keurszaal* *(Council members of BAPS only)*

11.00-11.30	Refreshment break – *Graanbeurszaal*

12.30-13.00	Lunch – *Graanbeurszaal*

13.00-13.05	**Opening Ceremony** – *Effectenbeurszaal* *President of BAPS David Burge and President of NVKC Marc Wijnen*

13.05-14.30	**Session 1: General and Trauma** *Effectenbeurszaal*
Chairs:	*David Burge, Southampton UK & Marc Wijnen, Nijmegen , NL*
001 13.05-13.15	**ACTIVE OBSERVATION VERSUS INTERVAL APPENDICECTOMY FOLLOWING SUCCESSFUL NON-OPERATIVE TREATMENT OF APPENDIX MASS IN CHILDREN: A RANDOMISED CONTROLLED EVALUATION** Nigel Hall[1,2], Michael Stanton[1], David Burge[1], Agostino Pierro[3], Simon Eaton[4], on behalf of the CHINA study collaborators[5], and the Paediatric Surgical Trainees Research Network[6] *[1]Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK* *[2]Faculty of Medicine, University of Southampton Southampton, UK* *[3]Division of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, Canada* *[4]UCL Institute of Child Health, London, UK* *[5]CHINA study collaborators, UK* *[6]Paediatric Surgical Trainees Research Network, UK*

002 13.15-13.20	**IS NON-OPERATIVE TREATMENT SAFE AND EFFECTIVE FOR ACUTE UNCOMPLICATED APPENDICITIS IN CHILDREN? A SYSTEMATIC REVIEW AND META-ANALYSIS.** Roxani Georgiou[1], Simon Eaton[2], Michael Stanton[1], Agostino Pierro[3], Nigel Hall[1,4] *[1]Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK* *[2]UCL Institute of Child Health, London, UK* *[3]Division of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, Canada* *[4]Faculty of Medicine, University of Southampton, Southampton, UK*
003 13.20-13.30	**HUMAN AMNIOTIC FLUID STEM CELLS: A NOVEL FETAL HAEMATOPOIETIC STEM CELL SOURCE WITH POTENTIAL FOR THERAPY** Stavros Loukogeorgakis[1], Durrgah Ramachandra[1], Panicos Shangaris[1,2], Eleni Antoniadou[1], Alfonso Tedeschi[1], Sindhu Subramaniam[1], Michael Blundell[3], Steven Howe[3], Anna David[2], Paolo De Coppi[1] *[1]Stem Cells and Regenerative Medicine, Institute of Child Health, University College London, London, UK* *[2]Institute for Women's Health, University College London, London, UK* *[3]Molecular and Cellular Immunology, Institute of Child Health, University College London, London, UK*
004 13.30-13.35	**THE MANAGEMENT OF BOYS UNDER 3-MONTHS OF AGE WITH AN INGUINAL HERNIA AND IPSILATERAL PALPABLE UNDESCENDED TESTIS: RESULTS OF A 10-YEAR MULTI-CENTRE RETROSPECTIVE REVIEW** Naomi Wright[1,2], Joseph Davidson[2], Christina Major[1], Natalie Durkin[3], Yew-Wei Tan[3], Matthew Jobson[4], Niyi Ade-Ajayi[3], Nigel Hall[4,5], Nordeen Bouhadiba[1,2] *[1]Evelina Children's Hospital, Guy's and St.Thomas' NHS Trust, London, UK* *[2]University Hospital Lewisham, London, UK* *[3]Kings College Hospital, London, UK* *[4]Southampton Children's Hospital, Southampton, UK* *[5]Faculty of Medicine, University of Southampton, Southampton, UK*
005 13.35-13.40	**THE BENEFITS OF INTRODUCING PROBIOTICS IN CHILDREN RECEIVING ENTERAL NUTRITION: A SYSTEMATIC REVIEW AND META-ANALYSIS** Evelyn Li Ping Lim[1], Antonino Morabito[2], Hayley Kuter[2], Lisa Kauffmann[2] *[1]University of Manchester Medical School, Manchester, UK, [2]Royal Manchester Children's Hospital, Manchester, UK*
006 13.40-13.45	**REDUCTION IN CENTRAL LINE SEPSIS IN INFANTS WITH GASTROSCHISIS** Melanie Drewett[1], David Burge[1,2], Nigel Hall[1,2] *[1]Departmentent of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK* *[2]University of Southampton, Southampton, UK*

007 13.45-13.50	**BENCHMARKING CONTEMPORARY SURGICAL OUTCOMES USING PUBLISHED LITERATURE: A SYSTEMATIC REVIEW AND META-ANALYSIS, USING THE EXAMPLE OF GASTROSCHISIS** Anna-May Long[1], Katie Hurst[2], Michael Lynch[4], Chun Sui Kwok[2], Simon Kenny[3,4], Jenny Kurinczuk[1], Marian Knight[1] *[1]National Perinatal Epidemiology Unit, University of Oxford, Oxford, UK* *[2]Oxford University Hospitals NHS Foundation Trust, Oxford, UK* *[3]Department of Paediatric Surgery and Urology, Alder Hey Children's Hospital, Liverpool, UK* *[4]University of Liverpool, Liverpool, UK*
008 13.50-13.55	**WHAT IS THE CURRENT PRACTICE REGARDING TIMING OF PATENT PROCESSUS VAGINALIS LIGATION FOR IDIOPATHIC HYDROCELE IN YOUNG BOYS IN THE UNITED KINGDOM?** Matthew Jobson[1], Nigel Hall[1,2] *[1]Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK, [2]Faculty of Medicine, University of Southampton, Southampton, UK*
009 13.55-14.00	**PARENTAL RECALL AFTER INFORMED CONSENT FOR ELECTIVE HERNIOTOMY** Beatrice F Koh[1], Maria RA Lipa[1], Fay X Li[1], Yee Low[1] Shireen A Nah[1] *[1]KK Women's and Children's Hospital, Singapore, Singapore*
010 14.00-14.10	**MANAGEMENT AND EARLY OUTCOMES OF MECONIUM ILEUS ASSOCIATED WITH CYSTIC FIBROSIS IN THE UNITED KINGDOM AND IRELAND; A PROSPECTIVE POPULATION COHORT STUDY** Ian Jones[1], Anna-May Long[3], Marian Knight[3], Janet McNally[2] *[1]Birmingham Children's Hospital, Birmingham, UK* *[2]Bristol Royal Hospital for Children, Bristol, UK* *[3]National Perinatal Epidemiology Unit, Oxford, UK*
011 14.10-14.15	**LEARNING FROM LAWSUITS: HOW DOES PAEDIATRIC SURGERY COMPARE TO OTHER SURGICAL DISCIPLINES?** Kathryn Ford[1], Lilli Cooper[2] *[1]King's College Hospital, London, UK* *[2]Queen Victoria Hospital, East Grinstead, UK*
012 14.15-14.20	**A NEW CLASSIFICATION SYSTEM FOR THE INTERNAL INGUINAL RING IMPROVES PREDICTION OF METACHRONOUS CONTRALATERAL HERNIAE** Girish Jawaheer[1] *[1]Great North Children's Hospital, Newcastle Upon Tyne, UK*
014 14.20-14.25	**HOW NEGATIVE IS A NEGATIVE CT IN BLUNT ABDOMINAL TRAUMA?** Sarah Braungart[1,2], Mark Powis[1], Paula Midgley[2], Tom Beattie[2] *[1]Department of Paediatric Surgery, Leeds Teaching Hospitals, UK* *[2]University of Edinburgh, Edinburgh, UK*
015 14.25-14.30	**TO ASSESS THE APPROPRIATENESS OF RADIOLOGICAL INVESTIGATION IN PAEDIATRIC MAJOR TRAUMA PATIENTS WITH SUSPECTED CHEST INJURY.** Christian Fox[1], Ross Fisher[1] *[1]Sheffield Children's Hospital, Sheffield, South Yorkshire, UK*

14.30-15.10	Refreshment break – *Graanbeurszaal*

15.10-17.00	**Session 2: Peter Paul Rickham and President's Prize** *Effectenbeurszaal*
Chairs	*Paul Losty, Liverpool, UK & Mikko Pakarinen, Helsinki, Finland*
016 15.10-15.20	**DIFFERENTIAL PROGRESSION OF LIVER FIBROSIS IN SYNDROMIC AND ISOLATED BILIARY ATRESIA** Anna Kerola[1], Annika Mutanen[1], Hannu Jalanko[1], Mikko P Pakarinen[1] *[1]Children's Hospital, University of Helsinki and Helsinki University Hospital, Helsinki, Finland*
017 15.20-15.30	**DELIVERY OF VASCULAR ENDOTHELIAL GROWTH FACTOR WITH BIOCOMPATIBLE NANOPARTICLES REVERSES STRUCTURAL ARTERIAL ABNORMALITIES IN THE NITROFEN RAT MODEL OF CONGENITAL DIAPHRAGMATIC HERNIA** Stavros Loukogeorgakis[1,5], Julio Jumenez[2], Noura Al-Juffali[3], Panagiotis Maghsoudlou[1], Jaan Toolen[2], Peter Carmeliet[4], Samuel Janes[3], Jan Deprest[2], Paolo De Coppi[1] *[1]Stem Cells and Regenerative Medicine, Institute of Child Health, University College London, London, UK* *[2]Department of Development and Regeneration, Katholieke Universiteit Leuven, Leuven, Belgium* *[3]Lungs for Living Research Center, University College London, UK* *[4]VIB Vesalius Research Center, Katholieke Universiteit Leuven, Leuven, Belgium* *[5]Center for Fetal Research, The Children's Hospital of Philadelphia, Philadelphia, PA, USA*
018 15.30-15.40	**A DOUBLE BLIND RANDOMISED CONTROLLED TRIAL OF PERCUTANEOUS ENDOSCOPIC GASTROSTOMY VS. RADIOLOGICALLY INSERTED GASTROSTOMY IN CHILDREN: PEG VS. RIG TRIAL** Rashmi R Singh[1,2], Derek Roebuck[1], Alex Barnacle[1], Samantha Chippington[1], Sam Stuart[1], Craig Gibson[1], Kate MK Cross[1], Joanna Stanwell[1], Iain M Yardley[1], Edward M Kiely[1], Paolo De Coppi[1,2], Agostino Pierro[1,2], Simon Eaton[1,2], Joe I Curry[1] *[1]Great Ormond Street Hospital for Children, London, UK, [2]UCL Institute of Child Health, London, UK*
019 15.40-15.50	**EXOME SEQUENCING REVEALS A RECESSIVE MECHANISM INVOLVING INTERACTING GENES IN PERSISTENT CLOACA** Jacob Hsu[1], Ruizhong Zhang[2], Fanny Yeung[1], Carol Wong[1], Michelle Yu[1], Ngoc Diem Ngo[3], Thanh Quang[3], Man-ting So[1], Miaoxin Li[1], Pak Sham[1], Huimin Xia[2], Paul Tam[1], Maria-Merce Garcia-Barcelo[1] *[1]The University of Hong Kong, Hong Kong, Hong Kong, [2]Guangzhou Women and Children's Medical Centre, Guangzhou, China* *[3]National Hospital of Pediatrics, Hanoi, Viet Nam*

020 15.50-16.00	**ILEO-ANAL POUCH FAILURE IN A PAEDIATRIC POPULATION** Khalid Abdelaal[1], Bruce Jaffray[1] *[1]The Great North Children's Hospital, Newcastle upon Tyne, UK*
021 16.00-16.10	**SPLANCHNECTOMY IMPROVES GASTRIC EMPTYING IN A RAT MODEL OF CEREBRAL PALSY AND FOREGUT DYSMOTILITY** Mairi Steven[1], Robert Carachi[1] *[1]University of Glasgow, Glasgow, UK*
022 16.10-16.20	**SURGERY FOR INFANTILE HYPERTROPHIC PYLORIC STENOSIS: A TEN YEAR NATIONAL COHORT STUDY** Nick Lansdale[1], Nadeem Al-Khafaji[2], Patrick Green[1] Simon Kenny[1] *[1]Alder Hey Children's Hospital, Liverpool, UK* *[2]University of Liverpool, Liverpool, UK*
023 16.20-16.30	**REGENERATIVE MEDICINE APPLICATIONS IN PAEDIATRIC UROLOGY: BARRIERS AND SOLUTIONS** Anna Radford[1,2], Carl Fishwick[2], Jennifer Southgate*[2], Ramanth Subramaniam[1] *[1]Department of Paediatric Surgery and Urology, Leeds Children's Hospital, Leeds Teaching Hospitals NHS Trust, Leeds, UK* *[2]Jack Birch Unit, Department of Biology, University of York, York, UK*
024 16.30-16.40	**ADMIT OR NOT TO ADMIT? HOW RELIABLE IS A CT SCAN IN THE DIAGNOSIS OF TRAUMATIC ABDOMINAL INJURY IN CHILDREN?** Sarah Braungart[1,2], Paula Midgely[2], Tom Beattie[2], Mark Powis[1], *[1]Department of Paediatric Surgery, Leeds Teaching Hospitals, Leeds, UK* *[2]University of Edinburgh, Edinburgh, UK*
025 16.40-16.50	**SMOOTH MUSCLE ACTIN EXPRESSION IS DECREASED IN SMALL BOWEL LONGITUDINAL MUSCLE IN HUMAN GASTROSCHISIS: POSSIBLE IMPLICATIONS FOR MOTILITY** Helen Carnaghan[1], Alex Virasami[2], Agostino Pierro[3], Paolo De Coppi[1], Alan J Burns[1], Neil J Sebire[1], Simon Eaton[1], *[1]UCL Institute of Child Health, London, UK* *[2]Department of Histopathology, Great Ormond Street Hospital, London, UK* *[3]Division of General and Thoracic Surgery, Hospital for Sick Children, Toronto, Canada*
026 16.50-17.00	**MORE THAN HALF OF PRETERM INFANTS WITH NECROTIZING ENTEROCOLITIS OR SPONTANEOUS INTESTINAL PERFORATION LOSE CEREBROVASCULAR AUTOREGULATION DURING LAPAROTOMY** Sara J. Kuik[1], Michelle E. van der Laan[1], Margot T.M. Brouwer-Bergsma[3], Jan B.F. Hulscher[2], Tony A.R. Absalom[3], Arend F. Bos[1], Elisabeth M.W. Kooi[0], *[1]Division of Neonatology, Beatrix Children's Hospital, Groningen, The Netherlands* *[2]Division of Pediatric Surgery, University Medical Center Groningen, Groningen, The Netherlands* *[3]Division of Pediatric Anesthesia, University Medical Center Groningen, Groningen, The Netherlands*

17.00-17.30	**Storz Keynote Lecture** – *Effectenbeurszaal*
	Professor David van der Zee **"Endoscopic Surgery in Children- the challenge goes on"** Introduced by: *Munther Haddad, London UK*

19.00-20.30	**Welcome** **President's reception** – *Graanbeurszaal* Includes Waffle wagon and piano recital by Jan Hulscher

THURSDAY 21ST JULY

08.30-09.45	**Session 3: Upper GI** – *Effectenbeurszaal*
Chairs	*Joe Curry, London, UK & Lucas Mathyssens, Bruges, Belgium*
027 08.30-08.40	**FOLLOW-UP OF RANDOMIZED CONTROLLED TRIAL OF GASTROSTOMY WITH MEDICAL TREATMENT *VERSUS* GASTROSTOMY WITH FUNDOPLICATION IN CHILDREN WITH NEUROLOGICAL IMPAIRMENT** Maurizio Pacilli[1], Eve Macharia-Coates[1], Kate Cross[1], Joseph Curry[1], Agostino Pierro[2], Paolo De Coppi[1], Simon Eaton[3] [1]*Great Ormond Street Hospital, London, UK* [2]*The Hospital for Sick Children, Toronto, Canada* [3]*Institute of Child Health, London, UK*
028 08.40-08.50	**A COMBINATION OF HUMAN MESANGIOBLASTS AND FIBROBLASTS MAXIMIZES CELL ENGRAFTMENT FOR THE DEVELOPMENT OF ENGINEERED OESOPHAGI** Luca Urbani[1], Carlotta Camilli[1], Claire Crowley[1] Rui Rachel Wong[1], Federico Scottoni[1], Edward Hannon[1], Ji Luo[1], Anna Urciuolo[1], Salvatore Aruta[1], Koichi Deguchi[1], Simon Eaton[1], Giulio Cossu[2], Paolo De Coppi[1] [1]*UCL Institute of Child Health and Great Ormond Street Hospital, London, UK* [2]*Institute of Inflammation and Repair, University of Manchester, Manchester, UK*
029 08.50-09.00	**OESOPHAGEAL ATRESIA WITH NO DISTAL TRACHEOESOPHAGEAL FISTULA: MANAGEMENT AND OUTCOMES FROM A POPULATION-BASED COHORT** Anna-May Long[1], Athanasios Tyraskis[1], Benjamin Allin[1], Marian Knight[1], David Burge[2] [1]*National Perinatal Epidemiology Unit, University of Oxford, UK* [2]*Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK* [3]*Southampton University, Southampton, UK*

030 09.00-09.10	**MULTICENTER SURVEY ON THE CURRENT SURGICAL MANAGEMENT OF ESOPHAGEAL ATRESIA IN BELGIUM AND LUXEMBOURG** Helena Reusens[1], Charlotte Vercauteren[1], Katrien van Renterghem[1], Dirk Van de putte[1], Antoine De Backer[2], Herbert De Caluwé[3], Martine Demarche[4], Marc Dirix[5], Paul Leyman[6], Pierre Lingier[7], Paul Philippe[8], Raymond Reding[9], Martin Ruppert[10], Koenraad Schwagten[11], Henri Steyaert[12,13], Alexandre Targnion[14], Sebastiaan Van Cauwenberge[15], Erwin Van Der Veken[16,12], Erik van Hoorde[17], Lucas Matthyssens[1] *[1]Dept of Paediatric Surgery GIHK, Princess Elisabeth Children's Hospital, Ghent University Hospital, Ghent, Belgium* *[2]Brussels University Hospital, VUB, Brussels, Belgium* *[3]University Hospital Gasthuisberg, UZL, Leuven, Belgium* *[4]CHR de la Citadelle, Liege, Belgium* *[5]CHC Clinique de l'Espérance, Liege, Belgium* *[6]AZ St-Augustinus, Antwerp, Belgium* *[7]Hôpital Erasme, ULB, Brussels, Belgium* *[8]Clinique Pédiatrique, CHL, Luxembourg, Luxembourg, [9]Cliniques Universitaires St-Luc, UCL, Woluwé, Belgium* *[10]Antwerp University Hospital, UA, Antwerp, Belgium* *[11]Queen Paola Children's Hospital, ZNA, Antwerp, Belgium, [12]Hôpital Universitaire des Enfants Reine Fabiola, ULB, Brussels, Belgium* *[13]CHU St-Pierre, ULB, Brussels, Belgium* *[14]CHR de Namur, Namur, Belgium* *[15]AZ St-Jan, Bruges, Belgium* *[16]Hôpital de Jolimont, La Louvière, Belgium* *[17]CHU Hôpital Civil Marie Curie, Charleroi, Belgium*
031 09.10-09.15	**COMPARISON OF OUR CURRENT PRE-OPERATIVE WORKUP OF CHILDREN WITH GASTRO-OESOPHAGEAL REFLUX DISEASE WITH THE NICE GUIDELINE** J Lopes[1], S Arul[1], A Lander[1], D Parikh[1], M Singh[1], G Soccorso[1], I Jester[1] *[1]Birmingham Children's Hospital, Birmingham, UK*
032 09.15-09.25	**LONG TERM OUTCOMES OF FAILED FUNDOPLICATION IN THE NEURODISABLED PAEDIATRIC PATIENT** Alexander Cho[1], Ali Hafiz[1], Ruth Kwong[1], Simon Eaton[3], Simon Blackburn[1], Joanna Stanwell[1], Edward Kiely[1], Alex Barnacle[2], Derek Roebuck[2], Joseph Curry[1], Kate Cross[1], Paolo De Coppi[1] *[1]Dept of Paediatric Surgery, Great Ormond Street Hospital, London, UK* *[2]Dept of Paediatric Interventional Radiology, Great Ormond Street Hospital, London, UK* *[3]Institute of Child Health, UCL, London, UK*
033 09.25-09.35	**LAPAROSCOPIC FUNDOPLICATION IN NEONATES AND YOUNG INFANTS: FAILURE RATE AND NEED FOR REDO FUNDOPLICATION AT A HIGH-VOLUME CENTER** Pablo Laje[1], Thane Blinman[1], Michael Nance[1], William Peranteau[1] *[1]Children's Hospital of Philadelphia, Philadelphia, PA, USA*

034 09.35-09.45	**THE DOSE-DEPENDENT PROMOTION OF TRACHEAL CARTILAGE GROWTH BY INTRATRACHEAL INJECTION OF BASIC FIBROBLAST GROWTH FACTOR** Makoto Komura[1,2], Hiroko Komura[2], Tetsuya Ishimaru[2], Kenichiro Konishi[2] *[1]Saitama Medical University, Irumagun, Saitama, Japan* *[2]University of Tokyo, Bunkyo-ku, Tokyo, Japan*

08.30-09.45	**Session 4: Urology** – *Keurszaal*
Chairs	*Kathryn Evans, London , UK & Rafal Chrzan, Amsterdam, NL*
035 08.50-09.00	**SURGICAL MANAGEMENT OF BALANITIS XEROTICA OBLITERANS IN ENGLAND: A TEN YEAR REVIEW OF PRACTICES AND OUTCOMES.** Patrick Green[1,2], George Bethell[1,2], David Wilkinson[3,2], Simon Kenny[1,2], Harriet Corbett[1] *[1]Alder Hey Children's NHS Foundation Trust, Liverpool, UK* *[2]University of Liverpool, Liverpool, UK* *[3]Royal Manchester Children's Hospital, Manchester, UK*
036 09.00-09.05	**EARLY REFERRAL OF PRIMARY UNDESCENDED TESTIS: QUESTIONS TO UK PRIMARY CARE PHYSICIANS** Joseph Davidson[1], Naomi Wright[1,2], Niyi Ade-Ajayi[3] *[1]University Hospital Lewisham, London, UK* *[2]Evelina Children's Hospital, London, UK* *[3]King's College Hospital, London, UK*
037 09.05-09.10	**UROLOGICAL IMPLICATIONS OF A ROUTINE THIRD TRIMESTER ANTENATAL SCAN** Kevin Cao[1], Radha Graham[2], Spyros Bakalis[2], Pranav Pandya[2], Peter Cuckow[1] *[1]Great Ormond Street Hospital for Children, London, UK* *[2]University College London Hospital, London, Greater London, UK*
038 09.10-09.15	**ARE POSTERIOR URETHRAL VALVES (PUVS) MORE COMMON IN BOYS WITH HYPOSPADIAS?** Boma Lee[1], Lynne McIntosh[1], Chris P. Driver[2], Salvatore Cascio[1], Martyn Flett[1], Stuart O'Toole[1] *[1]Royal Hospital for Children, Glasgow, UK* *[2]Royal Aberdeen Children's Hospital, Aberdeen, UK*
039 09.15-09.20	**HOW COMMON IS ESBL URINARY TRACT INFECTION (UTI) IN CHILDREN IN A UK REGION?** Ruth Wragg[1], Anna Harris[1], Mitul Patel[1], Andrew Robb[1], Harish Chandran[1], Liam McCarthy[1] *[1]Birmingham Children's Hospital, Birmingham, UK*
040 09.20-09.25	**INFANTILE ABDOMINOSCROTAL HYDROCELE: OUTCOMES FOLLOWING A CONSERVATIVE MANAGEMENT APPROACH** Silvia Ceccanti[1], Simone Frediani[1], Ilaria Falconi[1], Alessandro Boscarelli[1], Layla Musleh[1], Denis A Cozzi[1] *[1]Sapienza University of Rome, Rome, Italy*

041 09.25-09.35	**BLADDER AUGMENTATION IN ANURIC DEFUNCTIONED MICROBLADDERS AND A NOVEL ANTIREFLUX MECHANISM FOR MITROFANOFF ANASTOMOSIS TO THE ILEAL PATCH** Joana Lopes[1], Andy Robb[1], Liam McCarthy[1] [1]Birmingham Children's Hospital, Birmingham, UK
042 09.35-09.45	**AN IN VITRO MODEL TO STUDY CYSTINURIA** Hannah Rhodes[1,2], Louise Farmer[1], Timothy Knight[1], Mark Woodward[1,2], Gavin Welsh[1], Richard Coward[1,2] *[1]University of Bristol, Bristol, UK* *[2]Bristol Royal Hospital for Children, Bristol, UK*

09.50-10.20	**Storz Urology Lecture** – *Effectenbeurzaal*
	Professor Jean de la Rosette **"The EAU guidelines on Urolithiasis critically revisited"**

10.20-10.50	**Refreshment break – Graanbeurszaal**

10.50-12.20	**Session 5: Symposium** **'Genetics of Paediatric Surgical Conditions'** **-** *Effectenbeurszaal*
Chairs	**Jonathan Sutcliffe, Leeds, UK and Dick Tibboel, Rotterdam, NL**
10.50-11.05	*Iris van Rooij* **'Understanding the genetics of the aetiology of Anorectal malformations**
11.05-11.20	*Ivo de Blaauw* **'Impact of genetics in surgical and medical care of Anorectal malformations'**
11.20-11.35	*Sam Moore* **'Impact of genetics on surgical treatments of Hirschsprung's Disease'**
11.35-11.50	*Robert Hofstra* **'State-of-the-art in genetics of Hirschprung's Disease'**
11.50-12.05	*Annelies de Klein* **'Role of Chromosomal aberrations in congenital diaphragmatic hernia and oesophageal atresia'.**
12.05-12.20	**Questions and Answers**

12.20-13.30	**Lunch – Graanbeurszaal**

13.30-15.30	**POSTER WALKS** – *Graanbeurszaal and Beursfoyer*

Poster Walk 1: General – *Graanbeurszaal*	
Chairs	**Lara Kitteringham, Southampton, UK and Robin Garrett-Cox, Bristol, UK**
01 13.30-13.34 14.30-14.34	**A PROSPECTIVE STUDY OF LAPAROSCOPIC VERSUS OPEN SURGERY FOR PAEDIATRIC HYDROCOELES** Natasha Fourie[1], Kondjela Hamunyela[1], Corne De Vos[1], Behrouz Balieghbal[1] *[1]University of Stellenbosch, Cape Town, South Africa*
02 13.34-13.38 14.34-14.38	**OUTCOME REPORTING HETEROGENEITY IN GASTROSCHISIS RESEARCH - A SYSTEMATIC REVIEW** Benjamin Allin[1], Nicholas Patni[1], Marian Knight[1] *[1]National Perinatal Epidemiology Unit, Oxford, UK*
03 13.38-13.42 14.38-14.42	**RISK FACTORS OF RECURRENCE AND CONTRALATERAL INGUINAL HERNIA AFTER LAPAROSCOPIC PERCUTANEOUS EXTRAPERITONEAL CLOSURE (LPEC) FOR PEDIATRIC INGUINAL HERNIA** Hiromu Miyake[1], Koji Fukumoto[1], Masaya Yamoto[1], Hideaki Nakajima[1], Akinori Sekioka[1], Yutaka Yamada[1], Akiyoshi Nomura[1], Naoto Urushihara[1] *[1]Shizuoka Children's Hospital, Shizuoka, Japan*
04 13.42-13.46 14.42-14.46	**WHAT IS THE ROLE OF ENHANCED RECOVERY AFTER SURGERY PROGRAMMES IN PAEDIATRIC SURGERY?** Katherine Pearson[1], Nigel Hall[1,2] *[1]Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK* *[2]Faculty of Medicine, University of Southampton, Southampton, UK*
05 13.46-13.50 14.46-14.50	**IS THERE ANY ROLE FOR CLINICAL SCORING SYSTEM ALONGSIDE ULTRASOUND (US) IMAGING FOR REDUCING THE RATE OF NEGATIVE APPENDICECTOMY (NA)?** Francesco Fascetti Leon[1,2], William Sherwood[1], Kathryn Wessely[1], Munther Haddad[1], Simon Clarke[1] *[1]Chelsea and Westminster Hospital NHS Trust, London, UK, [2]Univeristy of Padova, Padova, Italy*
06 13.50-13.54 14.50-14.54	**CLINICAL RELEVANCE OF THE NON-VISUALISED APPENDIX ON ULTRASONOGRAPHY OF THE ABDOMEN IN CHILDREN** Sanjena Kumar Amuddhu[1], Sophia Sihui Ong[1], Wei Xiang Lim[1], Candy SC Choo[2], Te-Lu Yap[2], Phua Hwee Tang[2], Shireen Anne Nah[2], *[1]Yong Loo Lin School of Medicine National University Singapore, Singapore, Singapore* *[2]KK Women's and Children's Hospital, Singapore, Singapore*

07 13.54-13.58 14.54-14.58	**INTUSSUSCEPTION AND ROTAVIRUS VACCINE: INCREASED AWARENESS, INCREASED DEMAND?** Jessica Ng[1], Nicholas Edwards[1], Niki Solesbury[3], Kaye Platt[2], Alex Lee[1] [1]Department of Paediatric Surgery, Children's Hospital, Oxford University Hospitals NHS Foundation Trust, Oxford, UK [2]Department of Paediatric Radiology, Children's Hospital, Oxford University Hospitals NHS Foundation Trust, Oxford, UK [3]Information Department, Oxford University Hospitals NHS Foundation Trust, Oxford, UK
08 13.58-14.02 14.58-15.02	**"MIS-SOLD PPI?" - SEPSIS IN SURGICAL NICU PATIENTS AND THE USE OF ANTACIDS** Hemanshoo Thakkar[1], Leel Nellihela[1], Zeshan Rawn[1], Hammad Khan[1], Manasvi Upadhyaya[1] *[1]Evelina Children's Hospital, Guy's and St. Thomas' NHS Foundation Trust, London, UK*
09 14.02-14.06 15.02-15.06	**TESTICULAR TORSION TRANSFER: CAN WE DELIVER?** Jonathan McCann[1], Paul Rajjayabun[1] *[1]Alexandra Hospital, Redditch, UK*
10 14.06-14.10 15.06-15.10	**ULTRASONOGRAPHIC ASSESSMENT FOR ACUTE APPENDICITIS: DEFINING THE FEATURES THAT ENHANCE DIAGNOSTIC ACCURACY** Sanjena Kumar Amuddhu[1], Phua Hwee Tang[2], Seyed Ehsan Saffari[3], Wei Xiang Lim[1], Sophie Sihui Ong[1], Candy SC Choo[2], Te-Lu Yap[2], Shireen Anne Nah[2] *[1]Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore* *[2]KK Women's and Children's Hospital, Singapore, Singapore* *[3]Duke-NUS Medical School, Singapore, Singapore*
11 14.10-14.14 15.10-15.14	**ONE MORE SNIP: REVISION FRENULOTOMY AFTER TONGUE-TIE** Rachel Owusu-Ankomah[1], Katherine Fisher[1], Miriam Feen[1], Julienne Espineli[1], Maria Yasnova[1], Holly Churcher[1], Shailesh Patel[1], *[1]King's College Hospital, London, UK*
12 14.14-14.18 15.14-15.18	**TISSUE CRYOPRESERVATION - EVALUATION OF A NEW SERVICE AND EXPANSION VIA A THIRD PARTY MODEL** Molly Gilmartin[1], Kokila Lakhoo[1], Sheila Lane[1], Jill Davies[1], Stephen Kennedy[1], Enda McVeigh[1], Christian Becker[1], Muhammad Fatum[1] *[1]Oxford University Hospitals NHS Foundation Trust, Oxford, UK*
13 14.18-14.22 15.18-15.22	**WHAT A PAIN! ARE PAEDIATRIC SURGICAL DAY CASES RECEIVING OPTIMAL ANALGESIA AFTER DISCHARGE?** Benjamin O'Sullivan[1], Samuel Freeman[1], James Bates[1], Ruth Hallows[1], *[1]Royal Alexandra Children's Hospital, Brighton, UK*

Poster Walk 2: NEC/HPB – *Graanbeurzaal*	
Chairs	**Niyi Ade-Ajayi, London, UK and Clare Rees, London, UK**
14 13.30-13.34 14.30-14.34	**TOPICAL INTRAPERITONEAL PAPAVERINE TO MINIMIZE NON-VIABLE BOWEL RESECTION FROM NON-OCCLUSIVE BOWEL ISCHEMIA IN NEONATAL VOLVULUS: A CASE REPORT** Roger Zhu[1], Jason Sukowski[1], Gamal Marey[1], Vadim Kurbatov[1], David Kashan[1], Gainosuke Sugiyama[1], Francisca Velcek[1] *[1]SUNY Donwstate, College of Medicine, Brooklyn, New York, USA*
15 13.34-13.38 14.34-14.38	**GROWTH AND VITAMIN DEFICIENCIES IN CHILDREN WITH INTESTINAL FAILURE RECEIVING LONG-TERM PARENTERAL NUTRITION** Esther Neelis[1,2], Noortje Rijnen[1], Joanne Olieman[2,3], René Wijnen[2], Edmond Rings[1,4], Barbara De Koning[1], Jessie Hulst[1] *[1]Department of Paediatric Gastroenterology, Erasmus MC - Sophia Children's Hospital, Rotterdam, The Netherlands* *[2]Department of Paediatric Surgery, Erasmus MC - Sophia Children's Hospital, Rotterdam, The Netherlands* *[3]Department of Dietetics, Erasmus MC - Sophia Children's Hospital, Rotterdam, The Netherlands* *[4]Department of Paediatric Gastroenterology, Leiden University Medical Center, Leiden, The Netherlands*
16 13.38-13.42 14.38-14.42	**BONE HEALTH IN CHILDREN WITH INTESTINAL FAILURE MEASURED BY DUAL ENERGY X-RAY ABSORPTIOMETRY AND HAND RADIOGRAPHY** Esther Neelis[1,2], Noortje Rijnen[1], Joanne Olieman[2,3], René Wijnen[2], Edmond Rings[1,4], Barbara De Koning[1], Jessie Hulst[1] *[1]Department of Paediatric Gastroenterology, Erasmus MC - Sophia Children's Hospital, Rotterdam, The Netherlands* *[2]Department of Paediatric Surgery, Erasmus MC - Sophia Children's Hospital, Rotterdam, The Netherlands* *[3]Department of Dietetics, Erasmus MC Sophia Children's Hospital, Rotterdam, The Netherlands* *[4]Department of Paediatric Gastroenterology, Leiden University Medical Center, Leiden, The Netherlands*
17 13.42-13.46 14.42-14.46	**LIVER FUNCTION IN A NATIONAL COHORT OF BILIARY ATRESIA PATIENTS SURVIVING WITH NATIVE LIVER** Mikko Pakarinen[1], Antti Koivusalo[1], Risto Rintala[1] *[1]Pediatric Surgery, Pediatric Liver and Gut Research Group, Children's Hospital, University of Helsinki, Helsinki, Finland*
18 13.46-13.50 14.46-14.50	**PREDICTIVE VALUE OF A PERSISTENT TACHYCARDIA TO INDICATE IMPENDING PERFORATION IN NECROTIZING ENTEROCOLITIS** Francisca Van der Schyff[1], Jan Becker[2] *[1]University of Pretoria Faculty of Health Sciences, Pretoria, Gauteng, South Africa* *[2]Sefako Makgatho Health Sciences University, Pretoria, Gauteng, South Africa*

19 13.50-13.54 14.50-14.54	**PROBIOTICS FOR THE PREVENTION OF NECROTIZING ENTEROCOLITIS: META-ANALYSIS OF SURGICAL OUTCOMES** Clare M Rees[3], Nigel J Hall[2], Paul Fleming[4], Simon Eaton[1,3] *[1]UCL Institute of Child Health, London, UK* *[2]Faculty of Medicine, University of Southampton, Southampton, UK,* *[3]Great Ormond Street Hospital for Children, London, UK* *[4]Homerton University Hospital, London, UK*
20 13.54-13.58 14.54-14.58	**LIVER DISEASE IN THE SURGICAL NEONATE WITH INTESTINAL FAILURE** Sara Gozzini[1], Natalie Durkin[1], Mark Davenport[1] *[1]Kings College Hospital, London, UK*
21 13.58-14.02 14.58- 15.02	**PNEUMATOSIS INTESTINALIS IN A COHORT OF CHILDREN WITH NEUROLOGICAL IMPAIRMENT: A PATIENT GROUP WITH A MANAGEMENT DILEMMA** Karim Awad[1,2], Melissa Short[1], Anindya Niyogi[1], Alok Godse[1], Gareth Hosie[1] *[1]Newcastle upon Tyne Hospitals, Newcastle upon Tyne, UK* *[2]Ain Shams University Hospitals, Cairo, Egypt*
22 14.02-14.06 15.02-15.06	**DONOR-CELL ENGINEERING WITH GLYCOGEN-SYNTHASE-KINASE-3 BETA INHIBITOR-LOADED SYNTHETIC NANOPARTICLES ENHANCES LONG-TERM HAEMATOPOIETIC ENGRAFTMENT FOLLOWING IN UTERO TRANSPLANTATION** Stavros Loukogeorgakis[1,2], Camila Fachin[1], Andre Dos Santos Dias[1], Haiying Li[1], Li Tang[3,4], Aimee Kim[1], Jesse Vrecenak[1], Ilana Nissim[5], Izhtak Nissim[5,6], William Peranteau[1], Darrell Irvine[7,8], Paolo De Coppi[2], Alan Flake[0] *[1]Center for Fetal Research, The Children's Hospital of Philadelphia, Philadelphia, PA, USA* *[2]Stem Cells and Regenerative Medicine, Institute of Child Health, University College London, London, UK* *[3]Department of Material Science, Massachusetts Institute of Technology, Boston, MA, USA* *[4]Koch Institute for Integrative Cancer Research, Massachusetts Institute of Technology, Boston, MA, USA* *[5]Division of Child Development and Metabolic Disease, The Children's Hospital of Philadelphia, Philadelphia, PA, USA* *[6]Department of Pediatrics, Biochemistry and Biophysics, University of Pennsylvania, Philadelphia, PA, USA* *[7]Department of Biological Engineering, Massachusetts Institute of Technology, Boston, MA, USA* *[8]Ragon Institute, Massachusetts General Hospital, Massachusetts Institute of Technology and Harvard University, Boston, MA, USA,* *[9]Howard Hughes Medical Institute, Chevy Chase, MD, USA*
23 14.06-14.10 15.06-15.10	**NEONATAL NECROTISING ENTEROCOLITIS: THE ROLE OF COW'S MILK PROTEIN** David Burge[1,2], Melanie Drewett[1], Nigel Hall[1,2] *[1]Department of Paediatric Surgery and Urology, Southampton Children's Hospital,, Southampton, UK* *[2]University of Southampton, Southampton, UK*

24 14.10-14.14 15.10-15.14	**INTESTINAL STRICTURE RATE FOLLOWING NECROTIZING ENTEROCOLITIS - RESULTS OF A SINGLE CENTRE** Nicholas Alexander[1], Katherine DeRome[1], Grenville Fox[1], Dorothy Kufeji[1] *[1]Evelina Children's Hospital, London, UK*
25 14.14-14.18 15.14-15.18	**IS GENERALISED OEDEMA IS A PREDICTOR OF MORTALITY IN NEONATES UNDERGOING LAPAROTOMY OF NECROTISING ENTEROCOLITIS (NEC).** Sabie Rainton[1,2], Simon Blackburn[1], Joanna Stanwell[1], Kate Cross[1], Edward Kiely[1], Agostino Pierro[1,2], Paolo DeCoppi[1,2], Simon Eaton[2], Joe Curry[1] *[1]Great Ormond Street Hospital NHS Foundation Tust, London, UK, [2]Institute of Child Health, University College London, London, UK*
26 14.18-14.22 15.18-15.22	**IS STOMA FORMATION IN INFANTS BORN BEFORE 28 WEEKS GESTATION WITH ISOLATED INTESTINAL PERFORATION BEST SURGICAL PRACTICE?** Sarah-Jane Harris[1], Ruth Hallows[1,2] *[1]Brighton and Sussex Medical School, Brighton, East Sussex, UK, [2]Brighton and Sussex University Hospital, Brighton, East Sussex, UK*
27 14.22-14.26 15.22-15.26	**CONGENITAL BILIARY DILATATION AND MALROTATION: AN ASSOCIATION** Takeshi Shirai[1], Yoshinori Hamada[1], Hiroshi Hamada[1], Kengo Hattori[1], Yusuke Nakamura[1], Masahito Sato[2] *[1]Kansai Medical University, Hirakata City, Osaka, Japan* *[2]Kitano Hospital, Osaka City, Osaka, Japan*

Poster Walk 3: Trauma/Oncology/Thoracic/Upper GI – *Beursfoyer*	
Chairs	**Richard Stewart, Nottingham, UK and Oliver Gee, Birmingham, UK**
28 13.30-13.34 14.30-14.34	**PAEDIATRIC HIGH GRADE BLUNT SPLENIC TRAUMA : NON OPERATIVE MANAGEMENT VERSUS OPERATIVE MANAGEMENT** Ahmed Elgendy[1], Rasha Dawoud[2] *[1]Department of General Surgery, Tanta University Hospital, Tanta, Egypt* *[2]Department of Radiodiagnosis and Medical Imaging, Tanta University Hospital, Tanta, Egypt*
29 13.34-13.38 14.34-14.38	**INJURY TO THE ABDOMINAL AORTA IN CHILDREN RESULTING FROM BLUNT TRAUMA** Michael Fuenfer[1], Marc Lessin[2], Brian Gilchrist[3] *[1]Massachusetts General Hospital, Boston, Mass., USA* *[2]University of Michigan, Ann Arbor, Michigan, USA* *[3]Bronx-Lebanon Hospital, New York City, NY, USA*

30 13.38-13.42 14.38-14.42	**HANDLEBAR GRIP RELATED INJURY PREVENTION (GRIP) FEASIBILITY STUDY: ARE EXPOSED METAL HANDLEBAR ENDS ON CHILDREN'S BIKES AND SCOOTERS A RISK FACTOR FOR SERIOUS INJURY?** Andrew Neilson[1,2], Stuart Hartshorn[1,3], Suren Arul[1], Mark D Lyttle[4,5], Janet McNally[4], Paul Johnson[6], On behalf of PERUKI[3] *[1]Birmingham Children's Hospital, Birmingham, UK* *[2]University of Oxford, Oxford, UK* *[3]Paediatric Emergency Research in the United Kingdom & Ireland, UK* *[4]Bristol Royal Hospital for Children, Bristol, UK* *[5]Academic Department of Emergency Care, University of the West of England, Bristol, UK* *[6]Academic Paediatric Surgery Unit, Nuffield Department of Surgical Sciences, University of Oxford, Oxford, UK*
31 13.42-13.46 14.42-14.46	**OESOPHAGEAL REPLACEMENT WITH STOMACH LEADS TO SERIOUS LONG TERM MORBIDITY** Karim Awad[1], Bruce Jaffray[1] *[1]The Great North Children's Hospital, Newcastle upon Tyne, UK*
32 13.46-13.50 14.46-14.50	**UNILATERAL LUNG AGENESIS: IMPLICATIONS FOR THE PAEDIATRIC SURGEON** Costa Healy[1], Woolf Walker[2], Julian Legg[2], Michael Stanton[1], *[1]Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK* *[2]Respiratory Department, Southampton Children's Hospital, Southampton, UK*
33 13.50-13.54 14.50-14.54	**TACROLIMUS IMMUNOSUPPRESSION OF NEW ZEALAND WHITE RABBITS FOR AN EXPERIMENTAL MODEL OF OESOPHAGEAL REPLACEMENT** Edward Hannon[1], Federico Scottoni[1], Luca Urbani[1], Claire Crowley[1], Mark Neal[2], Demetra-Ellie Phylactopoulos[1], Carlotta Camilli[1], Paola Bonfanti[1], Paolo De Coppi[1] *[1]Institute of Child Health, University College London, London, UK* *[2]University College London, Royal Free Campus Biological Services Unit, London, UK*
34 13.54-13.58 14.54-14.58	**A SINGLE CENTRE 10 YEAR EXPERIENCE OF WILMS TUMOUR** Ceri R. Jones[1], Prisila Ahmed[1], Keren Sloan[1], Kokila Lakhoo[1] *[1]The John Radcliffe Hospital, Oxford, UK*
35 13.58-14.02 14.58-15.02	**LARYNGEAL ELECTROMYOGRAPHY AS A PROGNOSTIC INDICATOR OF RECURRENT LARYNGEAL NERVE RECOVERY FOLLOWING INJURY DURING TRACHEO-OESOPHAGEAL FISTULA REPAIR** Jonathan Durell[1], David Allen[2], Kate Heathcote[3], Andrea Burgess[4], Hasnaa Ismail-Koch[4], Lara Kitteringham[1] *[1]Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK* *[2]Department of Clinical Neurophysiology, Southampton, UK,* *[3]Department of Otolaryngology, Poole, UK* *[4]Department of Paediatric Otolaryngology, Southampton, UK*

36 14.02-14.06 15.02-15.06	**TOTAL OESOPHAGOGASTRIC DISSOCIATION: EXPERIENCE OVER TWO DECADES. OUTCOMES OVER THE LAST TEN YEARS** Sumita Chhabra[1], Anca Nedea[1], Lisa Kauffmann[1], Antonino Morabito[1] *[1]Royal Manchester Children's Hospital, Manchester, UK*
37 14.06-14.10 15.06-15.10	**DOCUMENTING PAEDIATRIC SURGICAL ONCOLOGY WORKLOAD TO INFORM SERVICE PLANNING** Rania Kronfli[1], Boma Lee[2], Aileen Rooney[1], Philip Hammond[1], Fraser Munro[1] *[1]Royal Hospital for Sick Children, Edinburgh, UK* *[2]Royal Hospital for Children, Glasgow, UK*
38 14.10-14.14 15.10-15.14	**CCAM TYPE 1 ASSOCIATED WITH MUCINOUS ADENOCARCINOMA: FIRST SURVIVOR OF NEONATAL SURGERY** Elena Palade[1], Mark Davenport[1], Ashish Desai[1] *[1]Kings College Hospital, London, UK*
39 14.14-14.18 15.14-15.18	**ACQUIRED AND RECURRENT TRACHEA-OESOPHAGEAL FISTULA - REPAIR UTILISING CARDIO - PULMONARY BYPASS AND AN MDT APPROACH.** Edward Hannon[1], Joseph Curry[1], Kate Cross[1], Clare McLaren[1], Derek Roebuck[1], Richard Hewitt[1], Madhaven Ramaswamy[1], Nizar Asadi[1], Muthialu Nagarajan[1], Martin Elliott[1], Paolo De Coppi[1], *[1]Great Ormond St Hospital, London, UK*
40 14.18-14.22 15.18-15.22	**WHAT IS SOUTH AMERICA DOING ON OA MANAGEMENT?** Marcia Matias[1] [1]Hospital Geral de Bonsucesso, Rio de Janeiro, Brazil
41 14.22-14.26 15.22-15.26	**OUTCOME OF OESOPHAGEAL SUBSTITUTION: 15 YEAR EXPERIENCE 2001- 2015** Keren Sloan[1], Bhanumathi Lakshminarayanan[1], Kokila Lakhoo[1], *[1]John Radcliffe Hospital, Oxford, UK*

Poster Walk 4: Lower GI/Urology – *Beursfoyer*	
Chairs	**Brice Antao, Dublin, Ireland and Martyn William, Cambridge, UK**
43 13.30-13.34 14.30-14.34	**OUTCOME REPORTING HETEROGENEITY IN HIRSCHSPRUNG'S DISEASE RESEARCH - A SYSTEMATIC REVIEW** Benjamin Allin[1], Amy Irvine[1], Marian Knight[1] *[1]National Perinatal Epidemiology Unit, Oxford, UK*
44 13.34-13.38 14.34-14.38	**REVIEW OF SURGICAL PATHOLOGY PRESENTING AS HAEMATURIA TO THE PAEDIATRIC SURGEON** Caroline Smith[1], Lalani Handalage[1], Prasad Godbole[1] *[1]Sheffield Children's Hospital, Sheffield, UK*
45 13.38-13.42 14.38-14.42	**IMPROVING THE RIGOUR OF VACTERL SCREENING FOR NEONATES WITH ANORECTAL MALFORMATIONS** Richard England[1], Bala Eradi[2], Govind Murthi[3], Jonathan Sutcliffe[4] *[1]Norfolk and Norwich University Hospital, Norwich, UK* *[2]Leicester Royal Infirmary, Leicester, UK* *[3]Sheffield Children's Hospital, Sheffield, UK* *[4]Leeds Teaching Hospitals Trust, Leeds, UK*

46 13.42-13.46 14.42-14.46	**THE USE OF BOTULINUM TOXIN IN THE TREATMENT OF CONSTIPATION IN CHILDREN** Shabnam Parkar[1], Nikhil Thapar[1], Keith Lindley[1], Oswaldo Borelli[1], Joseph Curry[1] *[1]Great Ormond Street Hospital, London, UK*
47 13.46-13.50 14.46-14.50	**RADIOLOGICAL APPEARANCE OF THE COLON IN PREMATURE AND TERM INFANTS ACCORDING TO AGE** Wen Hui Sim[1], Achint Gupta[1], Shireen Anne Nah[1] *[1]KK Women's and Children's Hospital, Singapore, Singapore, Singapore*
48 13.50-13.54 14.50-14.54	**LAPAROSCOPIC PROTACK™ RECTOPEXY (LPR): EARLY EXPERIENCE OF THIS NOVEL TECHNIQUE FOR FULL THICKNESS RECTAL PROLAPSE (FTRP) IN CHILDREN** Baqer Sharif[1], Stephen Stonelake[1], Oliver Gee[1], Ingo Jester[1], *[1]Birmingham Children's Hospital, Birmingham, UK*
49 13.54-13.58 14.54-14.58	**LAPAROSCOPY FOR INTRA-ABDOMINAL TESTES - DO WE ALWAYS HAVE TO SACRIFICE THE VESSELS?** Clara Chong[1], Charlotte Holbrook[1], Pankaj Mishra[1], Thomas Tsang[1], *[1]Norfolk and Norwich University Hospital, Norwich, Norfolk, UK*
50 13.58-14.02 14.58-15.02	**PREDICTING THE NEED FOR ACE IN ARM: AT THE EXTREMES** Charlotte Holbrook[1], Sonia Basson[1], Ashwini Joshi[1], Devesh Misra[1], Simon Phelps[1], Paul Charlesworth[1], Stewart Cleeve[1] *[1]Royal London Hospital, London, UK*
51 14.02-14.06 15.02-15.06	**THE ROLE OF URINARY TRACT ULTRASOUND SCAN IN CHILDREN AFTER A SINGLE EPISODE OFF ACUTE EPIDIDYMITIS** Amir Mohd-Amin[1], Atif Saeed[1], Tariq Burki[1], Martyn Williams[1], Adil Aslam[1] *[1]Addenbrookes Hospital, Cambridge, UK*
52 14.06-14.10 15.06-15.10	**EARLY EXPERIENCE OF ROBOTIC RECTOPEXY IN THE PAEDIATRIC POPULATION** Alison Campbell[1], Jonathan Sutcliffe[1], Ian Sugarman[1], David Jayne[1], *[1]Leeds Teaching Hospitals NHS Trust, Leeds, UK*
53 14.10-14.14 15.10-15.14	**POST HYPOSPADIAS URETHROCUTANEOUS FISTULA REPAIR COMPARISON BETWEEN PATIO AND OTHER TECHNIQUES** Kirtikumar Rathod[1], Jaskiren Loyal[1], Bharat More[1], Ashok Rajimwale[1], *[1]University Hospital of Leicester, Leicester, UK*
54 14.14-14.18 15.14-15.18	**RECOGNISING TRUE RECTOVAGINAL FISTULA: LESSONS LEARNT** Lucy Henderson[1], Richard Hill[1], Khalid Elmalik[1], Nitin Patwardhan[1], *[1]Leicester Royal infirmary, Leicester, Leicestershire, UK*
55 14.18-14.22 15.18-15.22	**AN UNEXPECTED HIGH PREVALENCE OF INTRONIC RET PROMOTER VARIATIONS IN BLACK AFRICAN HIRSCHSPRUNG DISEASE PATIENTS** Sam Moore[1], Monique Zaahl[1] *[1]University Of Stellenbosch, Tygerberg, South Africa*

15.10-15.40	**Refreshments – Graanbeuszaal**

15.30-16.10	**Video Session** – *Effectenbeurzaal*
Chair	***Ian Sugarman, Leeds, UK***
1 15.30-15.40	**HOW TO ACHIEVE A 3% LEAK RATE IN ILEO-ANAL POUCH SURGERY** Bruce Jaffray[1] *[1]The Great North Children's Hospital, Newcastle upon Tyne, UK*
2 15.40-15.50	**NOVEL USE OF PRE-FORMED SILO FOR LAPAROSTOMY** Yew Wei Tan[1], Niyi Ade-Ajayi[1] *[1]Kings College Hospital, London, UK*
3 15.50-16.00	**VIDEO PRESENTATION: A SURGICAL TECHNIQUE FOR THE CORRECTION OF PERINEAL BODY DISRUPTION AND FECAL INCONTINENCE VIA A POSTERIOR SAGITTAL APPROACH WITH RECTAL MOBILIZATION** Victoria Lane[1], Richard Wood[1], Kaleigh Peters APN[1], Geri Hewitt[1,2], Marc Levitt[1] *[1]Center for Colorectal and Pelvic Reconstruction (CCPR). Nationwide Children's Hospital, Columbus, Ohio, USA* *[2]Department of Obstetrics and Gynecology. Ohio State University College of Medicine, Columbus, Ohio, USA*
4 16.00-16.10	**OPERATIVE VIDEO: REPAIR OF A RECTOVAGINAL H-TYPE FISTULA** Carlos Reck[1], Victoria Lane[1], Richard Wood[1], Marc Levitt[1] *[1]Center for Colorectal and Pelvic Reconstruction, Nationwide Children's Hospital, Columbus, Ohio, USA*

16.10-16.45	**Session 6: Oncology**
Chairs	***Mark Powis, Leeds, UK & Robertine van Baren, Amsterdam, NL***
043 16.10-16.20	**FEASIBILITY OF THORACOSCOPIC SURGERY IN THE MANAGEMENT OF PAEDIATRIC INTRA-THORACIC TUMOURS** Ravindar Anbarasan[1], Nichola Coleman[1], Giampierro Soccorso[1], Michael Singh[1], Ingo Jester[1], Suren Arul[1], Dakshesh Parikh[1], *[1]Birmingham Children's Hospital, Birmingham, West Midlands, UK*
044 16.20-16.30	**PANCREATICODUODENECTOMY FOR PEDIATRIC PANCREATIC MALIGNANCY: A SINGLE-CENTER RETROSPECTIVE ANALYSIS** Erika Lindholm[1], Abdulaziz Alkattan[1], Sara Abramson[1], Anita Price[1], William Jarnagin[1], Michael La Quaglia[1] *[1]Memorial Sloan Kettering Cancer Center, New York, NY, USA*
045 16.30-16.40	**PARATESTICULAR RHABDOMYOSARCOMA: IMPORTANCE OF INITIAL SURGICAL TREATMENT** William Hammond[1], Benjamin Farber[1], Anita Price[1], Suzanne Wolden[1], Todd Heaton[1], Leonard Wexler[1], Michael La Quaglia[1] *[1]Memorial Sloan Kettering Cancer Center, New York, NY, USA*

046 16.40-16.50	**PREDICTORS OF OUTCOME IN NON-SPITZOID MELANOMA IN CHILDREN AND ADOLESCENTS** Benjamin Farber[1], William Hammond[1], Klaus Busam[1], Neha Bhattacharjee[1], Ashfaq Marghoob[1], Allan Halpern[1], Eric Stanelle[1], Todd Heaton[1], Daniel Coit[1], Michael La Quaglia[1], *[1]Memorial Sloan Kettering Cancer Center, New York, NY, USA*

16.50-17.20	**Journal of Pediatric Surgery Lecture** - *Effectenbeurzaal*
	Professor Dick Tibboel **"What's Next?"** *Introduced by Mark Davenport, London, UK*

Free Evening to enjoy Amsterdam

FRIDAY 22ND JULY

09.00-10.05	**Session 7 Thoracic** - *Effectenbeurzaal*
Chairs	***Carl Davis, Glasgow, UK & Adil Aslam, Cambridge, UK***
047 09.00-09.10	**BEST AND SERIAL OXYGENATION INDICES AS PREDICTORS OF SURVIVAL IN CONGENITAL DIAPHRAGMATIC HERNIA.** Yew-Wei Tan[1], Kamal Ali[2], Gwendolyn Andradi[1], Lekshmi Sasidharan[1], Anne Greenough[2], Mark Davenport[1] *[1]Dept. Paediatric Surgery, Kings College Hospital, London, UK* *[2]Dept. Neonatology, Kings College Hospital, London, UK*
048 09.10-09.20	**OXYGENATION INDEX AS AN OBJECTIVE PREDICTOR OF OPTIMAL TIMING FOR SURGERY IN CONGENITAL DIAPHRAGMATIC HERNIA** Yew-Wei Tan[1], Kamal Ali[2], Gwendolyn Andradi[1], Lekshmi Sasidharan[1], Anne Greenough[2], Mark Davenport[1] *[1]Dept. Paediatric Surgery, Kings College Hospital, London, UK* *[2]Dept. Neonatalogy, Kings College Hospital, London, UK*
049 09.20-09.25	**PULMONARY FUNCTION AND NUTRITIONAL MORBIDITY IN CHILDREN AND ADOLESCENTS WITH CONGENITAL DIAPHRAGMATIC HERNIA** Beth Haliburton[1], Marialena Mouzaki[1], Monping Chiang[1], Vikki Scaini[1], Margaret M Marcon[1], Wenming Duan[1], Theo J. Moraes[1], Priscilla P Chiu[1] *[1]Hospital for Sick Children, Toronto, ON, Canada*
050 09.25-09.35	**DEVELOPMENT OF A FAST GROWING ANIMAL MODEL FOR DIAPHRAGMATIC HERNIA** Mary Patrice Eastwood[1], Luc Joyeux[1], Savitrree Pranpanus[1], Lucie Hympanova[1], Johannews Lodewicus van der Merwe[1], Rita Rynkevic[1], Mieke Roggen[4], Ghislaine Gayan-Ramirez[5], Herbert Decaluwe[2], Erik Verbeken[3], Jan Deprest[1,6] *[1]Dept. of Development and Regeneration, KU Leuven, Leuven, Belgium* *[2]Dept. of Thoracic Surgery, University Hospitals Leuven, Leuven, Belgium* *[3]Dept. of Pathology, University Hospitals Leuven, Leuven, Belgium* *[4]Dept. of Pediatrics, University Hospital Leuven, Leuven, Belgium* *[5]Pneumology, KU Leuven, Leuven, Belgium* *[6]Department of Obstetrics and Gynecology, University Hospitals Leuven, Leuven, Belgium*
051 09.35-09.45	**TAP WATER IONTOPHORESIS IN THE TREATMENT OF PAEDIATRIC HYPERHIDROSIS** Ingrid Helbling[1], Sinead McCaffrey[2], Katie Mellor[2], Agnes Roycroft[1], Haitham Dagash[3] *[1]Department of Dermatology, Leicester Royal Infirmary, Leicester, UK* *[2]University of Leicester Medical School, Leicester, UK* *[3]Department of Paediatric Surgery, Leicester Royal Infirmary, Leicester, UK*
052 09.45-09.50	**THORACOSCOPIC BILATERAL T3 SYMPATHECTOMY FOR PRIMARY FOCAL HYPERHIDROSIS IN PEDIATRICS** Pablo Laje[1], Kali Rhodes[1], Mary Kate Klarich[1] *[1]Children's Hospital of Philadelphia, Philadelphia, PA, USA*

053 09.50-09.55	**SETTING UP EXPERIENCE WITH A CUSTOM-MADE BRACE SYSTEM FOR PECTUS CARINATUM WITHIN THE NHS** Melissa Short[1], Katheryn Green[1], Dakshesh Parikh[1], Alberto Attilio Scarpa[1] *[1]The Birmingham Children's Hospital NHS FT, Birmingham, UK*
054 09.55-10.00	**DOES THORACOSCOPY HAVE ADVANTAGES OVER OPEN SURGERY FOR ASYMPTOMATIC CONGENITAL LUNG MALFORMATIONS? AN ANALYSIS OF 1626 RESECTIONS.** Stephen Adams[1], Matthew Jobson[1], Patarawan Sangnawaki[2], Adam Heetun[1], Anthony Thaventhiran[1], Navroop Johal[1], Dankmar Böhning[2], Michael Stanton[1] *[1]Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK* *[2]Southampton Statistical Sciences Research Institute, University of Southampton, Southampton, UK*
055 10.00-10.05	**MYSTERIES OF THE UPPER POUCH TRACHEOESOPHAGEAL FISTULA** Virginia Summerour[1], Paul Stevens[1], Anthony Lander[1], Michael Singh[1], Giampiero Soccorso[1], Suren Arul[1] *[1]Dept. of Surgery, Birmingham Children's Hospital, Birmingham, UK*

09.00-10.00	**Session 8 Hepatobiliary** – *Keurszaal*
Chairs	***Evelyn Ong, Birmingham, UK & Jan Hulscher, Amsterdam , NL***
056 09.00-09.10	**MESENCHYMAL STEM CELL-PRECONDITIONED MEDIUM INCREASES SURVIVAL OF HUMAN ISLETS IN HYPOXIC CONDITIONS** Heide Brandhorst[1,2], Samuel Acreman[1,2], Niamh Mullooly[1,2], Simien Schive[3], Hanne Bjornson Scholz[3], Daniel Brandhorst[1,2], Paul Johnson[1,2] *[1]Academic Paediatric Surgery Unit, Nuffiled Department of Surgical Sciences, University of Oxford, Oxford, UK* *[2]Islet Transplant Research Group, Oxford Centre for Diabetes, Endocrinology, and Metabolism (OCDEM), Oxford, UK* *[3]Department of Transplantation Medicine and Institute for Surgical Research, Oslo University Hospital, Oslo, Norway*
057 09.10-09.15	**OUTCOMES OF LAPAROSCOPIC KASAI PORTOENTEROSTOMY FOR BILIARY ATRESIA: A SYSTEMATIC REVIEW** Mohammed Hassan Hussain[1,2], Naved Alizai[2], Bijendra Patel[1] *[1]Queen Mary University of London, London, UK* *[2]Leeds General Infirmary, Leeds, UK*
058 09.15-09.25	**LONG-TERM NEURODEVELOPMENTAL OUTCOME IN CHILDREN WITH BILIARY ATRESIA.** Lyan Rodijk[1], Anne den Heijer[1], Jan Hulscher[1], Henkjan Verkade[1], Ruben de Kleine[1], Janneke Bruggink[1] *[1]University Medical Center Groningen, Groningen, The Netherlands*

059 09.25-09.35	**LONG TERM COMPLICATIONS AFTER SURGERY FOR CHOLEDOCHAL MALFORMATIONS: A REVIEW OF THE DUTCH NATIONAL REGISTRY** Anneke ten Hove[1], Ruben H.J de Kleine[1], Maria. H.A. van den Eijnden[1], Jim C.H. Wilde[3], Matthijs W.N Oomen[2], Cornelius E.J. Sloot[4], Wim G. van Gemert[5], Ivo de Blaauw[2], David C van der Zee[6], Henkjan J. Verkade[1], Paul G.J.M Peeters[1], Jan B.F. Hulscher[1], *[1]University Medical Center Groningen, Groningen, The Netherlands, [2]Amalia Children's Hospital Radboud University, Nijmegen, The Netherlands [3]Emma Children's Hospital, Academic Medical Centerr, Amsterdam, The Netherlands [4]Erasmus Medical Center, Sophia Children's Hospital, Rotterdam, The Netherlands [5]University Medical Center Maastricht, Maastricht, The Netherlands, [6]University Medical Centerr Utrecht, Utrecht, The Netherlands*
060 09.35-09.40	**INVESTIGATING THE EPIDEMIOLOGY OF CHOLEDOCHAL MALFORMATIONS: CYSTIC VS. FUSIFORM** Jessica Burns[1], Kathryn Ford[1], Mark Davenport[1] *[1]Kings College Hospital, London, UK*
061 09.40-09.50	**DECREASED HEPATIC LXR AND ABCG5 8 GENE EXPRESSION ASSOCIATE WITH PARENTERAL NUTRITION, SERUM PLANT STEROLS AND LIVER INJURY IN INTESTINAL FAILURE** Annika Mutanen[1], Hannu Jalanko[2], Antti I Koivusalo[1], Mikko P Pakarinen[1] *[1]Section of Pediatric Surgery, Pediatric Liver and Gut Research Group, Children's Hospital, Helsinki University Central Hospital, University of Helsinki, Helsinki, Finland* *[2]Department of Pediatric Nephrology and Transplantation, Children's Hospital, Helsinki University Central Hospital, University of Helsinki, Helsinki, Finland*
062 09.50-10.00	**OUTCOMES FOLLOWING PARTIAL EXTERNAL BILIARY DIVERSION (PEBD) IN PATIENTS WITH PROGRESSIVE FAMILIAL INTRAHEPATIC CHOLESTASIS (PFIC)** Tanya Bhardwaj[1], Caroline Lemoine[1], Lee Bass[1], Riccardo Superina[1] *[1]Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL, USA*

10.10-10.40	**Refreshments – Graanbeurszaal**

10.40-11.50	**Session 9 Lower GI** – *Effectenbeurzaal*
Chairs	***Bala Eradi, Norwich, UK and Marc Miserez, President BELAPS***
063 10.40-10.50	**A STANDARDIZED APPROACH FOR ASSESSING INTERNATIONALLY ADOPTED CHILDREN WITH A PREVIOUSLY REPAIRED ANORECTAL MALFORMATION (ARM)** *Victoria Lane[1,2], Clare Skerritt[1], Kristine Nacion[2], Richard Wood[1], Carlos Reck[1], Katherine Deans[2], Peter Minneci[2], Marc Levitt[1],* *[1]Center for Colorectal and Pelvic Reconstruction, Nationwide Children's Hospital., Columbus, Ohio., USA* *[2]Center for Surgical Outcomes Research, Nationwide Children's Hospital., Columbus, Ohio., USA*
064 10.50-11.00	**A TISSUE ENGINEERING APPROACH TO CREATING A FUNCTIONAL VAGINAL EPITHELIAL SHEET AS AN ADJUNCT FOR CLOACAL RECONSTRUCTION** Tahera Ansari[1], Karin Greco[1], Alun Williams[2], Jonathan Sutcliffe[3] *[1]Northwick Park Institute for Medical Research, London, UK,* *[2]Department of Paediatric Surgery, Queens Medical Centre, Nottingham, UK* *[3]Department of Paediatric Surgery, Leeds General Infirmary, Leeds, UK*
065 11.00-11.10	**FUNCTIONAL OUTCOMES IN HIRSCHPRUNG DISEASE - A SINGLE INSTITUTION'S 12-YEAR EXPERIENCE** Hemanshoo Thakkar[1], Christopher Bassett[1], Andy Hsu[1], Dorothy Kufeji[1], Mina Agrawal[1], Catherine Richards[1], David Drake[1], Ali Keshtgar[1] *[1]Evelina Children's Hospital, Guy's and St. Thomas' NHS Foundation Trust, London, UK*
066 11.10-11.20	**PROCTOCOLECTOMY WITH ILEOANAL ANASTOMOSIS IN THE TREATMENT OF EXTENDED AGANGLIONOSIS IN HIRSCHSPRUNG DISEASE** Anni Timonen[4], Antti Koivusalo[1,2], Risto Rintala[1,2], Mikko Pakarinen[1,2] *[1]Pediatric Surgery, Helsinki, Finland* *[2]Helsinki University Hospital, Helsinki, Finland* *[3]Children's Hospital, Helsinki, Finland* *[4]University of Helsinki, Helsinki, Finland*
067 11.20-11.25	**NOTHING IS PERMANENT: REVERSAL OF THE MACE PROCEDURE** Riyad Peeraully[1], Ali Wright[1], Daniel Colliver[1], Richard Stewart[1], Brian Davies[1], Shailinder Singh[1], Bharat More[1] *[1]Queen's Medical Centre, Nottingham, UK*

068 11.25-11.30	**OUTCOMES FOLLOWING SCLEROTHERAPY FOR MUCOSAL RECTAL PROLAPSE WITH OILY PHENOL INJECTION - SINGLE CENTRE REVIEW** Rohini Sahay[1], Richard Lindley[1], Govind Murthi[1] *[1]Sheffield Children's Hospital, Sheffield Children's Hospital, UK*
069 11.30-11.35	**SURGICAL MANAGEMENT OF PAEDIATRIC INFLAMMATORY BOWEL DISEASE- A REGIONAL COHORT STUDY** Cameron Kuronen-Stewart[3], Paul Henderson[2], David Wilson[2], Claire Clark[1] *[1]Department of Paediatric surgery, Royal Hospital for Sick Children, Edinburgh, UK* *[2]Department of Gastroenterology and Nutrition, Royal Hospital for Sick Children, Edinburgh, UK* *[3]Child life and health, College of Medicine and Veterinary Medicine, University of Edinburgh, Edinburgh, UK*
070 11.35-11.40	**IS IT OK FOR PAEDIATRIC SURGEONS TO UNDERTAKE POUCH RECONSTRUCTION FOR CHILDREN AFTER PAN-PROCTOCOLECTOMY FOR ULCERATIVE COLITIS.** Isuru Perera[1], Joe Curry[1] *[1]Great Ormond Street Hospital NHS Foundation Trust, London, UK*
071 11.40-11.45	**SURGERY FOR AGGRESSIVE INFLAMMATORY BOWEL DISEASE ASSOCIATED WITH LIVER DYSFUNCTION** Bhanu Lakshminarayanan[1], Ashish Desai[1], Joseph Nunoo-Mensah[1], Marianne Samyn[1] *[1]Kings College Hospital, London, UK*
072 11.45-11.50	**PDGFRα+ CELLS IN RAT AND RABBIT COLON: OPTIMISING METHODOLOGY FOR IMMUNOHISTOCHEMISTRY** Arwa Al-Robeye[1], Hanan Elkuwaila[2], Jim Deuchars[2], Jonathan Sutcliffe[3] *[1]Faculty of Medicine, University of Leeds, Leeds, UK* *[2]Faculty of Biological Science, University of Leeds, Leeds, UK,* *[3]Department of Paediatric Surgery, Leeds General Infirmary, Leeds, UK*

11.50-12.10	**Denis Browne Gold Medal Presentation** - *Effectenbeurzaal*
12.10-14.00	Lunch – *Graanbeurszaal*

12.10-14.00	**International Forum** – *Keurszaal*
Chairs	**Richard Stewart, Nottingham, UK & Ashish Minocha, Norwich, UK**
	Introduction and reports by Fellows and Scholars
	International activities of members *David Croaker in Palestine, Prasad Godbole in Iraq, Naomi Wright in Africa*
	Discussion and conclusion *Niyi Ade-Ajayi*
14.00-14.30	**Hugh Greenwood Lecture** – *Effectenbeurzaal*
	Professor Nobhojit Roy **"Global Surgery – a view from the South"** Introduced by: *Kokila Lakhoo, Chair of the International Affairs Committee*

14.30-16.10	**Session 10 Symposium Frontiers in Necrotising Enterocolitis (NEC)** – *Effectenbeurzaal*
Chair	***Simon Eaton, London, UK and Nigel Hall, Southampton, UK***
14.30-14.50	***Kokila Lakhoo (UK):*** **'BAPS-CASS study on Surgical NEC'**
14.50-15.10	***Ernst van Heurn (NL):*** **'Clinical utility of I-FABP and other plasma urine markers'**
15.10-15.30	***Jan Hulscher (NL):*** **'Cerebral and splanchnic oxygenation in neonates at high risk for NEC: insights from NIRS'**
15.30-15.50	***Thomas Benkoe (Austria):*** **'Risk assessment in NEC- are cytokines of any help?'**
15.50-16.10	***Neena Modi (UK):*** **'UK Neonatal Collaborative Necrotising Entercolitis (NEC) Study'**

16.10-16.40	**Refreshments** – *Graanbeurszaal*

16.40-17.45	**Session 11 NEC** – *Effectenbeurzaal*
Chairs	***Eleri Cusick, Bristol, UK & Ernst van Heurn, Maastricht , NL***
073 16.45-16.55	**NECROTIZING ENTEROCOLITIS IN THE NETHERLANDS: AN INCREASED INCIDENCE IN THREE ACADEMIC REFERRAL CENTERS** Fardou Heida[1], Lisanne Stolwijk[3], Marie-Louise Loos[2], Stannie van den Ende[2], Wes Onland[3], Frank van den Dungen[3], Elisabeth Kooi[1], Arend Bos[1], Jan Hulscher[1], Roel Bakx[2] *[1]University Medical Center Groningen, Groningen, The Netherlands,* *[2]Academic Medical Center Amsterdam, Amsterdam, The Netherlands* *[3]VU Medical Center Amsterdam, Amsterdam, The Netherlands*

074 16.55-17.05	**ALTERED SERUM BILE ACID POOL ASSOCIATE WITH INTESTINAL RESECTION AND LIVER INJURY IN PEDIATRIC INTESTINAL FAILURE** Annika Mutanen[1], Hannu Jalanko[2], Antti I Koivusalo[1], Mikko P Pakarinen[1] *[1]Section of Pediatric Surgery, Pediatric Liver and Gut Research Group, Children's Hospital, Helsinki University Central Hospital, University of Helsinki, Helsinki, Finland* *[2]Department of Pediatric Nephrology and Transplantation, Children's Hospital, Helsinki University Central Hospital, University of Helsinki, Helsinki, Finland*
075 17.05-17.10	**SURGICAL PATHOLOGY AND OUTCOMES IN EXTREMELY PRETERM INFANTS REQUIRING LAPAROTOMY** Jonathan Durell[1], Melanie Drewett[1], David Burge[1], Nigel Hall[1,2], *[1]Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK, [2]Faculty of Medicine, University of Southampton, Southampton, UK*
076 17.10-17.20	**EXTRACELLULAR MATRIX HYDROGEL DERIVED FROM DECELLULARISED INTESTINAL TISSUE FOR THE 3D-CULTURE OF PRECURSOR CELLS IN TISSUE ENGINEERING.** Claire Crowley[1], Luca Urbani[1], Martina De Santis[1], Vivien Gaillet[1], Francesca Onofri[1], Laween Meran[1,3], Sang Eun Lee[1,3], Sara Campinoti[1], Paola Bonfanti[1], Alan Burns[1,4], Vivian Li[3], Martin Birchall[2], Simon Eaton[1], Paolo De Coppi[1] *[1]UCL Institute of Child Health and Great Ormond Street Hospital, London, UK* *[2]UCL Ear Institute, Royal National Throat Nose and Ear Hospital and UCL, London, UK, London, UK* *[3]The Francis Crick Institute, Mill Hill Laboratories, The Ridgeway, London, UK* *[4]Department of Clinical Genetics, Erasmus Medical Center, Rotterdam, The Netherlands*
077 17.20-17.30	**PARENTERAL NUTRITION ASSOCIATED CHOLESTASIS ASSOCIATED WITH SURGERY FOR IDIOPATHIC INTESTINAL PERFORATION AND NECROTIZING ENTEROCOLITIS** Karila Kristiina[1], Anttila Anna-Leena[2], Iber Tarja[2], Pakarinen Mikko[1], Koivusalo Antti[1] *[1]Dept.of Paediatric Surgery, Children's Hospital, University of Helsinki, Helsinki, Finland* *[2]Dept. of Paediatric Surgery, Tampere University Hospital, Tampere, Finland, Tampere, Finland*
078 17.30-17.35	**NECROTISING ENTEROCOLITIS - A 15 YEAR OUTCOME REPORT FROM A SPECIALIST CENTRE** William Calvert[1], Keerthika Sampat[1], Graham Lamont[1], Matthew Jones[1], Simon Kenny[1], Colin Baillie[1], Paul Losty[1,2] *[1]Alder Hey Children's NHS Foundation Trust, Liverpool, UK* *[2]University Of Liverpool, Liverpool, UK*

079 17.35-17.45	**A NATIONWIDE COHORT STUDY DESCRIBING OUTCOMES TO ONE YEAR POST-INTERVENTION FOR INFANTS IN THE UK WITH PREVIOUSLY SURGICALLY MANAGED NECROTISING ENTEROCOLITIS** Benjamin Allin[1,2], Anna Long[1,2], Amit Gupta[2], Marian Knight[1], Kokila Lakhoo[2] *[1]National Perinatal Epidemiology Unit, Oxford, UK* *[2]Oxford Children's Hospital, Oxford, UK*

17.45-18.00	**BAPS Closing and Prize ceremony** - *Effectenbeurzaal* Includes the presentation of the **Intercollegiate Exam Medal** to ***Kimberley Lumpkins***, and the presentation of the **Peter Paul Rickham prize** for best basic science paper by a trainee, the **President's Prize** for the best clinical paper and the **poster prizes** (one selected by the poster chairs and one by popular vote).

Abstracts of Papers

001

ACTIVE OBSERVATION VERSUS INTERVAL APPENDICECTOMY FOLLOWING SUCCESSFUL NON-OPERATIVE TREATMENT OF APPENDIX MASS IN CHILDREN: A RANDOMISED CONTROLLED EVALUATION

Nigel Hall[1,*], Michael Stanton[1], David Burge[1], Agostino Pierro[2], Simon Eaton[1], on behalf of the CHINA study collaborators[5], and the Paediatric Surgical Trainees Research Network[6]
[1]*Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK,* [2]*Faculty of Medicine, University of Southampton, Southampton, UK,* [3]*Division of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, Canada,* [4]*UCL Institute of Child Health, London, UK,* [5]*CHINA study collaborators, UK,* [6]*Paediatric Surgical Trainees Research Network, UK*

Aims: Initial successful conservative treatment of appendix mass in children is a common scenario. Systematic review (retrospective series only) suggested equipoise between the risk of recurrent appendicitis (20%) and complications of interval appendicectomy (IA). We aimed to conduct the first multi-centre randomised-controlled evaluation of IA (2-3 months following initial successful treatment) vs. active observation (AO, 3 monthly review for 1 year) in children with non-operatively treated appendix mass.

Methods: Ethically approved, international, multicentre randomised controlled-evaluation of children (3-15yrs) with appendix mass successfully treated without surgery or percutaneous drainage. Online randomisation was performed, with minimisation for age, gender, centre and presence of sonographic faecolith. Primary AO outcome was incidence of recurrent acute appendicitis (histological acute inflammation or recurrent appendix mass). Primary IA outcome was significant appendicectomy-related complication. Patients were followed for 1 year following enrolment. Data are median (range) or incidence and were analysed on an intention-to-treat basis. ISRCTN number: 93815412.

Results: Full enrolment was achieved - 106 children, 52 male, median age 8 years (range 3-15). Fifty-two allocated to IA, 54 to AO. Significant complications occurred in 3/52 (6%) IA patients - wound infection (n=2), bowel resection after port-site hernia (n=1). Six of 52 (12%) AO children underwent appendicectomy within 1 year for histologically-confirmed acute appendicitis. A further 6/52 (12%) had appendicectomy for acute or chronic abdominal pain without acute inflammation on histology. Three further AO children had hospital admissions for abdominal pain (no appendicectomy). Duration of hospitalisation is shown in the Table. No carcinoid tumours were detected.

Conclusions: More than 3/4 patients under AO did not require appendicectomy within one year. IA had a low risk (6%) of complications, with unplanned re-operation in 1 child (2%). Both IA and AO carry risks of further surgery and hospitalisation. These prospective data will help inform decision-making in this group of children.

Table: Duration of hospital stay during 1 year follow-up for each treatment group

	IA (n=51)	AO (n=52)
Scheduled hospitalisation for planned procedure	n=37, 31.5 hrs (10.0-73.3)	n=1, 32.8hrs
Unscheduled hospitalisation	n=3, 8 days (7.3-10.0)	n=15, 2.1 days (0.7-8.9)
Overall duration of hospitalisation	31.5 hrs (0.0-239.3)	0 hrs (0-248.9)

002

IS NON OPERATIVE TREATMENT SAFE AND EFFECTIVE FOR ACUTE UNCOMPLICATED APPENDICITIS IN CHILDREN? A SYSTEMATIC REVIEW AND META-ANALYSIS.

Roxani Georgiou[1], Simon Eaton[2], Michael Stanton[1], Agostino Pierro[3], Nigel Hall[1,4]
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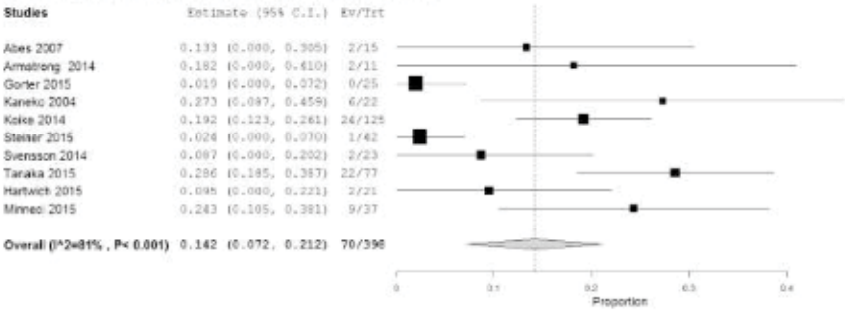
Aim: Non-operative treatment (NOT) with antibiotics alone, of acute uncomplicated appendicitis (AUA) in children has been proposed as an alternative to appendicectomy. Prior to a prospective evaluation, we aimed to determine safety/efficacy of NOT based on existing literature, using systematic review and meta-analysis. This type of assessment has not been reported previously in children.

Methods: Systematic review of existing literature in December 2015 to identify articles reporting NOT for AUA in children. Study quality was assessed using MINORS and Cochrane risk of bias tools. Primary outcome was efficacy of NOT (discharge without appendicectomy) during initial hospital episode. Meta-analysis was performed using MetaAnalyst and RevMan with a random effects model; p<0.05 considered significant.

Results: Ten articles reporting 413 children receiving NOT were included. Six studies, including one RCT, compared NOT with appendicectomy. The remaining 4 reported outcomes of NOT without a comparison group. NOT was effective in 97% of children (95%CI 96, 99; Figure). Initial length of hospital stay was shorter in children treated with appendectomy compared to NOT (mean difference 0.5 days [95%CI 0.2, 0.8]; p=0.002). At final reported follow-up (range 8 weeks - 4 years), NOT remained effective (no appendicectomy performed) in 79% of children (95%CI 73, 86%). Recurrent appendicitis occurred in 14% (95%CI 7, 21). Complications (risk difference 0.02 [95%CI 0.00, 0.05]; p=0.1), and total length of hospital stay during follow-up (mean difference 1.1 days [95%CI -1.2, 3.5]; p=0.34) were similar for NOT and appendicectomy. No serious adverse events related to NOT were reported.

Conclusions: Although limited, current data suggest that NOT is safe. It appears effective as initial treatment in 97% of children with AUA and the rate of recurrent appendicitis is 14%. Longer term clinical outcomes and cost effectiveness of NOT compared to appendicectomy require further evaluation, preferably as large randomised trials to inform decision making.

Figure: Forest plot of initial efficacy of NOT in children with uncomplicated acute appendicitis



003

HUMAN AMNIOTIC FLUID STEM CELLS: A NOVEL FETAL HAEMATOPOIETIC STEM CELL SOURCE WITH POTENTIAL FOR THERAPY

Stavros Loukogeorgakis[1], Durgah Ramachandra[1], Panicos Shangaris[1,2], Eleni Antoniadou[1], Alfonso Tedeschi[1], Sindhu Subramaniam[1], Michael Blundell[1], Steven Howe[3], Anna David[2], Paolo De Coppi[1]
[1]*Stem Cells and Regenerative Medicine, Institute of Child Health, University College London, London, UK,* [2]*Institute for Women's Health, University College London, London, UK,* [3]*Molecular and Cellular Immunology, Institute of Child Health, University College London, London, UK*

Aim of Study: The demand for haematopoietic stem cells (HSC) in clinical applications is increasing. Amniotic fluid stem cells (AFSC) serve as a potential alternative cell source for therapy. The significant haematopoietic activity of murine AFSC led us to explore the potential of human CD117/c-Kit+ AFSC to reconstitute the haematopoietic system in vivo.

Methods: Human AFSC (2nd and 3rd trimester) and cord blood HSC (CB-HSC; control) were selected for CD117 and CD34 respectively flow-cytometry. Sorted cells (10^4 in 200µl PBS) were injected intravenously into sub-lethally irradiated NOD-SCID/IL2rγ^{null} (NSG) mice (n=6/group). Haematopoietic engraftment of human cells (% of human CD45+ within total CD45+) and multi-lineage reconstitution (erythroid, myeloid and lymphoid) were assessed at 16 weeks in blood, bone marrow (BM) and spleen. BM mononuclear cells (MNC) from mice engrafted with human cells were used in secondary transplantation experiments (1.5x10^7 MNC in 200µl PBS; haematopoietic engraftment assessment 16 weeks post-transplantation; n=6/group).

Results: Human AFSC engrafted the haematopoietic system of sub-lethally irradiated NSG mice at levels similar to the ones achieved with CB-HSC (blood: AFSC 7.5±1.3% vs. CB-HSC 6.1±2.2%, p=0.6; BM: AFSC 46.3±7.9% vs. CB-HSC 38.3±8.2%, p=0.6; spleen: AFSC 39.6±9.3% vs. CB-HSC 34.7±10.5%, p=0.7). Importantly, the potential for multi-lineage haematopoietic reconstitution was comparable between groups at 16 weeks post primary transplantation. Moreover, at 16 weeks following secondary transplantation, AFSC-derived haematopoietic cells were detected in peripheral blood (8.9±1.6%) and other haematopoietic organs; engraftment levels were similar to these in the CB-HSC group (blood: 7.3±1.8%, p=0.8).

Conclusion: Human CD117/c-Kit+ AFSC have functional, multi-lineage haematopoietic potential that is similar to the current "gold-standard" stem cell source for haematopoietic transplantation. The ease of isolation during early gestation, as well as their gene-engineering and expansion potential make human AFSC a novel autologous fetal cell source for pre- and post-natal therapy of inherited haematological disorders.

004

THE MANAGEMENT OF BOYS UNDER 3 MONTHS OF AGE WITH AN INGUINAL HERNIA AND IPSILATERAL PALPABLE UNDESCENDED TESTIS: RESULTS OF A 10-YEAR MULTI-CENTRE RETROSPECTIVE REVIEW

Naomi Wright[1,4], Joseph Davidson[2], Christina Major[1], Natalie Durkin[3], Yew-Wei Tan[2], Matthew Jobson[4], Niyi Ade-Ajayi[3], Nigel Hall[2,3], Nordeen Souhediba[1,3]
[1]*Evelina Children's Hospital, Guy's and St.Thomas' NHS Trust, London, UK,* [2]*University Hospital Lewisham, London, UK,* [3]*Kings College Hospital, London, UK,* [4]*Southampton Children's Hospital, Southampton, UK,* [5]*Faculty of Medicine, University of Southampton, Southampton, UK*

Aims: Current practice regarding management of the testis in young boys with an indirect inguinal hernia (IIH) and ipsilateral palpable undescended testis (PUDT) varies widely. We aimed to identify the optimal management of these children by comparing outcomes of treatment strategies.

Methodology: Retrospective 10 year (2005-2015) review across 4 paediatric surgery centres of boys under 3 months of age with concomitant IIH and PUDT. Primary outcome was testicular atrophy. Secondary outcomes included testicular ascent, need for subsequent orchidopexy and hernia recurrence. Data are median (range). Chi squared test was used for analysis; $p<0.05$ was considered significant

Results: Forty-one infants were identified and all included. Median gestational age at birth was 37+ weeks (24-42) and birth weight 2.5kg (0.56-4.95). Post-conceptual age at time of diagnosis of IIH with PUDT was 43 weeks (33.52). At presentation, 19 (46%) hernias were right sided, 15 left (37%) and 7 (17%) bilateral. 27 (66%) hernias were reducible, 14 (34%) were symptomatic requiring emergency repair. Post-conceptual age at surgery was 45 weeks (37-65). Primary operations included: 7 (17%) open hernia repair with no orchidopexy, 1 (2%) open hernia repair and suturing of the testis to the inverted scrotum without scrotal incision, 29 (71%) open hernia repair and standard orchidopexy, 4 (10%) laparoscopic hernia repair with future orchidopexy if required.

Variation in atrophy rate between different surgical approaches did not reach statistical significance ($p = 0.09$; Table 1). There was a significantly higher risk of requiring a subsequent orchidopexy in the groups with open hernia repair and no orchidopexy or laparoscopic hernia repair than those receiving an orchidopexy at the time of primary surgery ($p = 0.0005$). No hernia recurred.

Conclusion: Orchidopexy at the time of primary surgery did not increase the risk of atrophy, but was associated with a significantly lower need for subsequent orchidopexy.

Table 1: The outcome of different operative strategies for boys under 3-months of age with both an IIH and IPUDT

	Open repair and no orchidopexy (n=7)	Open hernia repair and suturing of the testis to the inverted scrotum (n=1)	Open hernia repair and orchidopexy (n=29)	Laparoscopic hernia repair and subsequent orchidopexy if needed (n=4)
Atrophy				
Partial	2 (29%) *1R, 1I	0	3 (10%) *1R, 2D,	1 (25%) *1R
Complete	0	1 (100%) *1D	0	0
Not recorded	1	0	3	0
Subsequent orchidopexy	5 (71%)	0	1 (3%)	3 (75%)

* Type of hernia at the time of surgery: R – reducible, D – difficult to reduce requiring emergency repair, I – irreducible.

005

THE BENEFITS OF INTRODUCING PROBIOTICS IN CHILDREN RECEIVING ENTERAL NUTRITION: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Aim: To evaluate whether probiotics help improve the outcomes (feed intolerance, sepsis, time to reach full feeds, risk of necrotising enterocolitis (NEC) and mortality, duration of hospitalization and weight gain) of children receiving enteral feeds and to determine whether a single or a combination of probiotics work best.

Method: A systematic review was done in accordance with the guidelines in Cochrane Handbook for Systematic Reviews and Interventions. An electronic search through 3 databases (EMBASE, Medline, CINAHL) were conducted and references from papers reviewed were cross-checked. Expert contents were also sought for further information. The review included randomised controlled trials (RCT), systematic reviews and case reports. Data obtained from RCTs were pooled into a meta-analysis.

Results: 39 citations were identified (n=28,756) out of which 23 were RCTs (n=4855). A meta-analysis of the pooled data estimated a significant reduction in feeding intolerance (OR 0.33, 95% CI 0.23-0.46, p<0.00001), abdominal distension (OR 0.60, 95% CI 0.31-0.90, p=0.004), sepsis on clinical grounds (OR 0.55, 95% CI 0.38-0.80, p=0.002), risk of NEC (OR 0.45, 95% 0.34-0.60, p<0.00001), mortality (OR 0.47, 95% CI 0.35-0.64, p<0.00001) and time to achieve full enteral feeding (MD -2.83, 95% CI -4.80, -0.87, p=0.005) in the probiotic group. Incidences of vomiting & diarrhoea, blood cultured sepsis, duration of hospitalization and weight gain did not differ significantly. There was no adverse effects noted but five case reports described bacteraemia. Comparatively, administration of the multiple-strain probiotics yielded more benefits than single-strains.

Conclusion: Probiotics improve feeding intolerance, abdominal distension, clinical sepsis, risk of NEC & mortality and shorten the time to achieve full feeds when administered enterally in children. Multiple-strain probiotics seem more beneficial than single-strains. However, larger trials involving a wider range of age group should be conducted to assess the types of probiotics, dose and duration for supplementation.

006

REDUCTION IN CENTRAL LINE SEPSIS IN INFANTS WITH GASTROSCHISIS

Melanie Drewett[1], David Burge[1,2], Nigel Hall[1,2]
[1]*Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK,* [2]*University of Southampton, Southampton, UK*

Aims: Central venous line sepsis (CVLS) is a major cause of morbidity in gastroschisis. Following a recent review of CVLS in a tertiary neonatal unit an unexpected low incidence of CVLS in infants with gastroschisis was noticed. Over the past 5 years an increased use of hypoallergenic feeds and a decreased use of prophylactic antibiotics following delivery has occurred. We aimed to examine whether there had been variation in the rate of CVLS in gastroschisis coincident with these changes.

Methods: An institutionally-approved retrospective cohort study of all infants with gastroschisis managed at a single centre over 12 years. All infants are managed on a neonatal medical/surgical unit with predominantly percutaneous central venous lines (CVL). CVLS was defined as clinical signs of infection supported by laboratory results and positive blood culture whilst a CVL was *in situ*, treated by antibiotics for ≥5days +/- CVL removal. The number of infants with CVLS and the rate per 1000 CVL days were determined in three 4 year periods since 2001. Aseptic Non Touch Technique (ANTT) was adopted in 2005. The Chi squared and Fisher exact tests were used for statistical analysis.

Results: 170/177 infants with gastroschisis had complete episodes of stay. The incidence of CVLS was similar in the first 2 periods but significantly reduced in the last period ($p<0.01$; Table). The number of CVLS per 1000 CVL days was 14.5, 13.4 and 2.8 in the three periods respectively ($p<0.01$). There has been no change in the overall rate of CVLS on the neonatal unit.

Conclusions: We have seen a significant reduction in CVLS in infants with gastroschisis in the last 4 years coincident with changes in enteral feeding and antibiotic usage. These results support the concept that promoting a healthy gut microbiota may help to reduce CVLS.

	2004-07	2008-11	2012-15
Total number of infants	58	56	56
Total number of CVL days	1727	1423	1409
Number of infants with CVLS %	17 (29%)	14 (25%)	3 (5%)

Table: Number of patients with CVLS in three 4 year periods

007

BENCHMARKING CONTEMPORARY SURGICAL OUTCOMES USING PUBLISHED LITERATURE: A SYSTEMATIC REVIEW AND META-ANALYSIS, USING THE EXAMPLE OF GASTROSCHISIS

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[1]*National Perinatal Epidemiology Unit, University of Oxford, Oxford, UK,* [2]*Oxford University Hospitals NHS Foundation Trust, Oxford, UK,* [3]*Department of Paediatric Surgery and Urology, Alder Hey Children's Hospital, Liverpool, UK,* [4]*University of Liverpool, Liverpool, UK*

Aim of the Study: To use contemporary literature to provide a benchmark of outcomes in infants born with gastroschisis: to establish population outcomes for patients with simple and complex gastroschisis; to assess the quality of outcome reporting in the published literature.

Methods: The outcomes assessed were: mortality in the first 30 days and first year after birth, median length of hospital stay and reoperation within 30 days. A systematic review was undertaken including studies published from World Bank classified high-income countries after the year 2000. Meta-analysis was undertaken to generate population outcome estimates.

Main Results: The study identification process is illustrated within the PRISMA flow diagram (Fig 1). Two percent (95% CI 1-4%, 192/3938) of all infants died within the first month after birth. No significant difference in this outcome was identified between patients with simple (2%, 95% CI 0-3%, 15/766) and complex (3%, 95% CI 0-9%, 6/138) gastroschisis, (p=0.08). Seven percent (95% CI 5-10%, 279/2936) of all infants born with gastroschisis died before one-year of age. At one year there was a statistically significant difference in the proportion of deaths between infants with simple (2%, 95% CI 1-4%, 9/321) and complex (19%, 95% CI 3-42%, 6/50) gastroschisis (p=0.02). Overall median length of stay was 33 days (n=2384): 43 and 84 days for patients with simple and complex gastroschisis respectively. Studies contributing to the assessment of frequency of reoperation within 30 days were heterogeneous and few. The pooled estimate for the number of infants with this outcome was 11% (95% CI 3-20%, 24/171).

Conclusion: The published literature may be used as a means to benchmark outcomes in surgery. Heterogeneity in outcome reporting hinders the generation of robust evidence to guide practice. These pooled data may be used to counsel parents and inform assessment of hospital or surgeon outcomes.

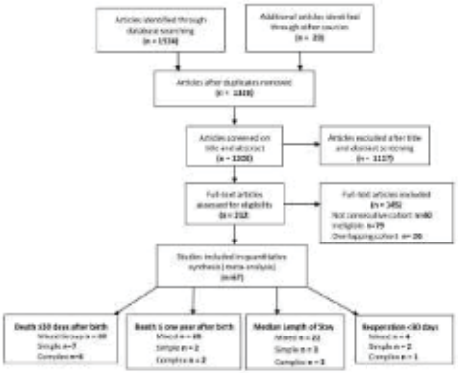

Fig 1. The PRISMA Flow Diagram for Study Identification

008

WHAT IS THE CURRENT PRACTICE REGARDING TIMING OF PATENT PROCESSUS VAGINALIS LIGATION FOR IDIOPATHIC HYDROCELE IN YOUNG BOYS IN THE UNITED KINGDOM?

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[1]Department of Paediatric Surgery and Urology, Southampton Children's Hospital, Southampton, UK, [2]Faculty of Medicine, University of Southampton, Southampton, UK

Aims: Nearly 3000 boys have surgery for hydrocele annually in England. The natural history of the patent processus vaginalis is unknown, resulting in uncertainty regarding the optimal timing for surgical repair. The aim of this study was to determine current practice regarding timing of hydrocele repair amongst UK based paediatric surgeons and urologists.

Methods: Validated survey using the REDCap online application. The survey was distributed amongst UK based paediatric surgeons and urologists via national organisation mailing lists. Participants were asked their preferred management option in five different clinical scenarios across five age ranges. Data are percentage of respondents.

Results: There were 71 respondents: full results are shown in the Table. The most common age to offer surgical intervention for a hydrocele that was present since birth and either stable or increasing in size, or a hydrocele of the cord, was 24-36 months. For a stable hydrocele presenting after 12 months of age, the most common age to offer repair was between 36 and 48 months. Approximately ¼ of respondents defer surgery until 4 years of age for any stable hydrocele. For a hydrocele that was present since birth but decreasing in size, the majority of respondents (57%) do not offer surgical intervention even over 4 years of age. The majority of respondents (61%) did not differentiate between communicating and non-communicating hydrocele when considering age for repair.

Conclusions: The age at which surgery is offered for hydrocele varies by clinical scenario and age amongst UK based paediatric surgeons and urologists. Whilst most commonly offered between 2 and 3 years, a significant number of surgeons defer surgery until at least 4 years of age. These results suggest that there is adequate uncertainty to support a prospective study of optimum age for hydrocele repair and the natural history of PPV closure.

Table

		Clinical scenario				
		Hydrocele present since birth, stable in size	Hydrocele present since birth, increasing in size	Hydrocele present since birth, decreasing in size	Hydrocele present after 12 months of age, stable in size	Hydrocele of the cord, stable in size
		Percentage of respondents offering surgical intervention				
Age from which surgical intervention is offered (months)	**<12**	0	3.2	1.6	N/A	6.6
	12-24	7.6	19	1.6	4.4	4.9
	24-36	34.8	42.9	6.6	24.6	42.6
	36-48	33.3	27	18	34.4	19.7
	>48	24.2	6.3	14.8	29.5	16.4
	Not offered	0	1.6	57.4	6.6	9.8

009

PARENTAL RECALL AFTER INFORMED CONSENT FOR ELECTIVE HERNIOTOMY

Beatrice F Koh, Maria RA Lipa, Fay X Li, Yee Low, Shireen A Nah
KK Women's and Children's Hospital, Singapore, Singapore

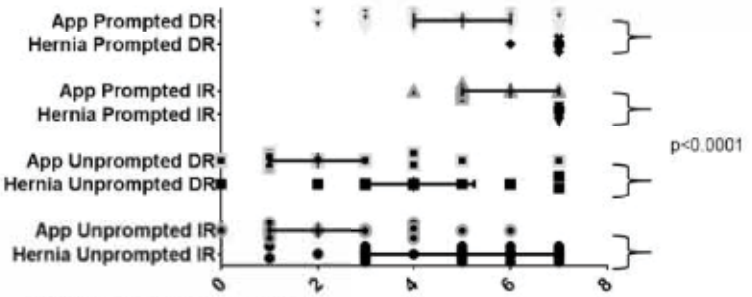
Aim of the study: A previous report from our institution showed that parents of children undergoing emergency appendicectomy had poor retention of information regarding surgical complications despite adequate counselling. This study evaluates parental recall after consent regarding elective herniotomy.

Methods: This was an ethically approved pilot prospective study recruiting parents of children undergoing elective day surgery hernia clinics between March-December 2015. All consents and interviews were done by one of 2 surgical doctors. Parents were counselled regarding 6 complications/sequelae of surgery(infection,haematoma,vas injury,vessel injury,recurrence,contralateral hernia risk) and 1 consequence of non-operative management(incarceration), giving maximum score of 7 per recall. Interviews took place on the operative day(unprompted immediate recall,IR) and again between 1-6 weeks postoperatively(unprompted delayed recall,DR). For each recall, parents were also reminded on complications they omitted(prompted recall). Demographic data were recorded. Data are reported as median(range). We compared results from this study(Hernia) to our previous study(App). Wilcoxon(for paired data) or Mann-Whitney(for unpaired data) tests and Spearman's correlation test were used as appropriate, with $p<0.05$ considered significant.

Main Results: Thirty parents were interviewed aged 38(24-51) years. Thirteen(43%) had university or postgraduate qualifications. Postoperative DR interviews were done at 14(2-43) postoperative days. Scores for unprompted IR [5(1-7)] were significantly higher than DR [4(0-7)],p=0.04. When prompted, all parents achieved full IR scores, and all except one achieved full DR scores(Figure). The most commonly remembered items were wound infection(IR n=29,97% vs DR n=25,83%) and haematoma(IR n=24,80% vs DR n=21,70%). The least remembered was incarceration(IR n=17,57% vs DR n=6,20%). Surprisingly, there was no correlation between DR scores and time between interviews(r=0.22,p=0.24). For all recalls, Hernia scores were better than App scores(Figure).

Conclusion: Although there was deterioration of recall, the recall rate for elective herniotomy was much higher than for emergency appendicectomy. This may be due to previous outpatient counselling prior to surgery,and less stressors present in the elective environment.

Figure: Scores achieved by parents asked to recall 7 items detailed in their surgical consent



IR: Immediate recall, DR: delayed recall
Hernia: Hernia study, n=30, 7 items
App: Appendicectomy study, n=31, 7 items
Each dot represents an individual's score
Line indicates interquartile range and passes through median

D10

MANAGEMENT AND EARLY OUTCOMES OF MECONIUM ILEUS ASSOCIATED WITH CYSTIC FIBROSIS IN THE UNITED KINGDOM AND IRELAND; A PROSPECTIVE POPULATION COHORT STUDY

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Aim of the study: The aim of this study was to assess the incidence, current management strategies and early outcomes of Meconium Ileus (MI) in association with Cystic Fibrosis (CF), in the UK.

Methods: This was a prospective, multicentre population cohort study utilising an established reporting system to identify new cases of MI associated with CF presenting between October 2012 and September 2014. Data were collected on antenatal and birth history, presentation, management and early outcomes of all reported cases.

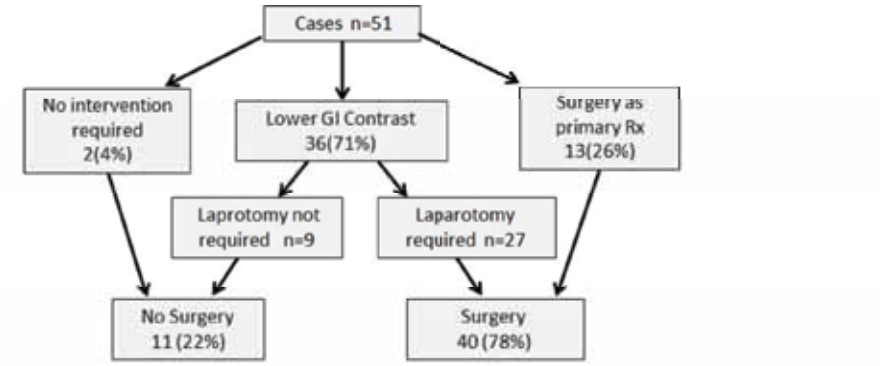
Main Results: 72 cases were reported, of which 51 (71%) have had the diagnosis of CF confirmed. Analysis of management and outcomes was undertaken on these 51 infants. 12 cases (24%) were considered 'high risk' for CF on antenatal screening. Additional congenital anomalies were found in 4 patients (8%).

A therapeutic contrast enema was performed in 36 infants (71%). 52 enemas were performed in total, (1-4 per patient). Two patients, (6%) had complications of enema treatment; one had a perforation detected the day after the procedure, another developed hyponatraemia following each of two enemas.

40 infants underwent laparotomy (79%). In 13(26%), this was a primary procedure; 27 were undertaken after contrast enema. At laparotomy, meconium obstruction was seen in 51%, perforation in 22%, atresia in 14% and 30% had evidence of volvulus. 35% underwent an enterotomy and irrigation, 10% had a resection with primary anastomosis and 24% had a bowel resection and enterostomy.

Two deaths were recorded within the cohort (4%). One had a contrast but no surgery and the other died several weeks post operatively.

Conclusions: These data provide a contemporary picture of the incidence of MI in association with CF in the UK, its clinical features and early management. The majority of patients required laparotomy despite the widespread and sometimes repeated use of therapeutic contrast enema (Fig 1).



D11

LEARNING FROM LAWSUITS: HOW DOES PAEDIATRIC SURGERY COMPARE TO OTHER SURGICAL DISCIPLINES?

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Aim: Medico-legal claims are a drain on NHS resources and promote defensive practice. This report aims to describe trends in paediatric surgery (PS) claims in comparison to the 10 other surgical specialties (as defined by the Royal College of Surgeons of England).

Methods: Data were requested for all claims received by the NHS Litigation Authority (NHSLA) from 2004 - 2014. Surgical specialties included paediatric, cardiothoracic, general, neurosurgery, obstetric, oral and maxillofacial (OMFS), orthopaedic, otorhinolaryngology, plastic, urology and vascular surgery. Inter-specialty comparative analysis was conducted including total number, cost and outcome of claims, leading causes of successful claim and time to settlement.

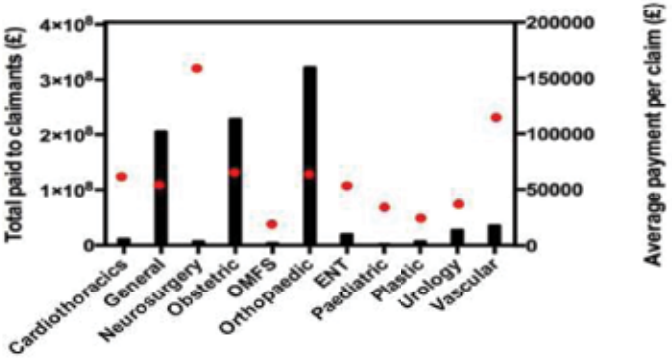
Results: The NHS paid out approximately £1.5 billion across 11 surgical specialties from 2004 - 2014. PS claims took the longest to settle (mean 35 months cf. pan-specialty mean 25.5 months, range 17.8 – 35 months).

PS received the least number of claims (n=62) and paid out the least in settlement costs (£2.3 million) over the 10-year period, though it did not pay out the least per claim (£33,941 cf. OMFS £16,946 and plastics £27,013) (Figure 1).

The three leading causes for successful claim in PS were: failure/delay in treatment (22.6%), intra-operative problems (11.3%) and delay in performing operation (9.7%). Overall, 806 never events were successfully claimed for during the 10-year period, 3 of which were in PS (wrong site surgery (n=1), retained foreign body/instrument (n=2), 4.8% of total PS claims). The specialty with with the highest number of never event claims was obstetrics (retained foreign body/instrument, n=277, 8.8% of total claims).

Conclusion: For the first time, a pan-specialty comparison of litigation claims has been conducted using NHSLA data. For paediatric surgery, unreasonable delay in treatment/surgery accounted for a majority of successful claims. This must be recognized during strategic planning in the current climate of centralisation of specialist services.

FIGURE 1: Inter surgical specialty comparison of the total amount paid to successful claimants (left y axis, black columns) and the average payment per claim (right y axis, red dots) in damages from 2004 - 2014



D12

A NEW CLASSIFICATION SYSTEM FOR THE INTERNAL INGUINAL RING IMPROVES PREDICTION OF METACHRONOUS CONTRALATERAL HERNIAE

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Aim: To determine whether any characteristic of the internal inguinal ring at laparoscopy, other than patency, is associated with the development of a hernia.

Methods: A prospective study of consecutive children with a unilateral inguinal hernia was performed. At the time of herniotomy, using an open approach, a 70^0 laparoscope was inserted through the hernial sac and a video recording of the contralateral ring was made. The contralateral groin was not explored irrespective of the findings. The children were followed up for hernia development.

Results: 204 children were recruited over a period of 5 years. Follow up was for a median of 3 (range 0.3-6) years. 21 children were excluded due to poor visualisation of the contralateral ring. 183 children (145 boys) with a median age of 8 months (range 3 weeks-16 years) were studied. There were 117 right and 66 left herniae. A contralateral hernia appeared in 13 (7%) children. Patency was noted in 61 rings and was associated with hernia development in 11 (18%) cases. A previously undescribed peritoneal veil appearing at the medial side of the ring was noted in 166 (91%) rings. A new classification system based upon patency and the presence of this veil was introduced: Type I ring (Patent without veil), Type II (Patent with veil) and Type III (Closed with veil). There were 17 (9%) Type I, 44 (24%) Type II and 122 (67%) Type III rings. The incidence of a metachronous hernia was 47% in a Type I, 7% in a Type II and 2% in a Type III ring.

Conclusions: Patency alone is a poor predictor of hernia development and leads to overtreatment. Our new classification provides the highest prediction of contralateral hernia development. A type I contralateral ring warrants herniotomy in an asymptomatic groin.

D14

HOW NEGATIVE IS A NEGATIVE CT IN BLUNT ABDOMINAL TRAUMA?

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Aim: CT is the imaging modality of choice in children in trauma. Concerns of missing an intraabdominal injury lead clinicians to admit children for a period of observation despite normal imaging. To date, there is no consensus on management of children with negative trauma CT following blunt abdominal trauma (BAT).

We performed a systematic review of the literature to determine the negative predictive value of a negative CT abdomen in children following BAT.

Methods: Search of the Pubmed database from 01/01/1980-31/12/2014; and manual search of references.

Results: Initial search: 972 articles. Following the PRISMA process 4 papers were included. No randomized controlled trials, 3 observational cohort studies, 1 non-systematic review

Awasthi 2008: 1065 children with normal CT following BAT. No missed injuries requiring intervention. NPV of negative CT abdomen to exclude intra-abdominal injury 99.8% (95%CI: 99.3%-100%).

Kerrey 2013: 3819 children. 3 intestinal injuries not visible on initial CT, 2 pancreatic injuries, 1 low-grade liver/spleen laceration. NPV of negative CT abdomen 99.6% (95%CI: 99.3%-99.8%).

Holmes 2012: 2734 adults. 8 missed injuries (0.4%). 5 required operative intervention: 2 pancreatic drainage, 1 liver packing, 1 serosal tear oversewing, 1 splenectomy. NPV of negative CT abdomen 99.7% (95%CI: 99.4%-99.9%).

Hom 2010: non-systematic review; included study by Awasthi 2008, and 2 smaller patient groups. NPV 99.8% (95%CI: 99.6%-99.9%).

Overall, the percentage of missed injuries ranged from 0.1%-0.4% and the NPV for CT to detect intra-abdominal injury from 99.6%-99.8%

Conclusion: Three observational cohort studies have been published with the aim to detect the rate of missed intra-abdominal injury following "negative" CT after BAT. These studies show that the NPV of CT is very high. Hence, a negative abdominal CT scan rules out significant intraabdominal injury to almost 100%. Discharge directly from the emergency department should be considered if there are no other reasons for admission.

015

TO ASSESS THE APPROPRIATENESS OF RADIOLOGICAL INVESTIGATION IN PAEDIATRIC MAJOR TRAUMA PATIENTS WITH SUSPECTED CHEST INJURY

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Introduction: Significant injuries due to blunt trauma raise major clinical concern. Due to their rarity, lack of experience in managing such cases and application of adult protocols, children are frequently investigated using CT scanning. In an attempt to reduce the radiation exposure of such children The Royal College of Radiology (RCR) produced an evidence based, paediatric specific trauma imaging protocol in 2014. This recommended chest x-ray rather than CT imaging as the primary imaging modality for major trauma.

Objective: To audit the radiological investigation of major trauma patients with suspected chest injuries

Method: A retrospective, case-note and radiology review was carried out of all children undergoing radiological investigation for chest injury following significant trauma at a Paediatric Major Trauma Centre between 2011 and 2015.

Results: There were 61 patients admitted of whom 53 (87%) had CXR as their primary imaging modality. Four patients had only CT as the primary imaging and 6 had CT following a normal CXR. Thus 16% of patients received chest CT irradiation that might be reduced if the recently issued guidelines had been followed.

Conclusion: The application of the RCR Guidelines will significantly reduce the radiological exposure of trauma patients without a reduction in diagnostic accuracy. This review highlights the need for wider understanding of the guidelines and their application.

016

DIFFERENTIAL PROGRESSION OF LIVER FIBROSIS IN SYNDROMIC AND ISOLATED BILIARY ATRESIA

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Aim of the study: Most biliary atresia (BA) patients require liver transplantation after portoenterostomy (PE) due to liver fibrosis, which progresses for unclear reasons. We addressed predictors, histology and molecular characteristics of liver fibrosis after PE.

Methods: After ethical approval, 28 BA patients with liver biopsies obtained during and after successful PE were included (Table). Biopsies were scored for fibrosis (Metavir F0-F4) and cholestasis (0-3). Expression of collagen 1 (*COL1A2*) and α-SMA (*ACTA2*), a marker of collagen producing myofibroblasts, were determined by immunohistochemistry and qRT-PCR. 29 pediatric donor livers and subjects undergoing cholecystectomy were used as controls.

Main results: Median serum bilirubin was 159±68 at PE and 10±19 µmol/L at follow-up, while histological cholestasis diminished from 2.0±0.9 to 0.0±0.3 ($p<0.001$ for both). Despite effective resolution of cholestasis fibrosis persisted (Metavir 2.0±0.7 to 2.0±1.2, $p=0.170$). Compared to controls, BA patients had markedly higher expression of collagen (area fraction, 17±5.5% and 16±11% vs 3.5±1.8%, $p<0.001$) and α-SMA (17±6.7% and 14±7.8% vs 7.1±4.2%, $p<0.001$) similarly both at PE and at follow-up, respectively. Collagen encoding *COL1A2* correlated positively with collagen and α-SMA protein expression ($r=0.475$, $p=0.019$ and $r=0.512$, $p=0.013$, respectively). Absence of associated anomalies was the only factor found to predict progression of fibrosis. Patients with associated anomalies (n=11) displayed significantly lower Metavir fibrosis stage, expression of α-SMA and collagen at follow-up than isolated BA patients, although PE and follow-up age and Metavir stage (2.5±0.5 vs 2.0±0.7, $p=0.138$), expression of collagen (18±5.3% vs 17±5.8%, $p=0.686$) and α-SMA (17±5.6% vs 16±7.1%, $p=0.385$) at PE were comparable between syndromic and isolated patients, respectively (Table).

Conclusion: Despite resolution of cholestasis after successful PE, liver fibrosis and expression of collagen 1 and α-SMA remain markedly up-regulated. This up-regulation was lower in syndromic than isolated BA supporting different pathogenesis in these subgroups.

	All (n=28)	Isolated (n=17)	Syndromic (n=11)
PE age (d)	60.5 ± 35.6	64.0 ± 33.6	56.0 ± 39.8
Follow up age (y)	3.04 ± 4.29	2.81 ± 4.44	4.20 ± 4.06
Metavir stage (0-4)	2.0 ± 1.2	3.0 ± 1.1	2.0 ± 1.1*
α-SMA area fraction (%)	13.9 ± 7.79	15.5 ± 7.22	11.1 ± 8.15*
Collagen 1 area fraction (%)	15.6 ± 11.3	19.4 ± 9.96	10.0 ± 12.8*
Collagen 1 grade (0-4)	2.0 ± 1.2	2.0 ± 0.9	1.0 ± 1.2*
COL1A2 gene (fold change)	2.72 ± 2.37	3.02 ± 2.50	2.08 ± 2.20

Table. Characteristics of native liver fibrosis median three years after portoenterostomy
Data are median ± SD. *Mann Whitney U-test vs isolated patients, P≤0.05.

017

DELIVERY OF VASCULAR ENDOTHELIAL GROWTH FACTOR WITH BIOCOMPATIBLE NANOPARTICLES REVERSES STRUCTURAL ARTERIAL ABNORMALITIES IN THE NITROFEN RAT MODEL OF CONGENITAL DIAPHRAGMATIC HERNIA

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Aim of Study: The aim of the study was to determine whether gradual prenatal intra-pulmonary delivery of vascular endothelial growth factor (VEGF), using nanodiamonds (ND) that release their cargo over 48-72 hours, has salutary effects against pulmonary arterial structural abnormalities in experimental congenital diaphragmatic hernia (CDH).

Methods: CDH was induced in pregnant Wistar rats by administration of nitrofen. Maternal hysterotomy was performed at E19, and ND (75µg/ml in 50µl vehicle/saline) were administered into the fetal trachea followed by tracheal occlusion (TO). ND were conjugated with recombinant VEGF164 (ND-VEGF; 2µg/ml VEGF164). Blinded assessment of lung-to-body weight ratio (LBWR) and pulmonary vascular morphometry was performed at E21.5 in CDH offspring. To examine the mechanism of action of VEGF in this setting, an inhibitor of the VEGF-receptor-2 (KDR/Flk-1) was co-administered (SU5416; 2mg/kg). Statistical analysis was performed using 1 way ANOVA with Bonferroni tests.

Results: ND-VEGF+TO was associated with improved lung growth (LBWR: 5.5±0.3%), which was significantly greater than that observed in unconjugated VEGF+TO (3.5±0.2%; p<0.01), raw ND+TO (3.3±0.2%; p<0.01), vehicle+TO (3.6±0.2%; p<0.01) and sham (2.0±0.2%; p<0.001), but similar to healthy controls (5.3±0.2%). Moreover, ND-VEGF+TO decreased muscularisation of pulmonary arterioles (≤50µm diameter: medial thickness: 20.3±0.9%) compared to other treatment groups (VEGF+TO: 26.8±0.8%, p<0.01; raw ND+TO: 26.9±1.0%, p<0.01; vehicle+TO: 26.9±1.2, p<0.01; sham: 36.9±1.2%, p<0.001). Morphometric parameter values in ND-VEGF+TO animals were comparable to those observed in healthy controls. Co-administration of SU5416 abrogated the beneficial effects of ND-VEGF, but did not affect outcomes in any other of the treatment groups.

Conclusions: Prenatal intra-pulmonary delivery of VEGF with biocompatible nanoparticles reverses CDH-associated structural arterial abnormalities via KDR/Flk-1 activation when used in combination with TO. The lack of measurable effects of unconjugated VEGF suggests that gradual release, mimicking the spatial and temporal expression of VEGF in normal lung development, is a requirement for bioactivity in this setting.

018

A DOUBLE BLIND RANDOMISED CONTROLLED TRIAL OF PERCUTANEOUS ENDOSCOPIC GASTROSTOMY VS. RADIOLOGICALLY INSERTED GASTROSTOMY IN CHILDREN: PEG VS. RIG TRIAL

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Aim of the Study: Retrospective reviews have suggested children with radiologically-inserted gastrostomy (RIG) have more complications than those with percutaneous endoscopic gastrostomy (PEG). Our aim was to determine whether PEG or RIG is superior in a prospective randomised controlled trial.

Methods: Following ethical approval, children at a single tertiary children's hospital requiring a primary gastrostomy were randomised to PEG or RIG, minimising for diagnosis, age, weight, inpatient status, and presence or absence of reflux and scoliosis. Following the procedure, patients were followed for up to three years by assessors blinded to insertion method. Complications were recorded using a standardised template and analysed by zero-inflated Poisson regression analysis, on an intention-to-treat basis and adjusting for length of follow-up.

Main Results: Between Nov 2011 and Nov 2014, 214 patients were randomised (107 PEG, 107 RIG). 100 patients received a PEG and 98 a RIG. All patients had at least one year follow up. Complications are indicated in Table 1. Major complications include buried bumper (PEG), gastro-colic fistula (RIG) and abscess requiring drainage under general anaesthetic (RIG). Minor complications included leakage and over-granulation. There was no significant difference in number of complications between PEG and RIG (p=0.83). Complications were assigned a severity score. There was no significant difference between PEG and RIG complication score; PEG patients had a 1.04 [0.88-1.22 95% CI] fold higher complication score than RIC patients (p=0.65). As independent factors, older (effect size 0.96 [0.93-0.99, p=0.003, oncological (0.72 [0.54-0.95] p=0.019 and metabolic patients (0.75 [0.57-0.97] p=0.03) all had a significantly lower complication score than neurologically impaired patients.

Conclusions: PEG and RIG are equally effective and safe methods of gastrostomy insertion. Longer-term follow up may reveal differences in complications such as gastro-colic fistula.

	Major Complications	Minor Complications
PEG	1	77
RIG	2	76
Total	3	153

D19

EXOME SEQUENCING REVEALS A RECESSIVE MECHANISM INVOLVING INTERACTING GENES IN PERSISTENT CLOACA

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Aim of the study: Persistent Cloaca (PC) is characterized by the convergence of the rectum, vagina, and urethra into a single common channel as a result of septational anomalies during development. PC is rare (1/20,000 live births), occurs sporadically (no family history; possibly because of the impaired reproductive fitness of the patients) and exclusively in females. The causes of this developmental failure are not known, yet there is strong evidence for a genetic component. The aim of this study is to investigate PC patients for genetic anomalies under the assumption sporadic conditions are likely to be caused either by recessively inherited or by *de novo* genetic lesions.

Methods: Whole exome sequencing was conducted on 10 PC trios following the standard protocol.

Main Results: Different rare damaging mutations in two interacting genes relevant in the development of the caudal region (*KRT18* and *ARHGAP9*) were found in 3/10 PC patients ($p<9.51 \times 10^{-5}$). Importantly, *KRT18* is also associated with bladder exstrophy-epispadias complex and urothelial differentiation. Similarly, mutations in the gene pair *GPRASP1* and *LRP2* were identified in 2/10 patients. Both *GPRASP1* and *LRP2* directly interact with members of two pathways essential for the development of the caudal region, namely sonic hedgehog (SHH) and bone morphogenetic protein (BMP). Another two patients had damaging compound heterozygous mutations in *MTR* and *MCM3* respectively. Both genes have been implicated in less severe anorectal malformations. Only one patient had damaging *de novo* mutations. Copy number analysis is underway.

Conclusion: 1: Our data supports a strong genetic basis for PC. 2: PC is genetically heterogeneous: different mutated genes in different patients. 3: PC is non-monogenic requiring mutations in two interacting genes to give rise to the developmental anomaly. 4: The inheritance of PC is likely to be recessive.

020

ILEO ANAL POUCH FAILURE IN A PAEDIATRIC POPULATION

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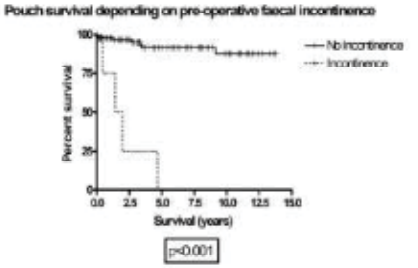
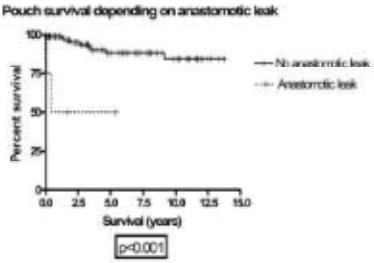
Aims: To quantify the incidence and variables associated with loss of ileo-anal pouches in children.

Methods: A single surgeon series of ileo-anal pouches was reviewed assessing pouch excision/permanent diversion. Possible explanatory variables were age, sex, indication for procto-colectomy, use of immunosuppressive drugs, anastomotic leak, number of stages, operative complication excluding anastomotic leak, open or laparoscopic surgery, rank order in series. Logistic regression was used to identify significant variables and Kaplan Meier graphs constructed to assess their effect on survival, comparing survival using the log rank test.

Results. Between 1999 and 2015, 103 children, 58 girls, underwent ileo-anal pouch at median age 14 years (SD 3.7). Median follow up was 4.2 years (range 0.3-14). Indications for restorative procto-colectomy were: ulcerative colitis (71), polyposis syndromes (15), chronic idiopathic constipation (9), Hirschsprung's disease (4), Crohn's disease (2), fibrosing colonopathy (2). 12 patients either has their pouch excised or were permanently diverted. Indications for pouch excision/diversion were: incontinence (4), abdominal pain and distension (3), inability to form pouch at initial procedure (2), exacerbation of known Crohn's disease (1), chronic pelvic sepsis (1), and chronic pouch vaginal fistula (1). All incontinent pouches were incontinent before surgery, three with idiopathic constipation and one with ulcerative colitis. Frequency of explanatory variables: exposure to immunosuppressive drugs (73), anastomotic leak (4), 2-stage surgery (59), 3-stage surgery (44), complication excluding leak (26), laparoscopic procedure (62). Faecal incontinence prior to surgery predicted pouch excision with all patients exhibiting this symptom suffering pouch failure. Otherwise only anastomotic leak predicted pouch excision, odds ratio 8.9 (95%CI 1.1-70, p = 0.038). Pouch survival was significantly worse following anastomotic leak. χ^2 =10.6, p = 0.001.

Conclusions: Pouch failure occurs in 12% of children following restorative procto-colectomy. Faecal incontinence prior to surgery should be a contra-indication. Anastomotic leak increases the probability of later pouch excision.





021

SPLANCHNECTOMY IMPROVES GASTRIC EMPTYING IN A RAT MODEL OF CEREBRAL PALSY AND FOREGUT DYSMOTILITY

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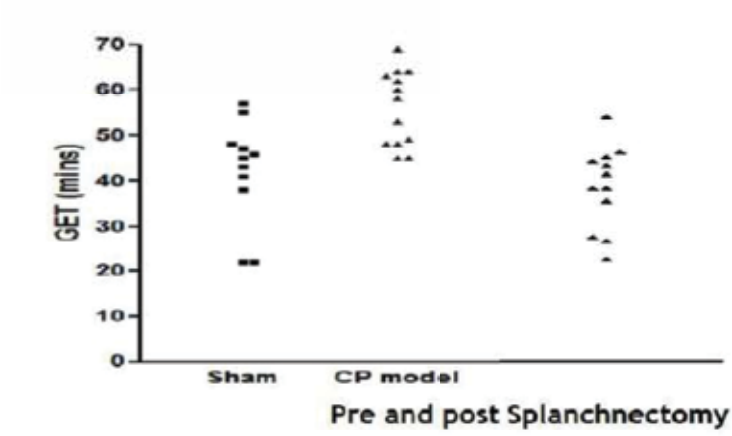
Aim of the study: To assess the effect of splanchnectomy on gastric emptying time in a previously described rodent model of cerebral palsy (CP) and foregut dysmotility compared to shams.

Methods: Ethical approval was obtained in accordance with the Animals (Scientific Procedures) Act 1986 (PPL 60/4262). Neonatal Sprague-Dawley rat pups, postnatal day 5-6, underwent midline craniotomies to allow bilateral brain injections in the medial prefrontal cortex (MPFC) of either ibotenic acid (IBA) i.e. our CP model or normal saline i.e. shams. Gastric emptying studies were then performed between day 14 and 20. Gastric emptying time (GET) was recorded by gavaging 0.2-0.5mls of water soluble contrast and performing time lapsed x-rays. On day 21 a midline laparotomy and splanchnectomy was performed with bipolar diathermy. GET was measured again between days 35 to 42. The pups were euthanized by means of transcardially perfusing with fixative under terminal anaesthesia. Statistical analysis was conducted to compare the GET of the two group's pre and post splanchnectomy by means of a Mann-Whitney U test using Graph Pad Prism

Main results: 26 rat pups were injected (14 female and 12 male). 13 pups underwent IBA injection and 13 sham injections. One pup died post brain injection from postoperative apnoea, the remainder progressed to splanchnectomy. Two pups, one from each group, died post laparotomy from intraoperative bleeding. The median GET was significantly longer in the CP model 58 minutes compared to 45 minutes ($p=0.0024$). Splanchnectomy reduced the GET in the CP group to 40.5 minutes ($p<0.0001$) as shown in the graph below.

Conclusion: Splanchnectomy can reverse the delay in GET we have shown previously in our rodent model of CP and dysmotility. Further work is needed to explore the mechanistic pathways behind this and may help develop new treatments for this challenging group of patients.



022

SURGERY FOR INFANTILE HYPERTROPHIC PYLORIC STENOSIS: A TEN YEAR NATIONAL COHORT STUDY

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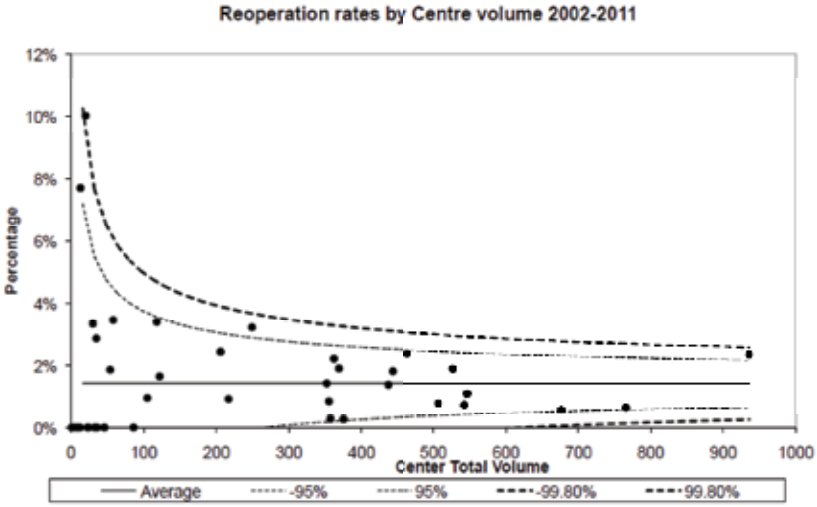
Aims: Determine: (i) outcomes of infantile hypertrophic pyloric stenosis (IHPS) surgery in England; (ii) whether there are differences in outcome between open or laparoscopic surgery, centre type and volume.

Methods: Hospital Episode Statistics (HES) data were used to analyse all NHS IHPS admissions in England 2002-2011. Data presented as median (IQR).

Results: 9686 infants underwent pyloromyotomy (83% male). Surgery was performed in 22 specialist centres (SpCen) and 39 non-specialist centres (NonSpCen), with 6221 (64%) transferred for surgery. Annual case volume in SpCen vs. NonSpCen was 40 (24-59) vs. 1 (0-3). Time to surgery was shorter in SpCen (1 day [1-2] vs. 2 [1-3]), but total stay equal at 4 days (3-6) due to 1 (1-2) day stay prior to transfer for many infants. Post-operative length of stay was also similar (2 days [1-3] vs. 2 [2-3]). 137 (1.4%) had complications requiring return to theatre (wound problem 0.6%; repeat pyloromyotomy 0.5% and laparotomy for perforation, bleeding or obstruction 0.2%); pooled rates were similar between SpCen vs. NonSpCen (1.4% vs. 1.6%, p=0.52, OR 0.84 0.46-1.53]). Similarly, individual centre analysis demonstrated SpCen had a range of 0-3.4% (median 1.2%) and NonSpCen, 0-10% (median 0%). Three NonSpCen had complication rates >5%, but all involved small numbers (1/13 or 2/20, complications/total cases). There was no relationship between reoperation rate and centre volume (Figure 1). Laparoscopic pyloromyotomy was associated with an increased risk of requiring repeat pyloromyotomy (10/983 vs. 40/8723, p=0.029, OR 2.28 [1.14-4.57].

Conclusions: Outcomes of IHPS surgery are consistent across England and in keeping with international benchmarks. Whilst surgical volume at NonSpCen fails to meet the NCEPOD criterion of no occasional surgery, outcomes appear equivalent although type II error must be considered. These data support published analyses demonstrating higher risk of inadequate myotomy with laparoscopy.



023

REGENERATIVE MEDICINE APPLICATIONS IN PAEDIATRIC UROLOGY: BARRIERS AND SOLUTIONS

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Purpose: Tissue engineering and regenerative medicine (TERM) provides opportunities to introduce new techniques into paediatric urology practice. In this work, improvements to the concept of composite cystoplasty: whereby high-pressure in end-stage disease bladders is alleviated by augmentation using bowel smooth muscle lined by an autologous *in-vitro* grown bladder epithelium, were sought.

Experimental Approach: Immunohistochemical characterisation of neuropathic bladders was performed. A hypoxia model was created in order to mimic the disease phenotype using propagated normal human urothelial cells and tissue *in-vitro*. Cell counts were used to assess proliferation. Trans-epithelial electrical resistance (TEER) was used to measure barrier function in differentiated urothelium. Immunocytochemistry, immunoblotting and RTPCR were employed to identify mechanistic pathways leading to heritable changes in cell and tissue phenotype.

Main Results: Assessment of human neuropathic bladder biopsies samples demonstrated significant expression of hypoxia-inducible factor (HIF-1 α) (median = 60.21, IQR = 42.37 – 95.05, n=15) compared to normal controls (median = 26.04, IQR = 11.66 – 33.98, n=9), ($p=<0.001$). Exposure to hypoxia reduced the proliferation and differentiation capacity of urothelial cells *in-vitro*. Whereas proliferation recovered upon switching to normoxia, the compromised differentiation persisted as demonstrated by a significantly reduced TEER in previously hypoxic cells (1803.33 Ω.cm^2 ± 235.02), compared to controls in normoxia (3203.33 Ω.cm^2 ± 220.66), ($p<0.001$, n=11). Repressive epigenetic marks were found to alter in location and abundance in the compromised urothelium. These marks were targeted using an epigenetic-modifying agent, which significantly recovered the differentiated urothelial phenotype. This recovery was replicated in urothelium from diseased bladders.

Conclusion: It is proposed that hypoxia results in persistent compromise in differentiated urothelium. The urothelial phenotype is recoverable by the application of an epigenetic modifying agent. By using an integrated approach to regenerative medicine, epigenetic modification may provide strategies to improve the efficacy of autologous tissue engineering approaches in paediatric urology.

024

ADMIT OR NOT TO ADMIT? HOW RELIABLE IS A CT SCAN IN THE DIAGNOSIS OF TRAUMATIC ABDOMINAL INJURY IN CHILDREN?

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Aim: No consensus exists on management of children with a negative trauma CT following blunt abdominal trauma (BAT). Asymptomatic children are frequently "admitted for observation" following negative CT without evidence for this practise.

We aimed to investigate the management of children with a negative trauma CT following BAT.

Methods: Retrospective audit at a UK paediatric major trauma centre of all children <16y who underwent abdominal CT for trauma between 01/01/2013-31/12/2014. Missed injury was defined as any injury found after the finalized CT report.

Results: 150 patients identified; 42 excluded leaving 108 patients. Median age: 11y at time of CT. 65 were male.

Commonest mechanisms of injury were road traffic collisions (61 patients; 56%) and falls from a height (37; 34%).

Clinical findings: 47(44%) no abnormal findings; 44(41%) abdominal tenderness +/-bruising; 13(12%) unconscious on arrival. 1 patient was peritonitic.

40(37%) had a normal CT scan, of whom 6(15%) were discharged from ED. The remainder were admitted, of whom 15(71%) were discharged within 24 hours. None of these discharged had further re-attendance. The remaining 19 children with normal CT required other specialty input.

CT was abnormal in 68(63%) children. 19/68(28%) had an acute intra-abdominal pathology, but only 2/68 (3%) required surgery for bowel perforation.

None of the 108 children had a missed intra-abdominal injury or re-attended with suspicion of missed intra-abdominal injury. Overall, the negative predictive value for CT to detect intra-abdominal injury in this audit was 100% (95%CI:96%-100%).

Conclusion: Our results are in keeping with the 3 observational cohort studies on the topic published to date and demonstrate that asymptomatic children with normal abdominal CT scan in the ED are very unlikely to have intra-abdominal pathology. A safe discharge from ED is possible for these children - a "period of observation" is not required, unless other extra-abdominal injury is present.

025

SMOOTH MUSCLE ACTIN EXPRESSION IS DECREASED IN SMALL BOWEL LONGITUDINAL MUSCLE IN HUMAN GASTROSCHISIS: POSSIBLE IMPLICATIONS FOR MOTILITY

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Aim of the Study: Gastroschisis-related intestinal dysfunction (GRID) is a significant morbidity. At birth gastroschisis bowel appears thickened. Serosal and muscle layers are reported to be proportionally thickened in human gastroschisis small bowel compared to controls. We aimed to understand the cellular basis of this bowel wall thickening.

Methods: This ethically approved retrospective archival gut tissue study compared resected small bowel from gastroschisis infants for atresia/stenosis/ischemia/perforation/persistently dysmotile gut with other pathologies including atresia/volvulus/strangulated hernia/intussusception/isolated perforation/meconium ileus. Only margins with normal architecture were selected. Sections (3 per stain/immunostain) were stained/immunostained with/for H&E, picrosirius red (PS; collagen), smooth muscle actin (SMA) and Ki-67 (proliferation marker). 10 images of both circular and longitudinal muscle layers for each stain/immunostain were taken in a horizontal orientation (40X objective). For each region of interest, total muscle area, percentage of positive PS or SMA staining, number of nuclei/mm2 and percentage of proliferating nuclei were blindly measured for each image and means calculated for each specimen. Data (mean±SEM) were compared by t test or Mann Whitney as appropriate, p≤0.05 was considered significant.

Main Results: 20 gastroschisis and 25 control specimens were included. The total longitudinal and circular muscle area was significantly larger in gastroschisis compared to controls (Table). The percentage of positive SMA staining in longitudinal muscle was significantly lower in gastroschisis (69%) than controls (80%;p=0.009) with some areas of absent staining. However, there was no increase in positive PS staining (collagen). Finally, there was no difference in the number of nuclei/mm2 (suggesting cells are not hypertrophic) or percentage of proliferating nuclei between gastroschisis and control gut.

Conclusion: The muscle layers are significantly thickened in small bowel of gastroschisis infants without evidence of hypertrophy or increased proliferation. However, SMA expression is decreased in the longitudinal muscle suggesting that a potential defect in smooth muscle contractility could explain GRID

	Control	Gastroschisis	P-value
longitudinal muscle area (mm^2)	0.054±0.004	0.079±0.004	0.0003
circular muscle area (mm^2)	0.075±0.004	0.086±0.002	0.023
SMA longitudinal muscle % +ve staining	79.7+2.3	69.4+3.1	0.009
SMA circular muscle % +ve staining	68.8+2.8	72.8+2.5	0.30
PS longitudinal muscle % +ve staining	26.2±3.1	29.6±2.5	0.42
PS circular muscle % +ve staining	20.1±2.5	25.7±2.5	0.13
longitudinal muscle nuclei/mm^2	5696±479	5313±735	0.33
circular muscle nuclei/mm^2	5589±586	5945±624	0.49
longitudinal muscle % proliferating nuclei	1.9±0.4	2.7±0.7	0.91
circular muscle % proliferating nuclei	2.0±0.5	1.8±0.5	0.68

026

MORE THAN HALF OF PRETERM INFANTS WITH NECROTIZING ENTEROCOLITIS OR SPONTANEOUS INTESTINAL PERFORATION LOSE CEREBROVASCULAR AUTOREGULATION DURING LAPAROTOMY

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Aim: Preterm infants who undergo major surgery are at risk of subsequent neurodevelopmental impairment. A possible explanation for this might be that cerebrovascular autoregulation (CAR) is reduced intraoperatively, resulting in harmful fluctuations of cerebral perfusion. Therefore, we wanted to evaluate CAR during laparotomy in comparison with pre- and postoperative CAR in preterm infants with necrotizing enterocolitis (NEC) or single intestinal perforation (SIP).

Methods. We prospectively included preterm infants (GA <37 wks) who underwent an exploratory laparotomy for NEC or SIP. We used Near-Infrared Spectroscopy (NIRS) to continuously measure mean cerebral oxygen saturation (rcSO2) eight hours preoperatively, during surgery and the first eight postoperative hours. To correct for effects of fluctuations of the arterial oxygen saturation (SpO2), we calculated the cerebral fractional tissue oxygen extraction (cFTOE) as follows: cFTOE = (SpO2-rcSO2)/SpO2. We used Spearman's correlation to determine the relation between cFTOE and mean arterial blood pressure (MABP) and defined inadequate CAR as rho >-0.3 with p <0.05. Comparisons in CAR were made using the Mackemar test.

Results: We included 27 preterm infants, twenty (74%) with NEC and seven (26%) with SIP. Median [IQR] GA was 27.6 wks [26.4-30.6], and BW of 1000 [790-1430]g. Surgery took place on median [IQR] postnatal day 9 [7-12]. Nineteen (70%) infants had MABP measurements (>1x/5min) preoperatively, during surgery, and postoperatively. Of these, three (16%) infants had inadequate CAR preoperatively, twelve (63%) had inadequate CAR intraoperatively, and none had inadequate CAR postoperatively. There was a higher incidence of inadequate CAR during surgery compared to preoperatively (p=.02) and postoperatively (p=.002).

Conclusion: More than half of preterm infants with NEC or SIP lose CAR intraoperatively, despite adequate CAR pre- and postoperatively. This poses an extra risk for brain damage. Monitoring of CAR during surgery might help to guide hemodynamic support, thereby possibly reducing brain damage.

027

FOLLOW UP OF RANDOMIZED CONTROLLED TRIAL OF GASTROSTOMY WITH MEDICAL TREATMENT *VERSUS* GASTROSTOMY WITH FUNDOPLICATION IN CHILDREN WITH NEUROLOGICAL IMPAIRMENT

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Aim of the Study: To investigate whether medical management of gastro-oesophageal reflux (GOR) provides similar results to fundoplication in neurological impaired (NI) children requiring a gastrostomy

Methods: With appropriate ethical approval, a follow-up of a randomized controlled trial (RCT) was performed. Children with NI requiring gastrostomy and treatment for severe GOR defined by combined pH/impedance study had been randomized to either: laparoscopic gastrostomy with maximal medical treatment (group A; 15 children) or laparoscopic gastrostomy and Nissen fundoplication (NF) (group B; 13 children). Failure was defined as need for a second procedure following the allocated primary procedure. Data are reported as median (range) or number of cases and were analyzed by Mann-Whitney U test and Fisher's Exact Test

Main Results: Age at randomization was 20 months (3-92); age at surgery was 21 months (5-96). Associated anomalies in addition to NI were present in all children. Deaths in each group were secondary to the primary medical condition and not associated with GOR. Follow up in surviving patients was 45 months (25-71). Main results are presented in the table. Overall, 8 (36%) survivors required a second procedure to control GOR but there was no difference in re-intervention rate between the groups. One child in group A and 2 children in group B required a third procedure (gastro-jejunostomy) for severe GOR after failed second procedure.

Conclusion: This follow-up study indicates that gastrostomy with medical treatment and gastrostomy with fundoplication in children with GOR and neurological impairment provide similar long-term results with an overall reintervention rate of 36%. A large multicentre trial may help clarifying if gastrostomy with medical treatment should be considered as the first line of treatment in children with neurological impairment and significant GOR.

Table

	Group A	Group B	P value
Second procedure	4 (Nissen fundoplication) 1 (Gastro-jejunostomy)	3 (redo-Nissen fundoplication)	0.4
Third procedure	1 (Gastro-jejunostomy)	2 (Gastro-jejunostomy)	0.6
Change in weight Z-score	+0.03 (±0.46)	+0.66 (±0.66)	0.4
Deaths	3	2	1.0

028

A COMBINATION OF HUMAN MESANGIOBLASTS AND FIBROBLASTS MAXIMIZES CELL ENGRAFTMENT FOR THE DEVELOPMENT OF ENGINEERED OESOPHAGI

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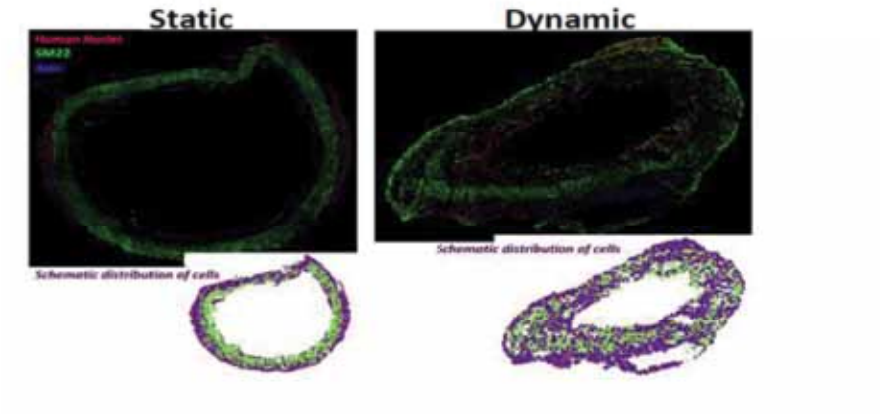
Aim of the Study: Tissue engineering is an emerging clinical reality for the repair of long-gap oesophageal atresia, with the aim of developing substitutes combining biomaterials and stem cells. The aim of this study is to mature a functional oesophageal replacement starting from decellularized matrices, natural templates that preserve the tissue-specific extracellular matrix. A combination of mesoangioblasts (hMABs) and fibroblasts (mFBs) was chosen to repopulate the scaffold to engineer the smooth muscle layer of the oesophagus using static and dynamic 3D-culture.

Methods: Rat oesophagi were decellularized with an established detergent-enzymatic protocol. Following ethical approval, hMABs were isolated from human skeletal muscle biopsies; mFBs were obtained from mouse hindlimb muscles by enzymatic digestion. Injection of different hMABs:mFBs ratios in the oesophageal muscle layer was tested after 11 days of static or dynamic culture using customised bioreactors.

Main Results: Fibroblasts increased engraftment and invasion of hMABs throughout the culture, favouring an overall homogeneous distribution within the scaffold layers. In particular, a combination of 85% hMADs and 15% mFBs enhanced cell engraftment without over-proliferation of stromal cells. hMAB proliferation and differentiation were not affected by the presence of fibroblasts, as detected with Ki67 and SM22 staining. The majority of smooth muscle differentiated hMABs (SM22-positive) was detected within the muscle layer of the scaffold, suggesting a strong cell-matrix influence. Fibroblasts' positive effect on tissue re-colonization was observed also in the dynamic system, where the bioreactor provided the proper 3D-culture setup, significantly enhancing growth and differentiation of hMABs (figure).

Conclusion: In this study, hMABs were identified as a successful cell source for oesophageal engineering. A finely regulated co-culture with tissue-specific fibroblasts maximized hMABs migration capacity, leading to optimal matrix maturation without fibrotic effects. The crosstalk between mesoangioblasts, fibroblasts and oesophageal matrix could be the key for the development of functional engineered constructs for oesophageal replacement.



029

OESOPHAGEAL ATRESIA WITH NO DISTAL TRACHEOESOPHAGEAL FISTULA: MANAGEMENT AND OUTCOMES FROM A POPULATION-BASED COHORT

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Aim of the Study: To describe the incidence and clinical outcomes to one-year in patients born with oesophageal atresia with no distal tracheoesophageal fistula within a population cohort.

Methods: A prospective multicentre population cohort study of all infants born with oesophageal atresia in a one-year period, 2008/2009 investigating clinical outcomes up to one year following initial surgery was undertaken. Outcomes of infants with oesophageal atresia and a lower pouch fistula (Type C), have previously been reported. A subgroup analysis describing the one-year outcomes of patients with oesophageal atresia and no tracheoesophageal fistula, (Type A) and those with only an upper pouch fistula, (Type B) was performed.

Main Results: Twenty-one of 151 infants were diagnosed with Type A or B oesophageal atresia (14%). Fifteen were Type A (71%) and 6 Type B (29%). Figure 1 illustrates the management pathways for these patients. With the exception of a patient with Type A, who died before reconstruction, all but four patients (all Type B) underwent more than one operation. Median time to delayed primary anastomosis in patients with Type A and Type B was 82 days (IQR 75-89 days). The median time to oesophageal replacement was 89 days (IQR 80-118 days). Median length of stay for infants with Type A or B oesophageal atresia from first operation to first discharge was 101 days (IQR 31-123 days). There was no significant difference in the number of infants who died before one year with Type A or B oesophageal atresia and those with Type C (p=0.68).

Conclusions: Oesophageal atresia with no distal tracheoesophageal fistula is uncommon, with only twenty-one infants of this type reported to have been born in the UK and Ireland in one year. These patients have a complex course, utilise a larger amount of resources and require substantial surgical expertise.

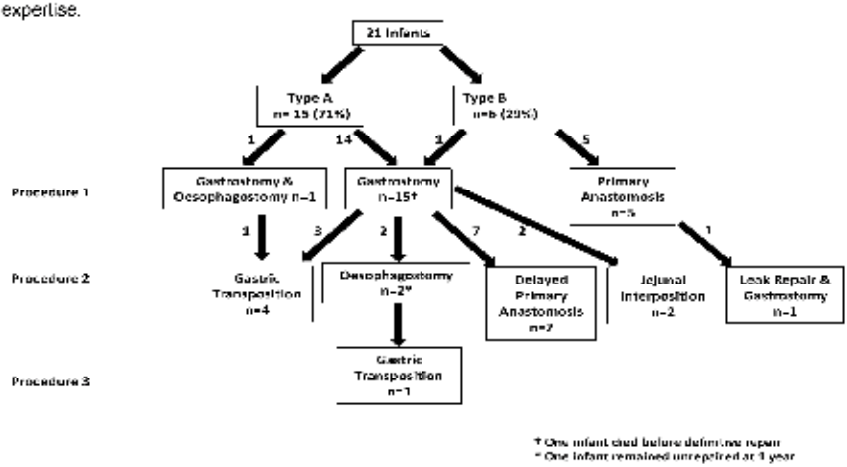

Fig 1. Management Pathways of Infants with Type A and B Oesophageal Atresia

030

MULTICENTER SURVEY ON THE CURRENT SURGICAL MANAGEMENT OF ESOPHAGEAL ATRESIA IN BELGIUM AND LUXEMBOURG

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Aim: The management of Esophageal Atresia (EA) with or without Tracheo-Esophageal Fistula (TEF) differs between surgical teams and no consensus exists. We aimed to describe the current practice in the management of EA/TEF in Belgium and Luxembourg, and compare this to literature.

Methods: A questionnaire on the surgical management of EA/TEF was constructed and sent to all paediatric surgical centers in Belgium and Luxembourg. Results of the survey were compared to the literature.

Results. (see table 1) Preoperative echocardiography is routinely performed, but routine use of tracheobronchoscopy is still controversial. The thoracoscopic approach is sporadic, but there is an increasing interest in this challenging technique. The preferred operative technique is primary end-to-end anastomosis with interrupted, absorbable sutures via extra-pleural thoracotomy. The use of a transanastomotic tube is common practice, but the majority of surgeons waits at least three days to start enteral feeding, and at least five days to start oral feedings. It has been debated that an extra-pleural chest drain does not help in detecting and treating leakage, but many surgeons hold on to this habit. In purse/long gap EA, the preferred surgical management is gastrostomy formation first, and delayed primary anastomosis. The definition of this delay remains highly variable (range 0-24 months). Half of the surgeons prescribes routine prolonged postoperative ventilation, for tensile, respiratory or historical reasons. Routine postoperative contrast study is still widely used. Most surgeons agree to routinely start anti-reflux medication, but there is no consensus on the necessity, type, dosage nor duration of medical treatment.

Conclusion: Anno 2016, there are still many differences and controversies in the pre-, peri-, and postoperative management of EA/TEF. Part of it is based on habits and difficult to change without scientific evidence. Prospective (inter)national registries may further clarify differences and changes in management, and may lead to more consensus.

TABLE 1	SURVEYS				PROSPECTIVE COHORT STUDIES		
	Current report	Zaed 2014	Shawyer 2014	Lal 2013	Bunge 2013	Sfeir 2013	Pino Pesto 2015
Number of participants	14 PSU 30 S	160 S	57 S	170 S	26 PSU	36 PSU	52 PSU
Pre-op bronchoscopy	36% EA/TEF 46% LGEA	43%	x	60% routine 13% selective	x	21.5%	4.7%
Routine use thoracoscopy	21% EA/TEF 31% LGEA	6%	x	50%	2.5%	x	3%
Chest drain	57% EA/TEF 77% LGEA	69%	70%	83%	53.7%	x	91%
TAT	100%	90%	83%	84%	96.3%	x	88%
Prolonged ventilation	50% EA/TEF 64% LGEA	56%	x	25%	80.5%	x	x
Routine Contrast study	86% EA/TEF 100% LGEA	72%	70%	85%	36.3%	x	88%
Reflux medication	93%	x	86%	76%	51.6	86%	x

PSU: Paediatric Surgical Unit; S: surgeons; EA/TEF: Esophageal Atresia with Tracheo-Esophageal Fistula; LGEA: long gap Esophageal Atresia; TAT: Transanastomotic Tube; x: no data available.

031

COMPARISON OF OUR CURRENT PRE-OPERATIVE WORKUP OF CHILDREN WITH GASTRO-OESOPHAGEAL REFLUX DISEASE WITH THE NICE GUIDELINE

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Aim of the study: In January 2015 NICE (National Institute for Health and Care Excellence) published the guideline "Gastro-oesophageal reflux disease (GORD): recognition, diagnosis and management in children and young people".

It recommends that before fundoplication an upper GI endoscopy with biopsies, a pH study (combined or not with impedance monitoring) and an upper GI contrast study should be performed.

We aimed to assess the current clinical practice of a group of expert Paediatric Surgeons in a Tertiary Teaching Paediatric Hospital regarding the use of these pre-operative investigations.

Methods: Retrospective review of fundoplications performed for GORD in this unit between 2014 and 2016. 40 cases pre and 40 cases post publication of the NICE guideline were analyzed, including demographic details, presentation, pre-operative investigations and results, operative details and outcome.

Main results: Pre NICE guideline: 90% (36/40) of patients had an Upper GI contrast, 12.5% (5/40) had an oesophageal biopsy and 5% (2/40) had a pH/ impedance study.

Post NICE guideline: 92.5% (37/40) of patients had an Upper GI contrast, 22.5% (9/40) had an oesophageal biopsy and 17.5% (7/40) had a pH/ impedance study.

37% of upper GI contrasts were normal, 45% showed reflux, 11% showed a hiatus hernia, 3% showed a patulous gastro-oesophageal junction, 4% showed malrotation. 43% of oesophageal biopsies were normal, 36% showed evidence of reflux oesophagitis, 21% showed non specific oesophagitis. 11% of pH/ impedance studies were normal, 67% showed significant reflux, 22% were failed procedures.

Conclusions: Paediatric Surgeons decide to perform a fundoplication for GORD in the majority of cases based on clinical findings and patient history. Most patients have a pre-operative upper GI contrast to rule out malrotation but without oesophageal biopsies or pH/ impedance studies, despite the recommendations from NICE. There is scope to reflect on current practice.

Session 3

032

LONG TERM OUTCOMES OF FAILED FUNDOPLICATION IN THE NEURODISABLED PAEDIATRIC PATIENT

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Aim: To ascertain the management and outcomes of neuro-disabled patients that require further intervention following Nissen fundoplication for gastro-oesophageal reflux (GOR).
Methods: Retrospective single-centre case-notes review of paediatric-patients undergoing primary Nissen fundoplication 2008-2010 for GOR. Unless stated, data given as median and range. Outcomes were compared using Fisher's exact test.
Main Results: 157 neuro-disabled paediatric patients underwent Nissen fundoplication at the age of 21-months (2-186m) with follow-up: 53m (8-92m). 56 (36%) patients were symptomatic and required further intervention. Presence of pre-existing gastrostomy was significantly higher in the failed fundoplication group ($p<0.01$). Average number of interventions (excluding GJ-tube changes) was 1.75 (1-5) with follow-up after last intervention: 29m (0-88m). Time to 1st intervention was 11m (0-64m). A variety of pathology and surgical interventions were identified (table). Regardless of pathology, the most common 1st intervention was revision fundoplication (35/56) with success rate of 46%. 83% were successfully performed laparoscopically. GJ feeding was used as 1st intervention in 17(30%) with a success rate of 47% but only in patients with a normal UGI contrast study. GJ feeding was used for hiatus hernia in 4/24 and for loosened wrap with success rates of 75% and 60% respectively. GJ feeding was used for with GOR +/-retching with normal UGI contrast in 25/30 with success in 72%. Elective changes: x4 (1-11); Emergency changes: x1 (0-12); Complications: buried bumper (1), 2x unable to positioning (2), abdominal-pain requiring removal (2). Follow-up from 1st insertion: 33m (4-74m).
Overall Outcomes: 2x post-operative mortalities: 2x acute obstruction with hiatus hernia; 1x perforated fundus. 54% patients jejunally-fed at time of review.
Conclusion: Optimal management for symptomatic neurodisabled patients following fundoplication remains unclear with a significant re-intervention rate. There may be a role for GJ feeding though numbers are low in cases with proven anatomical abnormality. A multi-center RCT may help provide clearer guidance.

Table: Summary of indication, intervention and Frequency of Intervention [illegible]

Indication	Intervention	Final Intervention	Further Intervention	Emergency Intervention
GOR with Hiatus Hernia	Redo Fundo	6	11	2
	GJ button/Roto-J	2	[illegible]	
GOR with migrated wrap	Redo Fundo	12	5	
	GGD	1		
	Roux en Y Jejunostomy	1		
	Roux en Y Jejunostomy & Redo Fundo	1		
	Surgical Jejunostomy & Redo Fundo	1		
GOR with loosened wrap	Redo Fundo	5	4	
	GJ button	3	9	
	Surgical Jejunostomy			
	Redo fundo & [illegible]	1	[illegible]	
	GGD			
GOR with normal UGI contrast	GJ button/Roto-J	2	9	
	Lap fundo	1		
	Surgical Jejunostomy	1		
	Roux en Y Jejunostomy	1		
	Redo fundo & pyloroplasty		[illegible]	
Retching / Burping	GJ button / Roto-J	11	2	
	Surgical Jejunostomy		[illegible]	
Other				
Loss of gastrostomy, GOR, wound dehiscence	Surgical Jejunostomy	1		
Suspected post op perforation	Redo fundo	1		
Delayed Gastric Emptying	Pyloroplasty	1		
Acute Perforation	OGJ	1		
Totals		52	34	2

033

LAPAROSCOPIC FUNDOPLICATION IN NEONATES AND YOUNG INFANTS: FAILURE RATE AND NEED FOR REDO FUNDOPLICATION AT A HIGH-VOLUME CENTER

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Aim of the Study: Present the outcomes of patients younger than 2 years who underwent laparoscopic fundoplication, highlighting the failure rate and need for redo fundoplication.

Methods: Retrospective review of patients < 2 years who underwent laparoscopic fundoplication between January 2009 and December 2014. Patients initially operated elsewhere and patients > 2 years were excluded from the study.

Main Results: 457 infants younger than 2 years underwent laparoscopic fundoplication at our hospital in the 6-year analyzed period. 360 underwent a Nissen, 77 a Toupet and 21 a Thal fundoplication. There were no demographic differences among the three subgroups. Median age at surgery was 5 (1-23) months. Median follow up was 3 (1-6) years. The conversion rate to open surgery was 0.8% (4 of 457 cases). Patients did not undergo invasive studies to assess the incidence of postoperative GER, but were instead followed clinically. Failure of the laparoscopic fundoplication was diagnosed when a patient was unable to gain weight and/or protect the airway while receiving gastric feedings due to clinically obvious postoperative GER. The overall failure rate in our experience was 2.8% (12 redo fundoplications in 457 cases [11/360 Nissen, 1/77 Toupet and 0/21 Thal]). All failed cases occurred due to upward migration of the wrap, confirmed preoperatively by a contrast study. Eleven redo fundoplications were done laparoscopically and one by laparotomy. Median time between the initial fundoplication and the redo was 13 (5-27) months. In the contemporaneous group of patients <2 years who underwent open fundoplication (n= 101) there were no failures/redo fundoplications.

Conclusion: The need for a redo fundoplication after a laparoscopic fundoplication was an uncommon event in our experience (12 of 457 cases). Our results contrast with published studies that report higher failure rates. Case volume per surgeon may explain in part the dissimilar results among studies.

034

THE DOSE DEPENDENT PROMOTION OF TRACHEAL CARTILAGE GROWTH BY INTRATRACHEAL INJECTION OF BASIC FIBROBLAST GROWTH FACTOR

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Aim of the Study: Symptoms in children with moderate to mild tracheomalacia are thought to improve as they grow older. This phenomenon is believed to be caused by a growth-related increase in the size of the trachea. Basic fibroblast growth factor (bFGF) is a very effective growth factor that induces the proliferation of chondrocytes. We have shown that intratracheal injection of slowly released bFGF enlarged the tracheal lumen by a marginally significant difference. This study aimed to investigate the dose-dependent promotion of tracheal cartilage growth by the intratracheal injection of bFGF in a rabbit model.

Methods: Group 1: Group 1: Distilled water (500 µL) was injected onto the posterior wall of the cervical trachea of New Zealand white rabbits using a tracheoscope (n=7: control). Groups 2 and 3: 100 or 200 µg/500 µL, respectively, of bFGF dissolved in water was injected onto the posterior wall of the cervical trachea (n=8 each group). All animals were sacrificed four weeks later, and the circumference and luminal area of the cervical trachea at the site of bFGF injection were measured.

Main Results: The cervical tracheas of the two bFGF injection groups were spindle-shaped and were of maximum diameter at the injection site. The median circumferences of cervical tracheas for groups 1, 2 and 3 were 18.8, 19.8 and 22.4 mm, respectively, and showed a significant difference between groups 1 and 3 (p = 0.003). The median luminal areas for groups 1, 2 and 3 were 27.4, 31.0 and 38.1 mm^2, respectively, and showed a significant difference between groups 1 and 3 (p = 0.002).

Conclusion: Intratracheal injection of bFGF significantly promoted the growth of tracheal cartilage in a dose-dependent manner in a rabbit model.

	Control	Gastroschisis	P-value
longitudinal muscle area (mm^2)	0.054±0.004	0.079±0.004	0.0003
circular muscle area (mm^2)	0.075±0.004	0.086±0.002	0.023
SMA longitudinal muscle % +ve staining	79.7±2.3	69.4±3.1	0.009
SMA circular muscle % +ve staining	68.8+2.8	72.8+2.5	0.30
PS longitudinal muscle % +ve staining	26.2+3.1	29.6+2.5	0.42
PS circular muscle % +ve staining	20.1±2.5	25.7±2.5	0.13
longitudinal muscle nuclei/mm^2	5696±479	5313±735	0.33
circular muscle nuclei/mm^2	5589+586	5945+624	0.49
longitudinal muscle % proliferating nuclei	1.9±0.4	2.7±0.7	0.91
circular muscle % proliferating nuclei	2.0±0.5	1.8±0.5	0.68

035

SURGICAL MANAGEMENT OF BALANITIS XEROTICA OBLITERANS IN ENGLAND: A TEN YEAR REVIEW OF PRACTICES AND OUTCOMES

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[3]*Royal Manchester Children's Hospital, Manchester, UK*

Aim: Circumcision has long been the mainstay of management for Balanitis Xerotica Obliterans (BXO), however there has been growing interest in surgical techniques that preserve the foreskin. The aim of this study was to:
1. Assess population based surgical management of BXO in England
2. Determine outcomes for patients undergoing surgery for BXO.

Method. All cases of BXO treated in English NHS trusts (2002-2011) were extracted from the Hospital Episode Statistics (HES) Database. Cases were identified by both an ICD-10 code for BXO and either an OPCS 4.8 code for circumcision or preputioplasty (with/without injection of steroid). All subsequent admissions were analysed for related complications/procedures. Exclusion criteria included patients with hypospadias/epispadias, patients residing outside of England and those treated in centres performing fewer than 5 operations/10 years. Data are presented as Median(interquartile range) unless otherwise stated.

Results: 7893 patients required surgical management for BXO of which 7567(95.8%) underwent circumcision. Primary preputioplasty was performed in 326(4.1%) in 44/130 centres, of these only 175/326 had concomitant injection of steroid. Age at surgical intervention was 9(6-11) years. 7509(95.1%) of cases were managed electively and 4201(54%) were treated at tertiary paediatric surgical centres.
There were no postoperative bleeds following preputioplasty and future meatal surgery rates were lower, however this did not reach significance (Table1;. 71(0.5%) of circumcisions required revision, while 7(2.1%) primary preputioplasty underwent a repeat procedure.
In total 74(22%) patients treated with preputioplasty subsequently went on to circumcision at a median of 677(277-1203) days post op. Concomitant steroid injection reduced the risk of subsequent circumcision (21/151(14%) vs 53/175(30%), p<0.001‡).

Conclusions: Although circumcision is the predominant treatment for BXO this data suggests that preputioplasty has equivalent outcomes. Selection bias may play a role and a randomized controlled trial is needed. Preputioplasty combined with steroid injection appears to reduce the chance of completion circumcision.

	Infection*	Post-operative Bleeding*	Further Meatal Intervention	Further Urethral Intervention
Circumcisions (n=7567)	48 (0.6%)	61 (0.8%)	421 (5.6%)	129 (1.7%)
Preputioplasties (n 326)	1 (0.3%)	0	10 (3.1%)	8 (5.7%)
p-value	0.723	0.182†	0.052‡	0.205‡

* ≤30 days post op.

† assessed using Fisher's Exact Test

‡ assessed using Chi Squared Test

TABLE 1. Outcomes of surgical therapies for BXO 2002-2011.

036

EARLY REFERRAL OF PRIMARY UNDESCENDED TESTIS: QUESTIONS TO UK PRIMARY CARE PHYSICIANS

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Aim of the Study: Timing of orchidopexy for primary undescended testis (UDT) is controversial. Collaborative guidelines (BAPS/BAPU/RCSEng 2015) suggest 12 months of age to optimally balance anaesthetic risks against potential germ cell loss in the undescended testis. The BAPU consensus statement of 2012 suggests referral should be made if UDT is found at the 6-8 week examination. ORCHESTRA is an international audit of orchidopexy for undescended testis; preliminary work presented at BAPS 2015 showed that of all patients receiving unilateral orchidopexy, only 32% were referred before 12 months of age: collaboration with primary care physicians was recommended (Skerritt et al.). We report current understanding of optimal UDT care among UK general practitioners (GPs).

Methods: An online survey was advertised to GPs using local commissioning care group emails and two national online GP forums. Questions concerned clinical case exposure, and understanding of the timings of referral and surgery. Chi-squared analysis of groups depending on experience within primary care was performed. Advice for dissemination of information and guidelines to GP colleagues was also sought.

Results: 94 responses: 13 GP trainees and 81 qualified GPs (62% in General Practice >5 and 22% >15 years.) 96% were unaware of the existing BAPU guidance on the timing for orchidopexy. Responses are summarised in Figure 1.
GP suggestions for disseminating information included online modules, deanery emails and forums, emphasis on the GP curriculum (within which the topic of UDT is not currently taught) and clinical review article in General Practice literature.

Conclusion:
- Independent of experience, perceptions of the need for early surgery in UDT vary widely among UK GPs
- Most (>90%) would refer UDT by 12 months but only 50% by 3 months
- Delayed primary care referral precludes timely surgery for boys with UDT
- Dissemination of current guidelines, targeted at GPs, may be beneficial

Experience			Understanding of UDT	Practice of referral in event of a finding of UDT			
Years of experience	n	Never encountered UDT? (p=0.002)	N of respondents recognising need to operate before 1 year of age (p=0.09)	Refer at 6-8w check? (p=0.09)	Refer by 3m? (p=0.06)	Refer by 6m? (p=0.15)	Refer by 1y?
<5	43	18 (42%)	8 (19%)	12 (28%)	18 (42%)	23 (53%)	38 (88%)
5-15	33	7 (21%)	13 (39%)	16 (48%)	22 (66%)	24 (73%)	31 (94%)
>15	18	0%	7 (39%)	4 (22%)	7 (39%)	9 (50%)	16 (89%)
Overall	**94**	**27%**	**30%**	**34%**	**50%**	**60%**	**90%**

037

UROLOGICAL IMPLICATIONS OF A ROUTINE THIRD TRIMESTER ANTENATAL SCAN

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Aim: Fetal anomalies have been diagnosed by the routine anomaly scan at 18-22 weeks since the 1980s. Recently, to aid the prediction of small fetuses some units have introduced a routine third trimester scan at 32 weeks of gestation. This has introduced the opportunity to review fetal anatomy for further abnormalities at a later point in gestation. We assessed the incidence of new urological abnormalities not present on the anomaly scan but found on the routine third trimester scan over a two year period from its introduction in April 2012.

Method. All sonographic reports during this period were reviewed with postnatal clinic letters and investigations to compile our dataset.

Results: 9582 women received both anomaly and third trimester scans. 34 fetuses (15 male, 15 female, 4 lost to follow-up) were diagnosed with new urological abnormalities on the routine third trimester scan. Postnatal evaluation by paediatric urologists revealed the final diagnoses as:

14 cases of hydronephrosis (3 bilateral), 5 vesico-ureteric reflux (3 bilateral), 1 case posterior-urethral valves, 1 unilateral megaureter, 1 duplex kidney and 1 unilateral renal agenesis. In cases with hydronephrosis, the postnatal AP diameter varied between 7mm to 18mm. 7 patients resolved their sonographic abnormality or had normal postnatal scans. The overall incidence of new urological diagnoses from the routine third trimester scan is 0.4%.

14 patients received antibiotic prophylaxis and regular follow-ups. 6 patients required surgery, including deflux injection, posterior-urethral valve ablation, circumcision and pyeloplasty.

Conclusion: Late gestation hydronephrosis is likely related to increasing volumes of fetal urine. This explains some of our 'normal' cases. We have however found a number of patients that need long-term medical management and surgery in some. The morbidity saved by this scan is potentially significant and will require further evaluation as the routine third trimester scanning service is adopted more widely.

038

ARE POSTERIOR URETHRAL VALVES (PUVS) MORE COMMON IN BOYS WITH HYPOSPADIAS?

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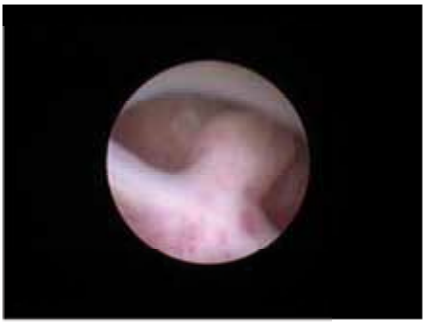
Aim: To evaluate the association between hypospadias and PUVs in boys with urinary symptoms post hypospadias repair.

Method: All patients were identified from surgical databases of prospectively collated information covering all specialist children's hospitals in the country. The medical notes were reviewed to ascertain demographics, the type of hypospadias, the mode of presentation of the valves and outcome.

Results: Between January 2003 and December 2011 there were 2,309 hypospadias repairs performed in Scotland. 15 of these patients were subsequently diagnosed with PUVs.
The median age at hypospadias surgery was 1.4 years (1 to 4 years). 6 patients had proximal/penoscrotal, 2 midshaft and 7 distal hypospadias. The median time to diagnosis of the PUVs was 2 years (0.2-10 years). 4 boys had associated anomalies.
13 boys presented with voiding symptoms +/- UTI and 2 with UTI only. All boys had valves diagnosed at cystoscopy with resection during the same procedure.
All boys had normal renal function. Ultrasound was performed pre cystoscopy in 7 boys, only one was abnormal with mild bladder thickening. Post operatively there were 2 abnormal ultrasounds.
Follow up was available for 13 patients (median 2 years). 11 had no urinary symptoms and 2 had ongoing but improved daytime incontinence.
The incidence of this dual diagnosis in Scotland is 6 per 1000 cases of surgically repaired hypospadias.

Conclusion: The incidence of PUVs in boys with hypospadias in Scotland is greater than 1 in 200. All of the boys in this series had normal renal function suggesting a milder spectrum of disease. All but their condition diagnosed incidentally at cystoscopy.

The incidence is not high enough to recommend routine cystoscopy in all case of hypospadias, but the diagnosis should be considered in boys presenting with urinary symptoms post repair. Awareness of this rare association is essential to make an early diagnosis.



039

HOW COMMON IS ESBL URINARY TRACT INFECTION (UTI) IN CHILDREN IN A UK REGION?

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Aim of the study: ESBL -producing Gram negative bacilli (ESBL) are resistant to most beta-lactam antibiotics including third-generation cephalosporins, quinolones and aminoglycosides. This resistance is plasmid-borne and can spread between species. Clinical and infection control management of infected or colonised patients is challenging, especially in children with recurrent UTIs and complex urological abnormalities, with limited antibiotic options. How big is this risk?

Methods: A retrospective review, from April 2014 to November 2015, of the microbiology database was performed, documenting date of pure isolates species in urine, pyuria, ESBL growth and patient demographics. Data analysis was by ANOVA, Chi square and Mann-Whitney U-test as appropriate, p <0.05 taken as significant

Main Results: Analysis of 9419 urine samples revealed 2619 with pure isolates, 1577 with a pyuria of >10x10^6WC/L. 136 urine cultures in 79 patients grew purely ESBL. In our region, 5.2% of urine pure isolates were ESBL and strikingly 9.5% of patients with pyuria >100x10^6WC/L had ESBL, whereas only 22/1032(2.1%) with no pyuria had ESBL (table1), p<0.0001

Urology patients had 86/136(63%) ESBL positive cultures. These represented 86/315(27%) of all positive cultures for urology patients vs. 50/2267(2.2%) for all other specialties, p<0.0001.

Possible ESBL transmission between organisms occurred in 3, all on prophylactic antibiotics. The incidence of plasmid transfer in our region was 1 per 45 children carrying ESBL (or per 1 million total children) every 6 months.

The monthly incidence of ESBL isolates rose from 9.5(7-15.5) to 13.5(12-17-5). 2014 to 2015, but not significantly. p=0.1

Conclusion: This study is the first to document the incidence of ESBL in children (5% of isolates in our region), and the first to estimate the frequency of possible plasmid transmission between bacterial species in children (1 per million children every 6/12). This quantifies the risk of ESBL infection/colonisation, especially to urology patients, and mandates better antibiotic stewardship.

Pyuria	All Pure growth	Urology	LSBL Pure growth	Urology	% LSBL
< 10 x 10^6/L	1042		22		2.1%
10 - 30 x 10^6/l	522		23		4.4%
30 - 100 x 10^6/L	468		35		7.5%
> 100 x 10^6/L	587		56		9.5%
Total	2619	352	136	80	5.2%

Table 1: Degree of pyuria in all pure growth UTIs and the subset with ESBL

040

INFANTILE ABDOMINOSCROTAL HYDROCELE: OUTCOMES FOLLOWING A CONSERVATIVE MANAGEMENT APPROACH.

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Aim of the study: There are only anecdotal case reports supporting the efficacy of conservative management of infantile abdomino-scrotal hydrocele (IASH). We report our preliminary experience managing these lesions with a 'wait and see' policy.

Methods: A single-institution retrospective case series of 28 consecutive patients encountered over a 17-year period (January 1998 – December 2015). Initial 16 patients underwent early surgical repair shortly after diagnosis. Their mean (SD) age at surgery was 8 (4) months. The remaining 12 patients were managed expectantly whilst awaiting spontaneous resolution of the IASH.

Main results: Of the total 15 IASH (3 bilateral cases) included in the expectantly managed group, 2 (13%) resolved completely between 32 and 47 months of age, two are still under observation (patients aged <18 months), and 11 persisting lesions ultimately required surgical repair, including 5 associated with cryptorchidism. Mean age at surgery was 22 (16) months. Both group of patients experienced significant morbidity, which included prolonged scrotal swelling (7), hypoplastic testis (5), inguinal hernia (5), scrotal hematoma (3), and high scrotal testis (1). Patients managed expectantly were at significantly higher risk of developing a postoperative inguinal hernia, which occurred in only 1 patient of the early IASH repair group (p=0.03). Notably, such inguinal hernias were all associated with a widened internal inguinal ring. There were no recurrences of abdominoscrotal hydrocele in the series at a mean follow-up of 46.5 months (33) and 30.2 months (29) (p=0.19), respectively.

Conclusion: Spontaneous resolution of IASH appears to be a rare event. Prolonged protrusion of the abdominal component through the inguinal canal may expose to an increased risk of developing an inguinal hernia after IASH repair.

041

BLADDER AUGMENTATION IN ANURIC/DEFUNCTIONED MICROBLADDERS AND A NOVEL ANTIREFLUX MECHANISM FOR MITROFANOFF ANASTOMOSIS TO THE ILEAL PATCH

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Background: Reconstruction of microbladders is a difficult surgical challenge: How can a neobladder be recreated when >90% of the new bladder is augmented patch, and how can a Mitrofanoff conduit be anastomosed when the native bladder is so tiny? This series describes 10 microbladders secondary to anuria and/ or diversion that required augmentation. This was done using a de-tubularized ileal segment, and due to the small size of the native bladder, Mitrofanoff anastomosis was performed to the bowel patch (using a novel 'Keel Procedure'). Technique and outcomes, especially success of the antireflux procedure for the Mitrofanoff channel are described.

Aims and methods: Our surgical experience in reconstruction of microbladders was reviewed: age, pre augmentation size, compliance and maximum detrusor pressure were compared with post augmentation parameters. The success of the Mitrofanoff anti-reflux technique is described. Data given as median (interquartile range) for volume mls, compliance mls/cmH_2O, pressure cmH_2O, and compared by Wilcoxon paired rank test, $p<0.05$ taken as significant

Results: 10 patients, median bladder capacity pre-op 10(9-20) mls were reconstructed. 9/10 were transplant patients, 1 complex cloacal abnormality with no functional bladder neck. Figure 1 illustrates the technique. Post op bladder capacity increased 16 fold to 167(114-261) mls, $p<0.01$. Compliance significantly improved from 1.7(0.3-4.8) to 14.3(4.1-66.3) mls/cmH_2O, $p<0.05$. Maximum detrusor over-activity decreased from 27(7-120) to 12.5(0-20) cmH_2O, (not significant, $p=0.3$).

Videourodynamics confirmed a leak in 2 patients (1st repaired, 2nd awaiting repair), leading to incorporation into the technique of a non-absorbable seromuscular suture to provide long-term robustness to the antireflux procedure.

Conclusion: Bladder augmentation in microbladders is possible, and a functional Mitrofanoff procedure with a continent anti-reflux procedure can be created using the "keel" technique implanting the Mitrofanoff into the augment patch, with 80% success (similar to published results for conventional anastomosis to native bladders).

042

AN *IN VITRO* MODEL TO STUDY CYSTINURIA

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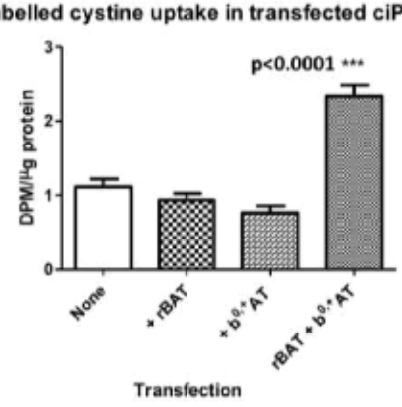
Aim of the Study: Cystinuria is an inherited renal stone disease caused by mutations in the amino acid exchanger system $b^{0,+}$ found on the proximal tubular epithelial cells (PTEC) of the kidney. Defects in either subunit of the transporter, rBAT or $b^{0,+}$AT, lead to the formation of recurrent cystine stones and significant renal impairment. There are no effective treatments available, and no recent therapeutic advances. Mutation analysis has recently been made available in the UK. This work aims to establish a functional *in vitro* model which can be used to investigate the cellular effects of mutations in rBAT and $b^{0,+}$AT to enable the identification of new therapeutic targets at the molecular level.

Methods: Epitope-tagged rBAT and $b^{0,+}$AT were expressed and characterised in human conditionally immortalised PTEC, and cystine uptake was quantified using radio-labelled cystine assays. Disintegrations per minute (DPM) were measured per microgram of protein following 60 second incubation of transfected and untransfected cells with 0.5mM cystine plus 0.5mCi [14C]-cystine and compared with one-way ANOVA with Tukey's multiple comparison post hoc test. Ethics approval 17/SC/0456

Main Results: Immunoprecipitation studies confirmed that expressed rBAT and $b^{0,+}$AT formed dimers in PTEC *in vitro*. Biotinylation studies confirmed correct trafficking of the dimerised transporter to the plasma membrane. Radiolabelled cystine uptake more than doubled in cells co-expressing both rBAT and $b^{0,+}$AT compared to untransfected PTEC, or PTEC expressing rBAT or $b^{0,+}$AT alone ($p<0.0001$, n=3 performed in triplicate), see Figure.

Conclusion: We have established a functional *in vitro* model that can be used to further interrogate system $b^{0,+}$ in the cell type specifically affected in cystinuria. This model can be manipulated to investigate known and discovered cystinuria mutations with the aim of facilitating the development of novel disease therapies.



043

FEASIBILITY OF THORACOSCOPIC SURGERY IN THE MANAGEMENT OF PAEDIATRIC INTRA-THORACIC TUMOURS

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Aim: Traditionally, most paediatric mediastinal and intra-thoracic tumours are biopsied or resected by open surgery with associated morbidity. The application and feasibility of Thoracoscopy in the management of paediatric thoracic masses may represent an important adjunct and remains to be evaluated. We evaluate the feasibility of thoracoscopic surgery in the management of paediatric intra-thoracic tumours.

Methods. This study included all the patients referred to our unit for the management of thoracic tumours from 2000. Data was analysed for demography, operative indication, post-operative morbidity and outcome.

Results: Forty cases (20 female) were referred for Thoracic surgery (both benign and malignant conditions) at the median age of 6 years (range 9months to 16years). Thoracoscopic surgery was carried out in 21 cases while it was thought to be not feasible due to size of the tumour, vascularity and location in 16 cases. The conversion was required due to excessive bleeding in 2 and removal of large solid tumour in one patient. CT with IV contrast and/or MRI were used as the imaging modality for anatomical localisation, extent and vascularity. The thoracoscopic procedures included either resection [benign conditions: lymphatic malformations (2); mediastinal tumours: neuroblastoma (7), teratoma (1), schwannoma (1), myofibroblastic tumour (2) and angiofollicular hyperplasia (1)] or biopsy of mediastinal or lung parenchymal lesions (7). Postoperative chest drain was inserted only in minority of cases that involved lung parenchyma resection and possibility of lymphatic leak. Complications included inadvertent phrenic nerve palsy presenting as diaphragmatic eventration in 3 cases. Follow up showed no recurrence in any of the tumour cases and biopsies resulted in diagnosis, leading to an appropriate oncological management.

Conclusion: Thoracoscopic procedures for paediatric intra-thoracic tumours are safe and feasible in appropriate cases referred for thoracic surgery resulting in good outcome.

044

PANCREATICODUODENECTOMY FOR PEDIATRIC PANCREATIC MALIGNANCY: A SINGLE-CENTER RETROSPECTIVE ANALYSIS

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Aim of the Study: Pancreaticoduodenectomy (PDD) is rarely required to treat malignant tumors in young patients. Although extensively studied in adults, few analyses have examined its use in pediatric/adolescent patients. We reviewed our institutional experience with this procedure, assessing indications, technique, complications, and patient outcomes.

Methods: With IRB approval, we identified all patients age ≤18 years who underwent PDD between 1993 and 2015. Data on demographics, diagnosis, management, and outcomes were evaluated.

Main Results: We identified 12 patients (7 female, 5 male) with a median age of 9 years (range: 2-18). Diagnoses included pancreatoblastoma (n=3), solid pseudopapillary tumor (n=3), neuroblastoma (n=2), rhabdomyosarcoma (n=2), and neuroendocrine carcinoma (n=2). Nine patients (75%) underwent chemotherapy or radiotherapy prior to surgery; 7 patients underwent PDD for treatment of recurrent tumor. A pylorus-sparing approach was used in all. Nine patients had a pancreaticojejunostomy (ductal anastomosis in 4, invagination in 5) while 3 underwent a pancreaticogastrostomy. The median operative time was 7 hours with a mean blood loss of 590cc. The mean intensive care stay and overall hospitalization were 5.2 and 10.6 days, respectively. There were no operative deaths. Four patients (34%) had Grade II complications, 1 had a Grade IIIb complication (chest tube), and 1 had a Grade IV (re-exploration) complication. The Grade IV complication was a pancreatic leak in one patient who had a pancreaticogastrostomy. Five patients (42%), all of whom had solid pseudopapillary tumors or rhabdomyosarcoma, are currently alive with a mean survival of 77.4 months. The remaining 7 patients (58%) died from progressive disease after a mean survival of 42.3 months.

Conclusion: Pancreaticoduodenectomy using the duodenal-sparing approach is a feasible management strategy for pediatric pancreatic malignancies and is associated with acceptable morbidity and overall survival. All three types of pancreatic reconstruction were successful. Long-term outcome is most dependent on underlying tumor biology.

045

PARATESTICULAR RHABDOMYOSARCOMA: IMPORTANCE OF INITIAL SURGICAL TREATMENT

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Aim of the Study: To evaluate factors associated with progression-free and disease-specific survival in patients with paratesticular rhabdomyosarcoma, we performed a cohort study. Also, since many patients present to our institution after initial therapy, we analyzed the effects of salvage therapy for scrotal violation.

Methods: We retrospectively reviewed all consecutive patients with histologically confirmed paratesticular rhabdomyosarcoma treated at our institution between 1978 and 2015. Fifty-one patients were identified; two were eliminated because of inadequate data, leaving 49 patients in our analytic cohort. Variables evaluated for correlation with survival included: TNM staging, margins at initial resection, presence of scrotal violation, hemiscrotectomy and/or scrotal radiation. The log-rank test was used to compare survival distributions.

Main Results: The median age and follow-up were 16 years and 6.9 years, respectively. The 5-year overall disease-specific survival was 78.7% (95% CI: 67.7-91.4 percent) and the progression-free survival 66.9% (95% CI: 54.8-81.6 percent). Median time to recurrence was 0.9 years. Scrotal violation occurred in 41% (n=20) and tripled the risk of recurrence for patients not appropriately treated with either hemiscrotectomy or scrotal radiation therapy (RR=3.0, 95% CI: 1.16-7.73). Results of univariate analysis are presented in the Table.

Conclusion: The strongest predictors of disease-specific survival were nodal status and distant metastasis at diagnosis. Scrotal violation remains a problem in paratesticular rhabdomyosarcoma and is a predictor of disease progression unless adequately treated. This could be reduced with appropriate initial resection.

Table. Correlation of variables with disease-specific and progression-free survival (alpha=0.05)

Variable	Disease-Specific Survival (DSS)	Progression-Free Survival (PFS)
T stage	Not significant	Not significant
N stage	0.001	0.001
M stage	0.005	0.003
Surgical Margin	Not significant	Not significant
COG-STS: Pretreatment Staging System	0.005	0.003
Scrotal Violation	Not significant	Not significant
Appropriate scrotal treatment after scrotal violation	Not significant	0.02

046

PREDICTORS OF OUTCOME IN NON SPITZOID MELANOMA IN CHILDREN AND ADOLESCENTS

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Aim of the Study: While melanoma in childhood and adolescence is relatively rare, its incidence is increasing. As most reported studies in this age group include Spitzoid lesions, which have a more favorable prognosis, we reviewed our institution's experience with non-Spitzoid melanomas to assess predictors of disease-specific survival and recurrence.

Methods: Records of pediatric and adolescent patients (age <22 years) with non-Spitzoid melanoma who were treated at our institution between 1960 and 2015 were retrospectively reviewed after obtaining IRB approval. Age, presentation with bleeding or ulceration, family history of melanoma, site, Clark level, depth, and regional nodal involvement were evaluated for prognostic significance. Outcomes were disease-specific survival and recurrence, and age and depth were analyzed as continuous variables.

Main Results: We identified 199 patients with histologically verified non-Spitzoid melanoma. Median age at diagnosis was 19 years (range 1-22 years) and 63% (n=126) were female. Median follow-up time was 5.3 years. Disease-specific survivals at 5 and 10 years were 83% (95% CI=77-89) and 77% (95% CI=70-85), and 5 year and 10 year recurrence rates were 23.5% and 33.1%, respectively. Variables predictive of disease specific survival and recurrence included: increased lesion depth, higher Clark level, positive lymph nodes, and ulceration (Table).

Conclusion: This cohort of patients had a female predominance, and the 5-year disease-specific survival of 83% is lower than that associated with purely Spitzoid lesions. Increased Clark level, greater lesion depth, lymph node involvement, and ulceration at diagnosis are associated with worse outcome, consistent with findings in adult populations.

Table. Factors that predict poor outcome in pediatric/adolescent non-Spitzoid melanoma.

Variable	Disease Specific Death (p-value)	Recurrence (p-value)
Age	0.27	0.85
Positive Family History	0.9	0.88
Site	0.09	0.05
Ulceration	0.03	0.0004
Lymph Node Involvement	<0.0001	<0.0001
Clark Level	<0.0001	<0.0001
Depth of Lesion	0.0001	0.04

047

BEST AND SERIAL OXYGENATION INDICES AS PREDICTORS OF SURVIVAL IN CONGENITAL DIAPHRAGMATIC HERNIA.

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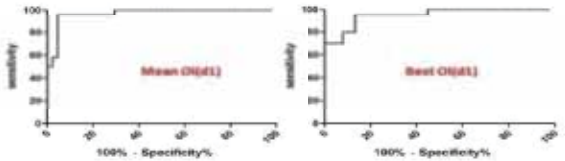
Aim of the study: Best oxygenation index (OI) on day1 (BOId1) is known to be strongly predictive of survival in CDH with a previous study showing that BOId1>11 was associated with mortality. However, BOId1 could reflect aggressive cardiorespiratory support, which may be unsustainable, and limit its clinical application. We investigated whether serial OI assessments in the form of mean OI on d1 (MOId1) could improve predictability of survival compared with BOId1.

Methods: Retrospective review of live-born antenatally-diagnosed CDH in 2009-2015 with available blood gas analyses. OI was defined as mean airway pressure (MAP, cmH2O) x FiO2 (%) / PaO2 (mmHg). OI for the first 24 hours were calculated at 6-hour intervals. Primary end point was 30-day mortality. BOId1 and MOId1 were tested using ROC analysis to identify appropriate cut-off levels. Statistics: continuous data as median (range), comparisons used Mann-Whitney U-test, P-value ≤0.05 was regarded as significant.

Main results: Survivors (n=44) and non-survivors (n=24) were comparable in terms of gestation (38 vs 37 weeks; P=0.26), birth weight (2.9 vs 2.8Kg; P=0.96), and FETO (43% vs 38%; P=0.65). One non-survivor had undergone surgery. Compared to survivors, non-survivors had higher BOId1 (15.4 vs 2.9, P<0.0001) and MOId1 (40 vs 7.5, P<0.0001).

ROC analyses showed that BOId1 (AUC 0.94, P<0.0005) and MOId1 (0.97, P<0.0005) were both excellent predictors of mortality. Selected BOId1 cut-offs were 6(sensitivity 92%, specificity 89%) and 11(sensitivity 87%, specificity 95%), and MOId1 was 17 (sensitivity 96%, specificity 96%) (**Figure**). The positive likelihood ratio for 30-day mortality using BOId1>6, BOId1>11, and MOId1>17 were 8, 14 and 21 respectively.

Conclusion: BOId1 and serial OI were excellent predictors of 30-day mortality, with serial (i.e. mean) OI offering higher sensitivity and specificity. The likelihood of mortality can be reliably predicted with the cut-off defined in this study.



048

OXYGENATION INDEX AS AN OBJECTIVE PREDICTOR OF OPTIMAL TIMING FOR SURGERY IN CONGENITAL DIAPHRAGMATIC HERNIA

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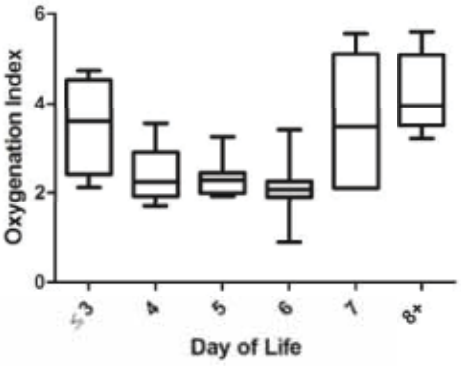
Aim of the study: Optimal timing for surgery in CDH is based on subjective clinical assessments of physiological variables. We hypothesised that oxygenation index (OI) might have a role in objectively predicting timing for surgery. We aimed to establish association of OIs with age at surgery (AS), ICU ventilation days (VD) and length of stay (LOS).

Methods: Retrospective review of live-born antenatally-diagnosed CDH repaired during 2009-2015. OI was defined as mean airway pressure (MAP, cmH2O) x FiO2 (%) / PaO2 (mmHg). OI within the first 48 hours were calculated at 6-hour intervals. Correlation of AS, VD and LOS with three OI variables - pre-operative OI (PreOI), and mean OI day1 & day2 (MOId1&2), were established. Spearman's correlation coefficient (r_s) determined correlations as weak (<0.4), moderate (0.4-0.6), or good (>0.6); continuous data were presented as median (range). P≤0.05^ and P≤0.01^^ were statistically significant.

Main results: 44 infants [gestation 37(32-42) weeks, birth weight 2.8 (1.7-4.0)kg, FETO in 20(46%)] underwent surgery at day 5(2-19) with a median PreOI 2.4 (0.9-5.6) (FIGURE). Median VD and LOS were 11 (3-57) and 29 (9-231) days respectively. There was one (2%) late death. There was moderate correlation between AS & VD (r_s=0.57^^) and AS & LOS (r_s=0.49^^), and good correlation between VD & LOS (r_s=0.75^^). MOId1&2 had moderate correlation with timing of surgery (r_s=0.40^^ and 0.50^^) but no or weak correlation with VD (r_s=0.27 and 0.33^) and LOS (r_s=0.16 and 0.10).

Conclusions: Timing of surgery and outcome does not appear to be preordained with only a limited relationship between these measures and OI calculated in the first 48 hours of life. Dynamic assessment of day to day respiratory indices and clinical course are more realistic determinates of optimal timing.



Session 7

049

PULMONARY FUNCTION AND NUTRITIONAL MORBIDITY IN CHILDREN AND ADOLESCENTS WITH CONGENITAL DIAPHRAGMATIC HERNIA

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Background: Failure to thrive (FTT) is a documented morbidity among congenital diaphragmatic hernia (CDH) survivors and may result from elevated respiratory effort. To our knowledge, this relationship has not been evaluated; we sought to examine body mass index (BMI), measured resting energy expenditure (mREE) and pulmonary function test (PFTs) results in children and adolescents with CDH.

Methods: With ethics approval (REB# 1000035323), anthropometrics, indirect calorimetry (IC) results and PFTs were collected from patients 5-17 years of age during CDH clinic visits from 2000-2015. FTT was defined as BMI z-scores <-2.0. mREE (as percent predicted REE) was measured using IC. forced expiratory volume in 1 second (FEV1) and forced vital capacity (FVC) were considered normal if >80% of reference ranges. Statistics completed with SAS v9.3.

Results: 77/118 patients who attended clinic had reproducible PFTs and anthropometrics. 31/77 had IC results. Mean BMI was -0.47±1.19 and 41.5% of patients were FTT: mean FEV1 (76.0±19.0) and FVC (78.0±20.9) were both below normal. A correlation was noted between BMI and PFTs (FEV1 R^2=0.46 P<0.0001; FVC R^2=0.44 P<0.0001). Mean mREE was 113±14% of expected with 68% of patients being hypermetabolic (mREE<110% predicted). IC results were not correlated with either FEV1 (R=0.12, p=0.50); or FVC (R=0.22, p=0.23).

Conclusions: These preliminary results suggest that a correlation may be present between BMI and lung function in CDH children and adolescents, whereas lung function does not seem to correlate with mREE. Additional research is underway to help explain these relationships.

050

DEVELOPMENT OF A FAST GROWING ANIMAL MODEL FOR DIAPHRAGMATIC HERNIA

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Aim: Congenital Diaphragmatic Hernia (DH) survivors undergoing patch repair (50%) suffer significant patch related complications. Our current growing rabbit DH model (30-50% defect) was modified to make it more representative with increased defect size (>50%) and re-herniation rates.

Methods: 6-week-old male rabbits were weighed, intubated fibro-optically and ventilated. Initially a left subcostal laparotomy with complete left hemi-diaphragmatic excision (1cm rim) and primary closure (goretex patch) was performed (n=13). Then modified with a reduced defect: 3x3cm (>50%) (n=21). Finally (n=7) a laryngeal mask airway (LMA) (V-gel, Millpledge) was tested. 90 day survival and hernia recurrence were documented, alongside transdiaphragmatic pressure and uni-axial tensiometry.

Results: 1.57kg (0.8-2.3) rabbits surviving 90days doubled their weight. Initially 6/13 (46%) with a complete defect survived >48 hours post defect closure, yet 4/6 (67%) developed respiratory failure by 30days and two survivors at 90days had recurrence. The reduced defect group (n=21) had improved survival at 48 hours (95%), yet 13/20 (65%) died (13-30days) later with respiratory failure. Post-mortem revealed no hernia recurrence but pulmonary respiratory distress syndrome (i.e. ARDS) with tracheal mucosal thickening, stricture formation and fibrotic inflammation on histology. Of the 7/21 survivors at 90days, 5/7 (71%) had recurrence. Tensiometry (n=6) showed reduction in disruption stress at patch interface compared to untouched right hemidiaphragm (p<0.05). Patch (n=4) vs. control (n=1) animals had higher transdiaphragmatic pressure (13.9 vs. 3,8 cmH20) and tube occlusion increased pressures. The final (LMA) group had 100% survival at 30 days.

Conclusions: The immature rabbit airway is easily traumatised: 65% developed late respiratory failure secondary to tracheal injury following endotracheal intubation. Rabbits with a 3x3cm left postero-lateral defect had 33% survival at 90days, weight more than doubled with a 71% recurrence r.t.c. Modified intubation technique will improve 90day survival, providing a clinically relevant growing animal model for further testing of new tissue engineered matrices.

051

TAP WATER IONTOPHORESIS IN THE TREATMENT OF PAEDIATRIC HYPERHIDROSIS

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Aim: The treatment options for localised hyperhidrosis include aluminium chloride antiperspirants, anticholinergics, iontophoresis, botox and surgery (thoracic sympathectomy). Tap Water Iontophoresis (TWI) involves immersing the affected area in tap water and passing a small electrical current through the area. Our aim was to assess the success of this therapy in a paediatric cohort.

Methods: A retrospective case note review of all patients under the age of 18 years who had TWI between 2002- 2015 was undertaken. Demographic data, number of treatment sessions, side effects and overall success were analysed. Typically individuals undergo 7 treatments over a 4-week period. A positive outcome was determined as a patient who saw an improvement in their symptoms based on a drop in the hyperhidrosis severity score (I-IV). Data are presented as mean with range in parentheses. Statistical analysis was by paired t-test.

Results: There were 43 patients (30 female, 13 male) with a mean age of 15 years (8-17) Nine patients (21%) had a family history of hyperhidrosis. Palmar and/or plantar hyperhidrosis (PPH) was present in 38/42 (90%) patients. Axillary hyperhidrosis (AH) was present in 19/42 (44%) patients. All patients (with the exception of one patient who did not tolerate the procedure) underwent a mean of 7 sessions (5-7). Side effects included pain (n=11), pruritus (n=11), dryness (n=5) as well as vesicle formation and burning sensation (n=1). A positive outcome was found in (36/43) 84% of patients. Mean pre-treatment hyperhidrosis severity score was 3.5, post treatment was 2 (p=.0001). No improvement in symptoms was seen in 4/43(9%) of patients.

Conclusion: TWI is a safe and effective modality of treatment for both PPH and AH in the paediatric population. It has minimal side effects. Paediatric surgeons should offer this treatment option before considering more invasive surgical procedures.

052

THORACOSCOPIC BILATERAL T3 SYMPATHECTOMY FOR PRIMARY FOCAL HYPERHIDROSIS IN PEDIATRICS

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Aim of the Study: Present our experience in the surgical treatment of primary focal hyperhidrosis of the hands by thoracoscopic bilateral T3 sympathectomy in pediatric patients.

Methods: Retrospective chart review of all patients operated between 2013 and 2015.

Main Results: We operated and included in the study 28 patients, 22 females and 6 males. Mean age was 14 (6-21) years. All patients had previously tried at least one form of medical therapy with no success. All patients were extensively counseled regarding the potential side effects of the sympathectomy. The operations were done in supine position with the arms extended. All patients were intubated with a double lumen endotracheal tube for sequential lung isolation. We used a 5-mm port for the scope and a 3-mm port for the instruments, both placed in the axilla. The third rib was identified by fluoroscopy. The sympathectomy was done with monopolar cautery. Mean operative time was 43 (25-71) minutes. No chest tubes were used. The incidence of intraoperative or postoperative complications was zero. All patients were discharged within the first 24 postoperative hours. All patients achieved immediate complete resolution of the palmar hyperhidrosis, sustained in all cases at a median follow up of 17 (2-34) months. The mean preoperative *quality of life score* (based on a multifunctional self assessment questionnaire) was 41/100, whereas after the operation was 92/100. Only 1 patient developed mild temporary compensatory sweating (defined as the need to change clothes or take oral medication). All patients were satisfied with the result of the operation.

Conclusion: Thoracoscopic bilateral T3 sympathectomy is a safe and effective treatment for children and adolescents with primary focal hyperhidrosis of the hands who failed medical management and has a very low rate of compensatory sweating.

053

SETTING UP EXPERIENCE WITH A CUSTOM MADE BRACE SYSTEM FOR PECTUS CARINATUM WITHIN THE NHS

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Aim: Correction by compression is not a new concept within surgical and dental specialities. However, NHS management of Pectus Carinatum (PC) does not include compression bracing, with operative correction offered to select few. We detail our setting-up experience of a pectus brace service and a pilot study outcome.

Methods: We evaluated a variety of pectus braces available and selected the custom-made lightweight (Surgical3D(Portugal) dynamic compression system (DCS). PC pilot was set up with charitable/private finances to bolster the business case. This was presented and is awaiting commissioner's approval (on average open correction costs 5,500GBP compared to Brace 1000GBP).

Assessments included. Skeletal, lung function and echo, clinical photography and 3DCT-scan to map the deformity and construct a personalised brace. Patients performed sternal manipulation exercises while awaiting the DCS delivery. Once the brace was fitted, the wearing time threshold was increased to 23hours/day for the correction phase and tightened periodically as tolerated. They were encouraged to follow physiotherapeutic exercises, to improve posture and develop core support. Patients were advised to look after skin pressure points and keep their initial bimonthly follow up with clinical photographs.

Results: Nine patients 8 boys, (median age 16; range 14-17years) with moderate to severe PC were fitted with DCS. One brace needed revision because of uncomfortable adaptation to her petite body shape. Compliance with brace was better in all 8 boys but tolerance to compression was variable ranging from 6 to 23hours. Deformity improvement was seen to some extent in 6, while noticeable correction was seen in 2(25%) boys after just 3months. One achieved almost full correction of PC but reported redness at the back pressure point.

Conclusions: Literature evidence and our pilot suggest Pectus brace correction is effective. The reduced costs and lack of utilization of inpatient resources alongside reduced morbidity should appeal to commissioners for their financial support.

054

DOES THORACOSCOPY HAVE ADVANTAGES OVER OPEN SURGERY FOR ASYMPTOMATIC CONGENITAL LUNG MALFORMATIONS? AN ANALYSIS OF 1626 RESECTIONS

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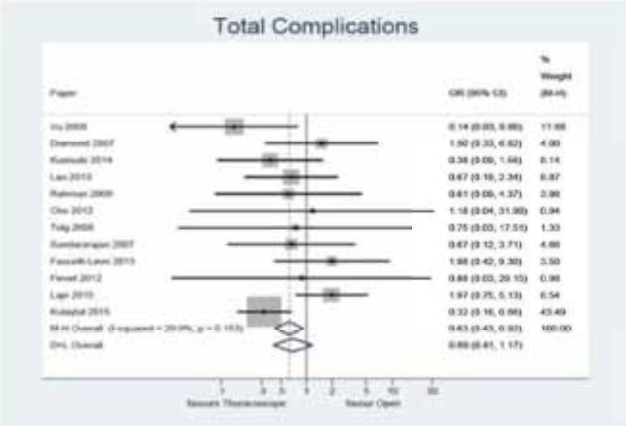
Aim: The apparent incidence of antenatally-diagnosed congenital lung malformations (CLM) is rising (1 in 3000) and the majority undergo elective resection even if asymptomatic. The thoracoscopic approach has been popularised, with early series reporting high conversion rates and significant complications. A large number of high-volume case series exis. since the only other published meta-analysis (data from pre-2010) on this subject. We aimed to perform systematic review/meta-analysis of outcomes of thoracoscopic vs open excision of asymptomatic CLMs.

Methods: Systematic review according to PRISMA guidelines. Data was extracted for all relevant studies (2004-2015) and Rangel quality scores calculated by 2 independent reviewers. Analysis was on 'intention to treat' basis for thoracoscopy. Meta-analysis was performed using the add-on package METAN of the statistical package STATA14™; p<0.05 considered significant.

Results: 36 studies were eligible, describing 1626 CLM resections (904 thoracoscopic, 722 open). there were no randomised controlled trials. Median Rangel score of included studies was 14/45 (IQR 6.5) indicating overall quality as 'poor'. 98/904 (11%) thoracoscopic procedures were converted to open. No deaths were reported.
Meta-analysis showed that regarding thoracoscopic procedures - total number of complications was significantly less (OR 0.63, 95%CI 0.43, 0.92; p<0.02, 12 eligible series, 912 patients, 405 thoracoscopic). Length of stay was 1.4 days shorter (95%CI -2.40, -0.37; p<0.01). Length of operation was 37mins longer (95%CI 16.56, 54.99, p<0.01). Age, weight and number of chest tube days were similar between the 2 groups.

The studies were not heterogeneous with respect to total number of complications (I^2 30%, p=0.15) and there was no evidence of publication bias.

Conclusions: A reduced total complication rate favours thoracoscopic excision over thoracotomy for asymptomatic antenatally-diagnosed CLMs. Although operative time was marginally longer, and open conversion may be anticipated in 1/10, the overall length of hospital stay was reduced by more than 1 day.



055

MYSTERIES OF THE UPPER POUCH TRACHEOESOPHAGEAL FISTULA

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Aim: Approximately 5% of oesophageal atresia (OA) will have a proximal tracheoesophageal fistula (pTOF). Failure to recognise an upper pouch fistula can hamper mobilisation of the upper pouch and lead to life threatening episodes of aspiration once oral feeding starts. We reviewed our experience of pTOF to see if there were features that could aid identification.

Methods: Retrospective notes review of our neonatal database and review of bronchoscopy videos from 01/01/2006 to 31/12/2015.

Results: Eight patients were identified (M: F 5:3) with a median gestation 34 weeks (28-39) and median birth weight 1.65 kg (1.1 - 3.4).

Six patients were initially thought to be pure OA and 2 had distal TOF. All patients had a rigid bronchoscopy at the time of initial surgery (1-3 days after birth), of these only 2 patients were identified as having a pTOF. The 6 missed on bronchoscopy were subsequently noted to have a pTOF at the initial thoracotomy when mobilising the upper pouch (3) or prone tube oesophagogram (3); 3 patients needed a further operation to ligate and divide the fistula. Review of the bronchoscopy videos revealed several differences between upper pouch and lower pouch fistulas. We identified the following characteristics of pTOF:

1. They are found just distal to the vocal cords so are easy to go past with the bronchoscope.
2. Very small diameter, often no more than a pit.
3. Did not open and close with ventilation as did H-type or distal fistulas.
4. Best identified by insufflation of air from oesophagus so that bubbles could be seen going through the fistula.

Conclusion: pTOF are relatively easy to miss because of different characteristics compared with H-type or distal fistulas. We have identified specific characteristics of proximal fistulas, not mentioned in the literature, which should help with recognition.

056

MESENCHYMAL STEM CELL PRECONDITIONED MEDIUM INCREASES SURVIVAL OF HUMAN ISLETS IN HYPOXIC CONDITIONS

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Aim of Study: Islet transplantation has the potential to reverse type 1 diabetes in children. Results in adults have been encouraging, but life-long islet survival remains challenging. Mesenchymal stem cells (MSC) produce growth factors that protect islets when co-transplanted in hypoxic conditions. However, transplanting MSC into immunosuppressed patients carries neoplasia risks. This study aimed to investigate whether MSC-preconditioned media provides the same islet protection.

Methods: MSC were isolated from human adipose tissue and expanded using MEM/glutamax medium supplemented with 10% FCS. Each culture medium batch was preconditioned with MSC cultured for 2 days in normoxia (21% oxygen) or hypoxia (1%). Unused medium served as control. After harvesting MSC, cell-depleted media were frozen at -20°C. Human islets were isolated with consent and ethical approval (n=8 pancreases) and cultured for 48-72 hours in hypoxia (2% oxygen) in either unused MEM/glutamax or MEM/glutamax preconditioned at 21% or 1% oxygen. Data were normalized to control islets in hypoxia and presented as mean ± SEM.

Main Results: Compared with controls, islet recovery increased to 117±12% (P=0.075) and 138±12% (P<0.05) when islets were cultured in medium preconditioned at 21 and 1% oxygen, respectively. Viability assessed by FDA-PI was unchanged after culture in MSC-medium either unused (59±2%), preconditioned at 21% (59±3%) or 1% (61±3%) oxygen. However, glucose-stimulated insulin release was significantly increased for islets cultured in MSC-medium preconditioned at 21% (49±30 µU/ng DNA/45 min, P<0.01) or 1% (27±9 µU/ng DNA/45 min, P<0.05) (controls 19±7 µU/ng DNA/45 min). Overall islet survival in MSC-medium preconditioned at 1% oxygen was significantly more protective (143±14%) than MSC-medium preconditioned at 21% oxygen (119±14%) or control medium (P<0.05).

Conclusions: This study demonstrates that MSC-preconditioned culture medium increases human islet survival and *in vitro* function in hypoxic conditions. This is an important novel finding that offers a safer alternative to co-transplantation with MSC.

057

OUTCOMES OF LAPAROSCOPIC KASAI PORTOENTEROSTOMY FOR BILIARY ATRESIA: A SYSTEMATIC REVIEW

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Aims of the study: Biliary atresia is a rare disease of infancy for which mainstay of treatment consists of open Kasai portoenterostomy. The aim of this review was to assess the outcomes of a relatively novel approach, laparoscopic Kasai portoenterostomy, in comparison to current conventional management. Outcomes identified were native liver survival rates, actuarial survival rates, post-operative cholangitis rates and incidence of adhesions at subsequent liver transplantation.

Methods: A comprehensive systematic literature search was conducted in the PubMed and COCHRANE databases. The keywords used were: hepatic portoenterostomy, biliary atresia, and laparoscopy. Studies looking at robotic Kasai portoenterostomy were excluded.

Results: Ten studies were included in this review with 140 patients who underwent laparoscopic Kasai procedures. The mean age at time of operation was 66.6 days (range 14-106). The mean operative time was 227 minutes (range 120-435). The mean native liver survival rate was 56.7% (range 33.3-77.8) at 6 months and 40.5% (range 8.33-75%) at 2 years. Mean actuarial survival rate was 95.2% (range 81.1-100%) at 6 months and 78.6% (range 54.4-100%) at 2 years. The rate of post-operative cholangitis was 50% (range 11.9-50%). Adhesions at subsequent liver transplantation was only reported in 4 patients, 2 of which had dense adhesions and 2 of which had no adhesions.

Conclusions: Although laparoscopic Kasai portoenterostomy is a feasible operation, the outcomes in terms of native liver survival rates and actuarial survival rates are unfavourable when compared to current conventional treatment. There is also no evidence from this review that laparoscopic Kasai is associated with less adhesions at subsequent liver transplantation.

Laparoscopic Kasai should not be used for the treatment of patients with biliary atresia and should be restricted to the remit of further research studies. Further prospective trials are needed to clearly delineate the outcomes of laparoscopic Kasai.

058

LONG TERM NEURODEVELOPMENTAL OUTCOME IN CHILDREN WITH BILIARY ATRESIA.

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Aim: Little is known about the long-term neurodevelopmental sequelae of biliary atresia (BA). The aim of this pilot study was to get more insight in the long-term neurodevelopmental outcome in BA patients at school-age.

Methods: An observational cohort study of BA patients between 6-12 years who were originally diagnosed in our center (n=18). We assessed neurodevelopmental outcome using motor-, and cognitive tests for the patient and questionnaires for the parents. We compared patient results with the age-specific Dutch norm using one-sample chi-square analyses.

Main results: Nine of ten (90%) children underwent a Kasai porto-enterostomy and eight of ten (80%) had a LTx. In 9 children, motor domains were affected; abnormal fine motor skills, ball skills and balance (resp. 78%, 78% and 44%, p<0.05). Children showed lower performance intelligence, attention abilities and perceptual ability (resp. 40%, 33%, 56%, p<0.05) compared with the Dutch norm population. The children showed behavioral problems; total behavioral problems, internalizing problems, and problems in attention, hyperactivity and metacognition (resp. 33%, 44%, 33%, 44%, 44%, p<0.05), and 58% of the children had learning problems.

Conclusion: This pilot study suggests impaired motor and cognitive outcome in BA patients at school-age, as well as behavioral problems. The data warrant an extension of the study population in combination with investigation of possible factors associated with impaired outcomes. Early identification of subgroups at risk for neurodevelopmental impairments may allow targeting interventions at an early stage, to improve long-term outcome.

059

LONG TERM COMPLICATIONS AFTER SURGERY FOR CHOLEDOCHAL MALFORMATIONS: A REVIEW OF THE DUTCH NATIONAL REGISTRY

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Aim of the Study: A choledochal malformation (CM) is a rare entity in the Western world. We gathered data of all children who underwent surgery for CM in the Netherlands between 1989 and 2015. This cohort has previously been reviewed, the current study has focused solely on the long term complications of CM's treated with extrahepatic bile duct resection followed by hepaticojejunostomy.

Methods: retrospective chart review including all Dutch patients < 18 years with a CM. Type V CM's were excluded. We only included complications occuring > 30 days postoperatively. During this study we focused on complications necessitating re-intervention and the development of malignancy

Main Results: Sixteen patients (17 %, 11 females and 5 males, median age at time of surgery of 2.4 years, range 0.03 – 17.4) out a total of 94 (65 females and 29 males, median age 2,3 years, range 0.03-17.7) developed long-term complications: cholangitis in 12 (13 %), anastomotic strictures in 4 (4%), intrahepatic stone formation in 2 (2%), and liver abscess, incisional hernia in 1 (1%). No malignancies were found in our entire cohort with a median of 13,6 years of follow up.

Complications occurred after a median of 15 months (range 1 – 280) after surgery. Seven patients (7 %) needed a re-intervention. Re-operation was performed in five patients (for stenosis of the hepaticojejunostomy, recurrent bile duct stone formation, adhesive ileus and persistent intrahepatic dilatation resp). One patient needed radiological drainage for recurrent cholangitis and one patient ERCP for bile duct stone formation.

Conclusion: We did not observe any malignancy, but follow-up still is relatively limited. However, long-term morbidity is significant, with major implications for the patient, as 7 % of patients need a radiological or surgical re-intervention.

060

INVESTIGATING THE EPIDEMIOLOGY OF CHOLEDOCHAL MALFORMATIONS: CYSTIC VS. FUSIFORM

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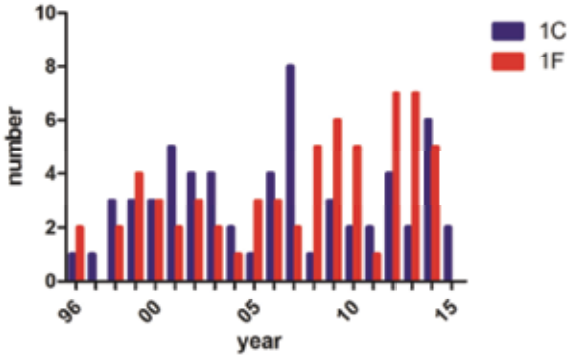
Aim of the study: The two principle morphological variations of choledochal malformation (CM) are described as cystic (1C) or fusiform (1F). We aimed to distinguish between them on the basis of their epidemiological characteristics.

Methods: Review of a prospective database of children with CM referred to a single tertiary hepatobiliary referral centre between 1996-2015. CM were classified using a morphological classification into 1F, 1C and 4(intra & extrahepatic). These were compared using epidemiological variables: gender, ethnicity, post-code, deprivation index, and seasonality of birth. Age at presentation was also noted. Chi Square tests & Mann-Whitney U tests were used as appropriate. P value of <0.05 was considered statistically significant.

Main results: There were 147 CM, [Type 1C, n = 64; Type 1F, n= 62 and Type 4, n = 18, others n = 3]. Direct comparison of 1C *versus* 1F showed that the former were more likely to be female (81% vs 63%, P = 0.02), have an antenatal diagnosis (35% vs 0%; P < 0.001) and to come to surgery earlier (median 23 vs 48 months, P <0.001). There was no difference in family location (inner vs outer city vs remote P = 0.66), deprivation index (P = 0.38) or season of birth (P= 0.49). There was however a trend towards ethnic variation (%white 72% vs 60%, P = 0.06). There was an increase in cases (40% vs 60%), particularly 1F, in the 2nd half of the period although this didn't reach significance (P = 0.18).

Conclusion: For the first time we show that there are epidemiological differences between 1C and 1F CM, unexplained by their morphology. We have also highlighted the absence of antenatal diagnosis in type1F malformations which may explain the later age at first surgery.



Session 8

061

DECREASED HEPATIC LXR AND ABCG5/8 GENE EXPRESSION ASSOCIATE WITH PARENTERAL NUTRITION, SERUM PLANT STEROLS AND LIVER INJURY IN INTESTINAL FAILURE

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Aim of the study: Parenteral nutrition (PN) associated cholestatic liver injury is a serious complication of pediatric intestinal failure (IF). In animal models, it is characterized by parenteral plant sterol induced suppression of nuclear receptor LXR and its target genes ABCG5 and ABCG8, encoding canalicular sterol transporters. We studied LXR, ABCG/8 expression in relation to liver injury, PN and serum plant sterols in children with IF.

Methods: After ethical approval, RNA (qRT-PCR) expression of LXR and ABCG5/8 were analyzed from liver biopsies in 40 IF patients and 6 donor livers (controls). Gene expression was quantified using ΔΔCt method and expressed relative to controls. Serum plant sterols were measured with gas liquid chromatography.

Main Results: Fourteen patients remained on PN after 31 (7.1-74) months and 26 patients had weaned off after 5.2 (2.3-13) months on PN. Gene expression of LXR and ABCG5/8 was up regulated in IF patients compared to controls (**table**). Up-regulation of LXR expression was significantly suppressed in patients receiving PN or having portal inflammation, and expression of ABCG5/8 in patients with cholestasis and/or portal inflammation (**table**). Portal inflammation grade inversely associated with LXR and ABCG5/8 gene expression (r=-0.497- -0.602, P<0.05 for all), and cholestasis grade inversely with ABCG5 (r=-0.404, P=0.010) and ABCG8 (r=-0.404, P=0.010) gene expression. During PN delivery, ABCC8 gene expression was inversely associated with increased serum concentration of plant sterols, campesterol (r=-0.600, P=0.023) and avenasterol (r=-0.537, P=0.048).

Conclusions: PN delivery, cholestasis and portal inflammation were coupled with failure of up-regulation of hepatic gene expression of LXR and sterol transporters ABCG5/8, possibly interfering physiological biliary secretion of plant sterols contributing to liver injury in IF.

Table. Gene expression of LXR, ABCG5 and ABCG8.

	Nutrition		Controls	Cholestasis		Portal inflammation	
	PN	Weaned off		Yes	No	Yes	No
Patients (n)	14	26	6	8	32	7	33
LXR	1.4±0.2[*]	1.7±0.1	1.0±0.2[#]	1.3±0.2	1.6±0.1	1.2±0.1[a]	1.6±1
ABCG5	2.8±0.4	3.0±0.2	1.1±0.2[#,+]	2.3±0.4[a]	3.1±0.2	2.0±0.2[a]	3.1±2
ABCG8	1.9±0.3	1.9±0.1	1.1±0.2[#]	1.5±0.3[a]	2.0±0.1	1.2±0.1[a]	2.0±1

Fold changes are mean ± SEM. *P<0.05 between groups; [+]P<0.05 patients on PN vs controls; [#] P<0.05 patients weaned off PN vs controls.

Session 8

062

OUTCOMES FOLLOWING PARTIAL EXTERNAL BILIARY DIVERSION (PEBD) IN PATIENTS WITH PROGRESSIVE FAMILIAL INTRAHEPATIC CHOLESTASIS (PFIC)

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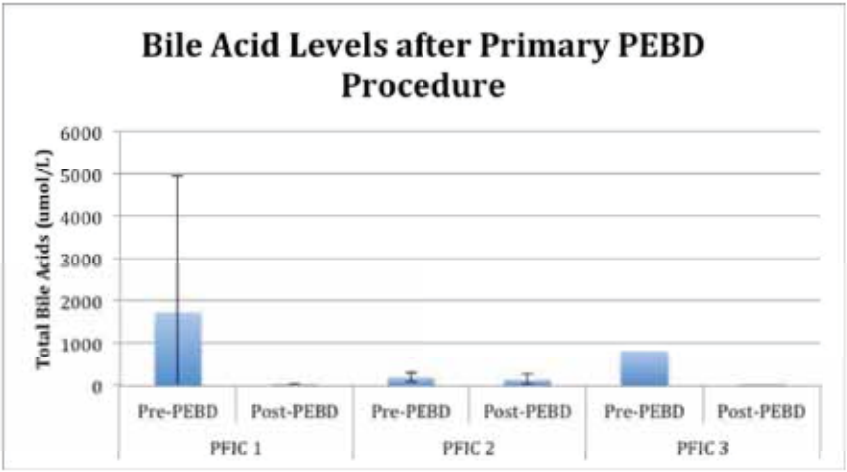
Aim: PFIC is a family of bile acid transport disorders PFIC1, 2 and 3) that may result in serious liver disease requiring transplantation. We reviewed our experience with PEBD as a method to improve liver function, ameliorate symptoms and avoid transplantation.

Methods: All patients with PFIC were reviewed. Outcomes included changes in serum bile acids (BA), improvement in symptoms permitting conversion to ileal bypass and stoma takedown, and survival without transplantation. All results were quantified according to PFIC subtype. Statistics were obtained using paired t-test and Wilcoxon test. p<0.05 was considered statistically significant. IRB approval was obtained for the study

Main Results: Thirty-five patients with PFIC were identified. Data is available in 21. Twenty-four children (12 males) underwent PEBD. 10 PFIC1, 13 PFIC2, and one PFIC3. BA levels decreased in PFIC1 patients from 1724.8±3215.3 to 11.5±6.2 um/L (p<0.05), but in PFIC2 patients, BA levels did not significantly decrease (192.9+99.2 pre diversion to 140.65+118.5 post diversion, p=0.17) (figure 1). In the single PFIC3 patient BA decreased from 821 to 11.2. Seven patients were converted from PEBD to ileal bypass: 2 PFIC2 patients were internalized for electrolyte imbalances from fluid loss, and went on to transplantation. However 5 PFIC patients were converted to ileal bypass because of life-style choice and improved symptoms. There were no significant changes in bile acid levels following conversion. Five year transplant free survival was 100% (11/11) in the PFIC1 and PFIC3 children, whereas 5/13 (38%) PFIC2 patients survived without a transplant (p=0.002, chi-square).

Conclusion: PEBD is an effective procedure to reduce total bile acid levels in PFIC patients and improve their symptoms. However, it appears to be less effective in PFIC2 patients. Those higher bile acid levels could contribute to ongoing damage to the liver, and contribute for the higher liver transplant rate in the PFIC2 group.



Session 8

063

A STANDARDIZED APPROACH FOR ASSESSING INTERNATIONALLY ADOPTED CHILDREN WITH A PREVIOUSLY REPAIRED ANORECTAL MALFORMATION (ARM)

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Background: Many internationally adopted children with previously repaired ARM have limited information available regarding previous medical and surgical history. We have therefore developed a standardized approach for assessing these children to identify associated anomalies and determine the need for further medical intervention.

Methods: The Center has a prospective data registry. All internationally adopted children with the diagnosis of ARM referred and assessed at our Center from April 2014 to September 2015 were identified. All children are routinely screened for associated renal, spinal and sacral anomalies. In addition, males undergo pelvic MRI to check for a remnant of the original fistula (R.O.O.F). All patients are examined in the outpatient clinic. When indicated patients undergo examination under anesthesia and cystoscopy/vaginoscopy to assess for anal mislocation in relation to the sphincter complex, anal stricture, rectal prolapse, and urethral and vaginal anomalies.

Results: Seventy seven adopted children were identified. Thirty seven were excluded (14 previous redo surgery in the U.S.A. 20 awaiting assessment, 3 awaiting primary repair). Forty children were included (21 males and 19 females). All children had an MRI spine; 23/40 (57.5%) were found to have occult spinal dysraphism. All children had a renal ultrasound: 15/40 (37.5%) had an abnormality (2 horseshoe kidney, 3 renal agenesis, 8 hydronephrosis, 2 other). 32/40 children had a VCUG; 20/32 (62.5%) patients had one or more abnormality identified (9 vesicoureteric reflux, 5 large post void residual, 7 urethral abnormality, 5 other). 18/40 (47.5%) had sacral anomalies. Twenty-nine patients (72.5%) underwent re-operative surgery for the following indications: anal mislocation(16), rectal prolapse(7), anal stricture(3), redo cloaca(4), rectovaginal fistula(2), retained vaginal septum(3), R.O.O.F (1).

Conclusions: A standardized approach for evaluating adopted children who have had previous surgery for ARM reveals a high number of associated anomalies that require either intervention or monitoring to prevent future morbidity.

064

A TISSUE ENGINEERING APPROACH TO CREATING A FUNCTIONAL VAGINAL EPITHELIAL SHEET AS AN ADJUNCT FOR CLOACAL RECONSTRUCTION

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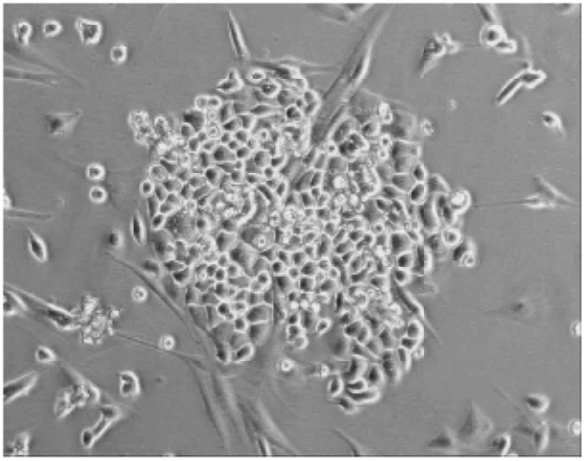
Aim of the Study: Cloacal malformations are associated with recurrent surgical interventions and impaired long term outcome, particularly for those at the most severe end of the spectrum. A bespoke tissue engineered (TE) approach to providing vaginal tissue might reduce the need for urogenital mobilisation, limit concomitant bladder dysfunction and simplify surgery for a subgroup of patients.

We aimed to provide proof of concept using porcine vaginal tissue to create a collagen based acellular matrix. A second aim was to examine the potential to create a functioning epithelium using a combination of vaginal epithelial cells and adipose derived mesenchymal stem cells (AD-MSC).

Methods: With ethical approval, vaginal tissue was harvested from pigs undergoing termination from unrelated studies and de-cellularised using either hyper/hypotonic solutions or a combination of detergents (Triton x-100 and Sodium deoxycholate) and enzymes (DNAse /RNAse). Tissue was subjected to histological analysis and assessed for the presence of cellular material (H&E) and collagen structural integrity (PSR-MF). Additionally, abdominal fat and vaginal epithelial cells were harvested and used to isolate and expand AD MSC and vaginal epithelial cells using cell culture techniques.

Main Results: Data obtained to date indicate that a combined approach using detergents and enzymes produces a non-immunogenic acellular matrix, free of all nuclear material and with preserved collagen structural integrity. Harvesting and expansion of AD-MSC was routine whereas expansion of vaginal epithelial cells, although initially technically challenging, resulted in a pure population of cell passage to P2 over a 14 day period (figure 1).

Conclusion: The basic components required to create functional epithelium have been identified. Both require further characterisation using molecular techniques prior to integration of cells and scaffold matrix. This study demonstrates proof of principle for a novel application of technology that may confer clinical benefit.



065

FUNCTIONAL OUTCOMES IN HIRSCHPRUNG DISEASE - A SINGLE INSTITUTION'S 12-YEAR EXPERIENCE

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Aims: Hirschprung disease (HD) is a chronic condition associated with long-term morbidity. Several different operative techniques have been described in the literature with varying success. We assessed the short and long-term functional outcomes of all patients in a single institution over a twelve-year period.

Methods: Retrospective review of patients between 2002-2014. Patients with their surgery performed elsewhere were excluded. Early post-operative complications included bowel obstruction, sepsis and anastomotic leak. Constipation, soiling, use of laxatives and social impact were assessed in patients over 4 years of age using the Rintala Bowel Function Score (BFS), a validated tool for assessment of functional outcomes in HD. There are 7 components to the score (best score =20).

Main Results: 75 patients were included in the study period. 53(71%) patients were male. 4(5%) had a positive family history and 5(6.6%) had Trisomy 21. The median age at presentation was 7 days (2-2466 days). All patients except two (Soave) underwent a Duhamel Pull-Through. The median age at surgery was 4 months (2 weeks-90months). 36(48%) procedures were performed as single-stage. 6(8%) patients had total colonic HD. 11(15%) patients had early complications and 11(15%) were treated for enterocolitis. There were two late mortalities unrelated to surgery both out-of-hospital. The median number of further surgical interventions needed was zero(0-6) with 12(16%) receiving botulinum toxin and 7(9%) having a spur division. 4(5%) patients have had an antegrade colonic enema stoma fashioned and 4(5%) temporarily received a stoma for relief of obstructive symptoms. Median BFS for all patients currently over 4 years of age (70% of all patients) was 17(5-20). Median follow up was for 6 years (2-12 years).

Conclusions: The outcomes for HD using the Duhamel technique are largely favourable. Despite early complications, the long-term functional outcomes of this procedure are excellent with an infrequent need to perform further surgery.

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PROCTOCOLECTOMY WITH ILEOANAL ANASTOMOSIS IN THE TREATMENT OF EXTENDED AGANGLIONOSIS IN HIRSCHSPRUNG DISEASE

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Aim: We assessed complications and functional outcomes of restorative proctocolectomy with ileoanal anastomosis (IAA) performed on children with Hirschsprung disease (HD) in relation to patients with ulcerative colitis.

Methods: Medical records of all HD patients (n=16) who underwent proctocolectomy with IAA during 1997-2015 in a single center were retrospectively reviewed. Data on complications, stool frequency, day- and nighttime continence, enterocolitis/pouchitis and fecal calprotectin levels were collected and compared to the patients, who underwent IAA for pediatric-onset ulcerative colitis by the same surgeons.

Results: Median age of HD patients was 1.6 (IQR, 0.8-11.5) months at IAA and 5.6 (IQR 2.5-12) years at follow-up. Fourteen patients received J-pouch with median length of 4.0 (range 3.0-10) cm and two straight IAA. Diverting ileostomy was closed after median 11 (4.3-33) months. Three patients were re-operated due to complications: ileostoma prolapse, fascial rupture and adhesive obstruction, while no case of anastomotic leakage occurred.
As shown in table, daytime and nighttime stool frequency was 3.5 and 0, respectively. Two children below three years wore diapers. Of the rest, one patient aged 2.3 years used diapers during nights, while 11/14 (79%) were continent without fecal soiling or accidents. At least two treated (antibiotics and/or intersphincteric botulinum) enterocolitis/pouchitis episodes occurred in 13/16 (81%) HD patients, while histologically verified pouch inflammation was observed in only 4 (27%). Median fecal calprotectin was in normal range, while increased (>100 µg/g) value was observed in four.
Comparison of different parameters of stool frequency, fecal continence and enterocolitis/pouchitis between HD and UC patients is shown in table.

Conclusion: Proctocolectomy with IAA provides encouraging bowel functional outcomes in TCA. In relation to pediatric onset UC, stool frequency and fecal continence appeared better preserved. Although episodes of enterocolitis were common, frequency of histological pouch inflammation and fecal calprotectin levels were lower than in UC.

Variable	HD (n=16)	UC (n=32)
Follow-up age (y)	5.6 (2.5-12)	24.1
Stool frequency/day	3.5 (2.3-4.0)	5.8
Stool frequency/night	0 (0-1.75)	1.5
Fecal soiling (%)*	21%	22%
Totally continent (%)^	79%	44%
Enterocolitis/pouchitis (%)	81%	69%
>two episodes (%)	81%	22%
Histological pouch inflammation (%)	27% (n=15)	60%
Fecal calprotectin (µg/g)	68 (20-286) (n=10)	340

Table Data are median/mean (IQR) or frequencies. *Patients weaned from daytime diapers included (n=14). HD=Hirschsprung disease, UC=ulcerative colitis.

Session 9

067

NOTHING IS PERMANENT: REVERSAL OF THE MACE PROCEDURE

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Aim of the Study: The Malone Antegrade Continence Enema (MACE) procedure is an established treatment option for children with faecal incontinence secondary to chronic idiopathic constipation (CIC) and those who have faecal incontinence following pull-through for anorectal malformations (ARM) and Hirschsprung's disease (HD).
It is perceived as a permanent procedure by patients and carers, with the majority of reversals reported to be secondary to complications, lack of effectiveness or non-compliance.
This single-centre retrospective study analyses MACE procedure reversals following the return of normal bowel habits in children with CIC, ARM and HD.

Methods: Children who underwent a MACE procedure in our unit between 1998 and 2015 were identified. Demographic and clinical data were obtained from contemporaneous records. Indications for MACE formation, age at MACE formation and reversal, and indications for reversal were analysed. Data are given as a percentage or mean (range)

Main Results: Over the 18-year study period, 47 children underwent MACE procedure. Underlying diagnoses were CIC (21; 45%), ARM (16; 34%) and HD (10; 21%). Age at time of surgery was 9.4 (3-19) years and follow up time was 5.7 (0.3-10.8) years.

Eighteen MACE procedures (38%) were reversed; 2 (4%) due to stomal non-efficacy, 5 (11%) due to stomal complications and 11 (23%) secondary to development of independent continence. In this latter group of 11, underlying diagnoses were CIC (4; 36%), ARM (1; 9%) and HD (6; 55%). Age at MACE formation was 9.9 (4-14) years, age at reversal was 17.8 (13-22) years and period with the MACE was 8.0 (2-13) years.

Conclusion: We found a significant proportion of patients did not need their MACE after prolonged use. This counters the perception that a MACE is always for life and provides encouragement that development of independent continence in patients with CIC, HD and ARM may be a possible indication for reversal of the procedure.

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OUTCOMES FOLLOWING SCLEROTHERAPY FOR MUCOSAL RECTAL PROLAPSE WITH OILY PHENOL INJECTION - SINGLE CENTRE REVIEW

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Aim of the study: To review the outcomes following treatment of mucosal rectal prolapse treated by injection sclerotherapy with oily phenol in our centre.

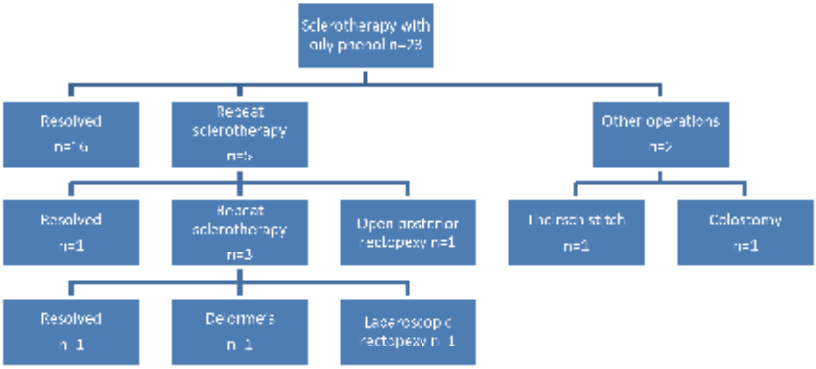
Methods: Retrospective case-note review of all children who underwent sclerotherapy with oily phenol injection as primary surgical intervention for mucosal rectal prolapse, from January 2007 – December 2015, was conducted.

Main Results: A total of 31 patients were identified. Mean age at presentation was 4.8 years (range 5 months - 12 years). 23 patients underwent injection sclerotherapy with oily phenol as primary procedure following failure of medical management. Patients with full-thickness rectal prolapse (n=8) were excluded from the study. Of these, I was treated previously at another centre and was found to have rectal atresia, 3 patients underwent Delorme's procedure and one patient each was treated with Altmeier's procedure, laparoscopic rectopexy, Thiersch stitch and defunctioning colostomy. The cause for rectal prolapse was considered to be due to: constipation (n=15), idiopathic (n=7), spina bifida (n=1).

Follow-up was for minimum 6 months, mean = 2 years; range 6 months – 17 years. Recurrence following injection sclerotherapy with oily phenol requiring further procedures was 30.4% (7/23). Results treatment and outcomes following recurrence are illustrated in Fig 1.

Conclusions: Injection sclerotherapy with oily phenol is a safe, effective and minimally invasive primary treatment option for mucosal rectal prolapse not responding to conservative management. Its failure in a third of patients is similar to other agents[1]; it can be repeated with good results. In case of recurrence a cautious re-examination under anaesthesia should be undertaken to exclude a missed full thickness rectal prolapse before re-injecting.

1. Shah A, Parikh D, Jawaheer G, Gornall P. Persistant rectal prolapse in children: sclerotherapy and surgical management. Paediatric surgery International (2005) 21: 270-273.



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SURGICAL MANAGEMENT OF PAEDIATRIC INFLAMMATORY BOWEL DISEASE: A REGIONAL COHORT STUDY

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Aim of study: To investigate the incidence and characteristics of surgery for paediatric inflammatory bowel disease (PIBD) in a regional centre. The incidence of P BD is increasing in Scotland(1) and other countries. Data informing surgical management of PI3D is lacking, especially population-based data.

Methods: A surgical audi. database was utilised to study surgeries in PIBD patients from 1/8/97-31/12/14 using an existing prospective database to identify incident and prevalent PIBD patients at a regional treatment centre caring for 230,000 children. Results presented as median (interquartile range).

Main Results: 394 patients with PIBD were identified, of which 65 (16%) had surgery. 61% of surgical patients were male, 80% had Crohn's disease (CD), 17% had ulcerative colitis (UC), and 3% had IBD unclassified. 21% of CD, 12% of UC and 4% of IBDU patients had surgery. 68% had intestinal procedures and 46% had perianal procedures; 14% had both. Age at diagnosis was 11.8yrs (9.4 - 13.5) and age at last follow up was 17.8yrs (17.3 18.3). CD Patients who underwent perianal procedures were younger at first surgery (12.5yrs [9.7 - 14.2] versus 14.5yrs [12.9 - 15.5]) than intestinal procedures, despite similar age at diagnosis (10.7 [8.5-12.5] for perianal surgery and 11.0 [9.0-12.1] for intestinal). 5-year cumulative risk of all surgery in CD patients was 17%, and 9.6% for intestinal surgery. 5-year cumulative colectomy risk in UC was 9.6%. The most common procedures were total colectomy in UC, and right hemicolectomy and drainage of perianal sepsis in CD.

Conclusions: A UK regional study shows that almost one-fifth of PIBD patients undergo PIBD specific surgery, with the highest incidence of surgery in CD.

References

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Session 9

070

IS IT OK FOR PAEDIATRIC SURGEONS TO UNDERTAKE POUCH RECONSTRUCTION FOR CHILDREN AFTER PAN-PROCTOCOLECTOMY FOR ULCERATIVE COLITIS

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Aim: It remains controversial as to whether paediatric surgeons should perform restorative proctocolectomy. Our operative experience is but a fraction of equivalent adult surgeons but we are best placed to manage the holistic needs of children and know full well the powers of recovery and resistance and resilience to infection. We also know our patient and family very well and have already conducted the colectomy and stoma formation needed to manage the disease initially. Our aim was to investigate whether the results from pouch reconstruction in childhood is equivalent or otherwise to adult practice thus justifying this procedure being performed prior to transition to adult services.

Method: A review was conducted of the english speaking literature using a defined set of search terms relating to conducting restorative proctocolectomy in paediatric surgery. The frequency of functional outcomes and complications were recorded. This was compared to a similar review of such surgery being performed in adult surgery to compare the initial complications and functional outcome.

Results: The main results are shown in the figure. The results of restorative proctocolectomy surgery performed in children show at least equivalent or better rates of complications and functional outcome

Conclusions: The complications and functional outcomes of restorative proctocolectomy in childhood are at least equivalent if not better than that seen in adult practice. There are other issues to consider when it comes to whether paediatric surgeons should perform this surgery such as frequency of surgical performance, long term follow up and the size of the necessary equipment to undertake such surgery. We propose that a pathway for children undergoing restorative surgery be agreed by paediatric surgeons in the UK and we propose such a pathway.

Figure
Post operative complications and outcome

	Rate of all post operative complications	Day time stool emptying	Night time stool emptying	Leak/ Soiling	Pouchitis
Review of patients 6 to 11 years of age	41%	Mean 4.4	Mean 1 Median 1	14%	37%
Review of patients 12 to 16 years of age	46%	Mean 5	Mean 2 Median 1	15%	35%
Review of adult literature	52%	Mean 6	Mean 2 Median 2	70%	50%

Session 9

071

SURGERY FOR AGGRESSIVE INFLAMMATORY BOWEL DISEASE ASSOCIATED WITH LIVER DYSFUNCTION

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Aim of the Study: Inflammatory bowel disease (IBD) with associated liver disease (LD) may run a relatively benign clinical course. We highlight the role of surgery when disease progression is aggressive.

Methods: A retrospective study of patients with IBD and associated LD who underwent surgery (colectomy, liver transplant or both) was carried out (2006 to 2015). Details from electronic records and prospectively maintained departmental databases included: age at diagnosis, surgical interventions, bowel and liver histopathology and outcomes. Data are reported as median (ranges).

Main Results: 11 patients (9 m) underwent surgery for IBD with associated LD in the study period. The age at diagnosis was 12 (8 – 18) years for IBD and 11 (3 – 16) years for LD. The IBD diagnosis was ulcerative colitis (n–8), Crohn's (n–1) and indeterminate (n–2). In 6 patients (55%) the diagnosis of IBD was made after the onset of LD. The liver pathology was autoimmune sclerosing cholangitis (n=9), autoimmune hepatitis (n=1) and liver dysfunction related to IBD medications (n=1)

Interventions: Colectomy for disease progression despite intensive medical treatment [n=6 (55%)]. In this group LD remains stable at 24 (12 - 84) months follow up. Primary liver transplant [n= 4 (36%)] where LD deteriorated more rapidly than IBD. 3 (75%) had a diagnosis of LD before the onset of IBD symptoms. 2 transplanted patients died (multi-organ failure; metastatic sarcoma). The 2 survivors have stable IBD. Combined colectomy and liver transplant [n=1 (9%)] – well with stable function at 12 months follow up.

Conclusions: This is one of the largest series of children who underwent colectomy / liver transplant surgery for IBD and LD

- IBD and LD progression is variable and multi-disciplinary decision making is complex
- Survival in this series is 82%

072

PDGFRα+ CELLS IN RAT AND RABBIT COLON: OPTIMISING METHODOLOGY FOR IMMUNOHISTOCHEMISTRY

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Aim of the Study: Outcomes in Hirschsprung Disease (HD) may be compromised by dysmotility. "Interstitial Cells" (IC), including cKit+ and the recently recognised PDGFRα cells, are pivotal in smooth muscle motility control. PDGFRα cells may play a role in HD as they affect smooth muscle relaxation, but have not been investigated. Nine papers have examined cKit cells in HD, yet experimental technique (including use of fixative and antibody) and results differ. Our aim was to identify an optimal methodology to fix tissues to allow this cell group to be examined in the colon.

Methods: Anaesthetised rabbit and rats were euthanized (UK Home Office Licence 40/3126), colons removed and rinsed in phosphate buffered saline. Segments were fixed in four different fixatives, acetic ethanol, paraformaldehyde, zinc and Zamboni's. Samples were cryoprotected in sucrose and then sectioned using a cryostat in a cross-sectional orientation. Sections were blocked using donkey serum to minimise non-specific binding of antibodies, followed by incubation with antibodies against cKit (Miltenyi Biotec) and PDGFRα (R&D Systems). Antibody binding was detected with the biotinylated secondary antibodies and visualised with streptavidin Alexx^{555}. Staining was analysed using a confocal microscope.

Main Results: Both cKit+ and PDGFRα+ ICs were identified in the muscular layers of the rabbit and rat colon. Tissue fixed using acetic ethanol or zinc revealed qualitatively better labelling of cells compared to those fixed with paraformaldehyde or Zamboni's. The cKit antibody raised in mouse enabled labelling of the rabbit tissue since the DAKO gold-standard is raised in rabbit. Sections labelled using the biotinylated method exhibited clearer staining compared to the direct secondary approach.

Conclusion: Acetic ethanol and zinc fixatives resulted in enhanced staining for both cKit and PDGFRα positive cells in comparison to paraformaldehyde and formalin. This will facilitate optimisation of immunohistochemistry for human tissues.

073

NECROTIZING ENTEROCOLITIS IN THE NETHERLANDS: AN INCREASED INCIDENCE IN THREE ACADEMIC REFERRAL CENTERS

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Introduction: Necrotizing enterocolitis (NEC) is a severe inflammatory disease with high mortality rates, mostly occurring in preterm infants. The Dutch guidelines for active treatment of extremely preterm infants changed in 2006 from 26+0 to 25+0 weeks of gestation, and in 2010 to 24+0 of gestation. The aim of this study was to gain insight in the incidence, the clinical outcomes and treatment strategies, in three academic referral centers in the Netherlands during the last nine years.

Methods: We performed a multicenter retrospective cohort study of all patients with NEC (Bell stadium ≥ 2a) in three academic referral centers diagnosed between 2005 and 2013. Outcome measures consisted of incidence, changes in clinical presentation, treatment strategies and mortality.

Results: Between 2005 and 2013 14.161 children were admitted to the neonatal intensive care unit in the three centers. The overall percentage of children born at a gestational age of 24 weeks and 25 weeks increased with 1.7% after the introduction of the guidelines in 2006 and 2010. The incidence of NEC increased significantly (period 2005-2007: 2.1%; period 2008-2010 3.9%; period 2011-2013: 3.4%; p=0.001). We observed a significant decrease of peritoneal drainages (↓16%; p=0.001) and a decrease of laparotomies (↓24%; p=0.002). The mortality rate (03% in 2011-2013) remained unchanged.

Conclusion: The incidence of NEC significantly increased in the last nine years. The increase in incidence of NEC seems to be related with the increase of the total admissions of children born at a gestational age of 24- and 25 weeks. The percentage of patients needing surgery decreased, while 30-day mortality did not change.

074

ALTERED SERUM BILE ACID POOL ASSOCIATE WITH INTESTINAL RESECTION AND LIVER INJURY IN PEDIATRIC INTESTINAL FAILURE

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Aim of the study. Bile acids serve as important signaling molecules regulating liver function. Modification by intestinal bacterial modulate bile acid's ability to activate their target receptors. In germ free animals lack of secondary bile acids promote liver injury. We studied serum bile acid pool in relation to intestinal resection and histological liver injury in pediatric intestinal failure (IF).

Methods. After an ethical approval, serum bile acids were measured with gas liquid chromatography in 45 IF patients [median age 5.1 (IQR, 2.3-10) years] and 27 age-matched healthy controls [6.3 (4.2-13), P=0.128]. Liver biopsies for histological analyses were available in 27 patients. Fourteen patients remained on parenteral nutrition (PN) after 36 (6.7-87) PN months and 31 patients had weaned off after 10 (4.4-16) PN-months.

Results. Absolute serum concentrations and percentages of primary bile acids, chenodeoxycholic acid and cholic acid, were increased and those of secondary bile acids, lithocholic acid, deoxycholic acid and ursodeoxycholic acid, were decreased in IF patients. (**Table**). During PN, lowered percentage of (bacterially modified) secondary bile acids lithocholic (r=-0.641, P=0.03) and deoxycholic acid (r=-0.720, P=0.008) associated closely with histological liver inflammation. Likewise, liver fibrosis was related decreased lithocholic acid percentage (r=-0.83, P=0.001) and increased concentration of primary bile acids, chenodeoxy (r=0.724, P=0.008) and cholic acid (r=0.679, P=0.0015). Serum cholic acid concentration was increased further in PN-dependent IF patients (**Table**) and in those without any remaining ileum [(72 (40-280) vs 25 (16-49), P=0.002)]. Remaining ileum length correlated negatively with serum cholic acid concentration (r=-0.392, P=0.008).

Conclusions. The bile acid pool is altered in IF, characterized by profoundly decreased secondary bacterially modified bile acids and increased primary bile acids. These changes associated with intestinal resection and histological inflammation and fibrosis of the liver, suggesting that altered bile acid signalling may contribute to live injury in IF.

able. Serum bile acids in intestinal failure patients and controls

Variable	All Patients	Patients on PN	Patients weaned off PN	Controls
	N=45	N=14	N=31	N=27
Total bile acids (µg/100 ml)	232 (116-345)[1]	122 (97-364)[1]	237 (127-345)[1]	103 (79-131)
Primary bile acids				
Chenodeoxycholic acid (%)	51 (45-64)[1]	61 (43-82)[1]	58 (45-65)[1]	24 (18-33)
µg/100 ml	129 (52-212)[1]	56 (45-226)[1]	139 (58-210)[1]	27 (17-43)
Cholic acid (%)	23 (13-32)[1]	28 (22-36)[1,2]	17 (12-25)[1]	14 (11-20)
µg/100 ml	43 (21-85)[1]	38 (26-115)[1]	41 (20-72)[1]	15 (8.6-19)
Secondary bile acids				
Lithocholic acid (%)	3 (2-6)[1]	7 (2-8)[1]	3 (2-7)[1]	18 (12-20)
µg/100 ml	0.5 (0.5-13)[1]	3.0 (0.6-13)[1]	0.2 (0.3-13)[1]	16 (12-21)
Deoxycholic acid (%)	7 (3-12)[1]	10 (5-13)[1]	6 (3-9)[1]	27 (23-35)
µg/100 ml	12 (8.3-17)[1]	13 (9.3-21)[1]	12 (8.0-17)[1]	27 (20-41)
Ursodeoxycholic acid (%)	3 (2-10)[1]	3 (2-6)[1]	4 (1-10)[1]	10 (7-14)
µg/100 ml	0.0 (2.3-22)[1]	3.2 (2.2-23)[1]	20 (11-72)[1]	9.6 (0.3-16)

Data are median (IQR). % percentage of total bile acids. Mann Whitney U-test. [1]P<0.05 vs controls, [2]P<0.05 vs patients weaned off PN.

Session 11

075

SURGICAL PATHOLOGY AND OUTCOMES IN EXTREMELY PRETERM INFANTS REQUIRING LAPAROTOMY

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Aim of study: A high requirement for laparotomy in extremely preterm infants (born <26 weeks gestational age) has been previously reported. Whilst the most frequently reported indication for laparotomy in the literature is necrotising enterocolitis (NEC), other pathologies exist. We aimed to investigate the cause of surgical pathology, incidence of subsequent surgical procedures, and the outcome of extremely preterm infants requiring laparotomy before neonatal discharge.

Methods. Institutionally approved, retrospective review of neonates born within a UK regional neonatal network at <26 completed weeks gestation that required a laparotomy over a 9 year period (2007-2015). Data was recorded from neonatal discharge summaries, histopathology and radiology reports, and operation notes.

Results: Of 361 neonates born at <26 weeks gestation, laparotomy was performed in 72 (19%). Median gestation was 24+5 (range 23+1-25+6); median birth weight was 692g (range 430-1100). Surgical pathology encountered included spontaneous intestinal perforation (22), NEC (25), previously sealed intestinal perforation (3), midgut volvulus (1), strangulated inguinal hernia (1), milk curd obstruction (8), and meconium ileus of prematurity (5). Negative laparotomy for acute abdomen was performed in 7. Twenty-four (33.3%) neonates had formation of a stoma. Seventeen neonates (24%) required further laparotomies (Table).
There was a high requirement for non-gastrointestinal surgery in this group with 31/72 (43%) undergoing ligation of patent ductus arteriosus and 25/72 (35%) requiring laser therapy for retinopathy of prematurity.
Overall 54/72 infants (75%) survived to discharge; median total length of stay for survivors was 128 days (range 78-193).

Conclusion
One in five neonates born extremely preterm required a laparotomy. Underlying pathology was NEC in only one-third of cases. A quarter required repeat laparotomy, many also required non-gastrointestinal procedures. Despite this three quarters of these infants survived to discharge. These data are important for parental counselling and organisation of neonatal services.

Table: Indication for further laparotomy in 17 infants

Indication	N
further bowel perforation	4
adhesional obstruction	4
anastomotic leak/stenosis	4
NEC	3
non-adhesional obstruction	1
stoma closure	1

076

EXTRACELLULAR MATRIX HYDROGEL DERIVED FROM DECELLULARISED INTESTINAL TISSUE FOR THE 3D-CULTURE OF PRECURSOR CELLS IN TISSUE ENGINEERING.

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Aim: Anatomical/functional loss of the small intestine can require the use of total parenteral nutrition or indeed the need for an intestinal transplant. Both options unfortunately have a high associated risk. A hydrogel derived from decellularised intestine, thereby possessing the extracellular matrix (ECM) information of the native tissue, would be beneficial for many applications within intestinal tissue engineering, including; cell delivery to restore function, 3D-culture of organoids for the repopulation of decellularised scaffolds or as a hybrid engineered intestinal replacement. Here, we develop and characterise such a hydrogel focusing on its ECM preservation, rheology and cytocompatibility investigating its potential in tissue engineering.

Methods: Pig intestine was decellularised with the Detergent Enzymatic Treatment (DET) and ECM components were quantified. A gelation protocol was developed, involving drying, milling and digestion followed by neutralisation to physiological pH and temperature. Whole intestine and mucosa alone were compared examining gelation properties, conductivity and ECM composition. Finally the gel was investigated for its potential to support intestinal organoids in 3D-culture conditions.

Results: The pig intestine was successfully decellularised with a significant reduction of DNA quantified and immunofluorescence staining showing no nuclei. Quantification of the ECM components showed Collagen, Elastin and GAG were preserved after decellularisation. A hydrogel was successfully formed as evident in turbidimetric tests showing normalised absorbances forming sigmoidal curves typical of gelation. The mucosa alone formed a more stable and consistent gel than the whole intestine with a faster gelation time of 20minutes. Oscillation rheology showed both tissues to have a high storage modulus of 100-1000Pa. The gel successfully supported the 3D-culture of intestinal organoids maintaining cell viability and comperable morphologically to Matrigel®.

Conclusion: This study reports the optimisation of an ECM hydrogel derived from non-immunogenic intestinal tissue with encouraging potential in organoid culture, tissue engineering and cell delivery for intestinal repair and regeneration

077

PARENTERAL NUTRITION ASSOCIATED CHOLESTASIS ASSOCIATED WITH SURGERY FOR IDIOPATHIC INTESTINAL PERFORATION AND NECROTIZING ENTEROCOLITIS

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Aim of the study: Parenteral nutrition (PN) associated cholestasis (PNAC) is a serious complication in surgical premies. We assessed occurrence, risk factors and outcomes of PNAC in neonates who underwent surgery for necrotizing enterocolitis (NEC) or (IIP) idiopathic intestinal perforation in two Finnish neonatal centres.

Patients and methods: After ethical consent, hospital records of neonates who underwent surgery for NEC or IIP during 1986-2014 were reviewed. PNAC was defined as serum direct bilirubin > 2mg/dl (34mmol/l) any time after 14 days of PN. Predisposing factors were assessed with Multivariate Logistic Regression.

Main results: A total of 229 patients were included with NEC in 160(70%) and IIP in 69(30%), median birth weight was 880 (IQR 690-1100) grams. Median duration of PN was 25 (13 - 58) days in NEC and 27 (18 - 47) days in IIP, p = 0.56. Of 194 (84%) patients who survived after 14 days of PN 81(42%) developed PNAC, which lasted median 92 (47 - 150) days. Sixteen (20%) patients with PNAC history died, eleven (13%) of them had unresolved cholestasis. In all survivors PNAC resolved. In multivariate analysis blood culture positive sepsis episodes, HR = 1.8(95%1.3 2.7), p=0.002, proportional age-adjusted length of remaining small intestine <60%, HR = 2.2(95%CI = 1.1-4.4), p=0.03 and birth weight under 900 grams, HR = 2.3(95%CI = 1.1-5.1), p = 0.046 predicted PNAC. Overall survival was 79%. Conditional postoperative survival beyond 14 days was 83% in patients with PNAC and 84% in patients without PNAC (p = 0.84). During 1986-2000 and 2001-14 respective incidence and survival of PNAC was 42% vs. 40% (p=0.86) and 85% vs 78% (p=0.38).

Conclusion: PNAC remains common complication among premies with NEC and IIP without added mortality beyond two weeks. PNAC was predicted by blood stream infections, extensive resection of small intestine and low birth weight.

078

NECROTISING ENTEROCOLITIS - A 15 YEAR OUTCOME REPORT FROM A SPECIALIST CENTRE

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Aim of the Study: Necrotising Enterocolitis (NEC) is a challenging disease in newborns associated with high mortality and morbidity. Low birthweight and prematurity are well recognised risk factors. "Term NEC" in mature infants is also described though a rare association. In this study we report outcomes of all babies having emergent laparotomy for NEC at our institution (utilising co-location to neighbouring NICU's post-operatively) to examine - impact of gestational age on (1) mortality and (2) timing of operation and its relationship(s) to survival.

Methods: Medical case records of babies with ICD code(s) - NEC / Necrotising enterocolitis were examined for the era(s) 2000 - 2015. After excluding 'non-operative' NEC patients - 254 cases were identified having emergency surgery for advanced Bells stage NEC (confirmed on histology). Effect of (a) timing of surgery and (b) mortality within 30 days (30D) were statistically analysed using Pearsons correlation coefficient (P< 0.05 significant)

Results: Mean gestational patient age was 28.46 weeks (CI 95% 27.95 to 28.96). Overall 30D mortality for the operative cohort was 18.5%. 30D mortality according to the WHO Gestational Age Classification was : (i) < 28 weeks 29% , (ii) 28 < 32weeks 7% , (iii) 32 < 37weeks 10% , (iv) > 37weeks - 0% , showing a correlation with birthweight. Term newborns > 37 weeks - comprised 6 % of all patients. Babies born near term had operation at a significantly shorter time interval after delivery vs those born prematurely (Pearson correlation co-efficient of -0.117 ; p=0.005).

Conclusion: Excellent survival with early operation (> 70%) is feasible in extremely (< 28 weeks) premature infant(s) with NEC. With increasing gestational age (> 32 weeks) mortality is now uncommon. Aggressive resuscitation and timely emergency operation has contributed to the improving outcomes for NEC at this centre.

079

A NATIONWIDE COHORT STUDY DESCRIBING OUTCOMES TO ONE YEAR POST-INTERVENTION FOR INFANTS IN THE UK WITH PREVIOUSLY SURGICALLY MANAGED NECROTISING ENTEROCOLITIS

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Aim: This study's aim was to describe on-going surgical interventions, and outcomes up to one year, for infants in the UK with previously surgically managed necrotising enterocolitis (NEC)

Methods: Infants born in the UK between 01/03/2013 and 28/02/2014 were eligible for inclusion in the study if they had suspected NEC where a decision for surgery was made, regardless of whether surgery was conducted. NEC was defined as bilious gastric aspirate/emesis, abdominal distension, or per-rectal bleeding, plus either pneumatosis intestinalis, hepato-biliary gas or pneumoperitoneum on abdominal radiography. Cases were notified via monthly reporting cards sent to every paediatric surgical centre in the UK, with data-collection forms sent in response to case notification and one year after notification.

Results: 204(86%) of the 236 originally enrolled infants had one-year follow-up data.

Forty-three infants (18%) died prior to 28-days post decision to operate, and 16(7%) died between 28-days and one year. One-year mortality rate was 25%. Median time to death was 9 days (IQR1-49 days).

Of the 192 infants with one-year follow-up and information recorded, 67(35%) had one further procedure, 31(16%) had two further procedures and 19(10%) more than two further procedures. 46 infants (24%) required a second laparotomy, of which 17(37%) were performed for stoma formation. The most commonly performed additional procedure was stoma closure, which was performed in 83 infants (43%). 66 stoma closures (80%) were performed electively. The median time to elective stoma closure was 98 days (IQR 52-148days). Gestational age at birth was not correlated with time to stoma closure.

Conclusions: This population-based study has highlighted that the majority of the mortality for infants with surgical NEC occurs in the first 10 days post-operatively. Surviving infants frequently require multiple further procedures in the first year of life. There is wide variation in timing of stoma closure when performed electively.

Posters and Videos

01

A PROSPECTIVE STUDY OF LAPAROSCOPIC VERSUS OPEN SURGERY FOR PAEDIATRIC HYDROCOELES

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Aim: Standard of surgical practice for paediatric hydrocoele is resection of a segment of patent processes vaginalis (PPV) and drainage of the scrotal fluid. The groin incision is often 3-4 cm long. These incisions grow with time and can reach 10 cm or more in an adult. We would like present a comparison of laparoscopic excision of PPV (Lap PPV) to that of open approach.

Materials and Methods: This was a prospective study and human ethics was obtained from relevant hospital ethics/advisory committees. Over a 6-year period (Mar 2009-Aug 2015), 30 Lap PPV cases (including 2 recurrent and 3 bilateral) was compared to 61 open unilateral PPV cases. Open PPV was performed for (a) parents' preference or (b) medical insurance carrier refusing Lap PPV approach because of increased cost.

Lap PPV was done via trans-peritoneal hemiotomy with a 5mm scope and 3mm grasper and scissors. The patients went home the same day. Oral paracetamol/ibuprofen combination was written for post-op analgesia 8-hourly for 3 days (9 doses).

Main results: There were no conversions, no minor/major complications and no recurrences in either group. Open PPV procedure time was 14-25 minutes (average 19.8 minutes) and for Lap PPV 15-30 minutes (average 23.5 minutes), excluding bilateral cases (p=0.1).

When questioned one week later, the parents reported that the children who underwent open PPV operations required 3-8 oral analgesic doses (average 4.2) and those undergoing Lap PPV required 3-9 doses (average 4.7) (p=0.57).

At 6 months post surgery, there was no visible scar with Lap PPV cases.

Conclusion: Lap PPV excision appears to be at least equivalent to open approach. Although, aesthetically more superior, it was expected to be less painful than open surgery but this was not noted in this cohort.

02

OUTCOME REPORTING HETEROGENEITY IN GASTROSCHISIS RESEARCH – A SYSTEMATIC REVIEW

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Aim: The aim of this work was to identify which outcomes are currently investigated in gastroschisis research, and make an assessment of the quality of their reporting.

Methods: A systematic review was conducted according to a pre-specified protocol (CRD42015025026). Titles were eligible for inclusion if they compared two methods of visceral reduction and defect closure in infants with gastroschisis. Studies were excluded if they only reported outcomes from one intervention without a comparator. Assessments of eligibility and extraction of data were carried out by two researchers working independently.
Primary outcome:

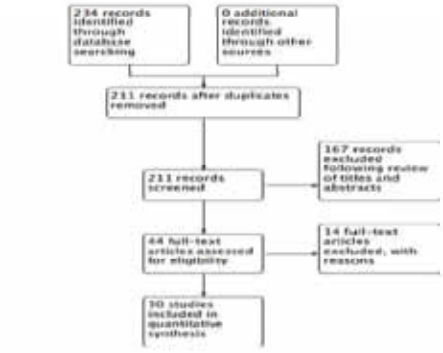
- Identification of outcomes reported by eligible studies

Secondary outcomes:

- The median number of outcomes reported per study
- The percentage of studies meeting Harman et al's criteria for transparent outcome reporting
- The percentage of studies fully reporting data for every outcome they investigated.

Main Results: The search retrieved 211 unique titles related to gastroschisis. 30 were deemed eligible for inclusion in the review. Within these 30 studies, 82 unique outcomes were investigated. Only three outcomes were investigated in more than 50% of eligible studies - length of stay (24 studies, 80%), mortality (19 studies, 63%), and development of necrotising enterocolitis (16 studies, 53%). Thirty-one outcomes(50%) were only investigated once. The median number of outcomes reported per study was 9(IQR5-11).
Three studies were only available as abstracts and therefore excluded from data reporting assessments. None of the remaining studies met all criteria for complete data reporting, and 12 (44%) fully reported data for every outcome measure they investigated.

Conclusion: The need for a core outcome set in gastroschisis is highlighted by the substantial outcome reporting heterogeneity and significant risk of reporting bias demonstrated in this review. The outcomes identified in this review could be used in a robust Delphi process involving patients, parents and clinicians to develop such a core outcome set.



03

RISK FACTORS OF RECURRENCE AND CONTRALATERAL INGUINAL HERNIA AFTER LAPAROSCOPIC PERCUTANEOUS EXTRAPERITONEAL CLOSURE (LPEC) FOR PEDIATRIC INGUINAL HERNIA

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Aim of the Study: Laparoscopic percutaneous extraperitoneal closure (LPEC) for paediatric inguinal hernia has recently been gaining popularity. Recurrence and contralateral metachronous inguinal hernia (CMIH) are important problems for LPEC. This study analysed the risk factors for these problems.

Methods: Our institution started LPEC for essentially all patients with inguinal hernia in July 2008. This study included 1530 patients who underwent LPEC from July 2008 to December 2015. The mean follow-up period was 45 months. Of 1030 patients, 867 were boys and 663 were girls. The mean age at the time of operation was 3.9 years; mean body weight was 15.1 kg. Asymptomatic contralateral internal ring was routinely observed in the operation, and when patent processus vaginalis (PPV) was confirmed, prophylactic surgery was performed regardless of the size of patency.

Main Results: Recurrence was seen in 0.48% of the patients (8/1653 sides). CMIH was seen in 0.22% of the patients (3/1382). All cases of recurrence and CMIH occurred in male patients, with rates of 0.85% and 0.39%, respectively. On the basis of these results, we focused on the differences between the sexes (Table). Asymptomatic contralateral PPV was confirmed in 40.6% of male unilateral patients and 49.6% female unilateral patients ($p < 0.01$). In male patients, the rate of recurrence occurring within 1 year was confirmed as 2.13% and that occurring after 1 year or later as 0.44% ($p = 0.03$).

Conclusion: In our study, recurrence and CMIH were seen only in boys. In addition, the patency rate of contralateral PPV was higher in girls. During operations for male patients, care was taken to prevent damage to the sperm duct and testicular blood vessels. This seemingly affected our procedure and observation. In conclusion, we must be more careful when male patients, especially those aged less than 1 year, undergo LPEC.

Table. Comparison in each sex

	male	female	p value
case	847	683	
side (right/left/bilateral)	473/307/67	313/314/56	<0.01
mean age (year)	3.25	4.67	<0.01
mean body weight (kg)	14	16.5	<0.01
mean follow up period (month)	44.8	45.3	0.06
mean operative time			
unilateral (min)	22.8	18.8	<0.01
bilateral (min)	28.3	23.1	<0.01
patency rate of contralateral PPV (%)			
total	40.6	49.6	<0.01
right side	39.1	42.6	0.37
left side	42.4	56.5	<0.01
incidence of CMIH (%)	0.39	0	0.12
recurrence rate (%)	0.88	0	0.01

PPV: patent processus vaginalis CMIH: contralateral metachronous inguinal hernia

04

WHAT IS THE ROLE OF ENHANCED RECOVERY AFTER SURGERY PROGRAMMES IN PAEDIATRIC SURGERY?

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Aims: Enhanced Recovery after Surgery (ERAS) pathways are standard practice in many adult surgical specialties resulting in improved clinical outcomes with less morbidity, reduced cost and higher patient satisfaction. It is unclear whether ERAS principles are applicable to Paediatric Surgery and whether similar benefits could be realised. We performed a scoping review to identify the extent to which ERAS has been used in Paediatric Surgery, the nature of interventions and outcomes. A scoping review allows a broader interrogation than a systematic review since it is not confined by narrow confines of a predetermined research question.

Methods: Pubmed, Cochrane library, Google Scholar and Embase were searched using the terms enhanced recovery, post-operative protocol/pathway and paediatric surgery. Studies were excluded if they did not include abdominal/thoracic/urological procedures in children or if the only interventional element was post-operative pain management

Results: Nine studies were identified (published 2003-2014: total 1021 patients) from centres in UK, USA, Europe and Asia. Three were case control studies, one retrospective review and five prospective implementations of a "fast track protocol". There were no RCTs. Interventional elements identified were post-operative feeding and mobilisation protocols, morphine-sparing analgesia, and reduced use of nasogastric tubes and urinary catheters.
Outcomes reported included post-operative length of stay (LOS), time to oral feeding and stooling, readmissions and parent satisfaction. Case-matched studies compared fast-track programmes with traditional treatment; prospective studies investigated successful introduction of fast-track elements and compared LOS to national data.
Fast-track programmes significantly reduced LOS in 6/7 studies, time to oral feeding in 3/3 studies and time to stooling in 2/3 studies. Parent satisfaction was high.

Conclusions: The use of ERAS pathways in Paediatric Surgery appears very limited but existing literature suggests that such pathways may have benefits in children. Prospective studies should evaluate other interventions used in adult ERAS on outcomes in the paediatric setting.

05

IS THERE ANY ROLE FOR CLINICAL SCORING SYSTEM ALONGSIDE ULTRASOUND (US) IMAGING FOR REDUCING THE RATE OF NEGATIVE APPENDICECTOMY (NA)?

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Aim of the study: Paediatric appendicitis can have a high incidence of misdiagnosis in non-specialist paediatric centres. The Alvarado score (AS) is among the most validated clinical prediction rules for the diagnosis of appendicitis. Primary aim of the study was to demonstrate to our regional network that a pathway involving a clinical score system & US-scan (AS+US) can maintain an acceptable NA rate without using CT-scan. A secondary aim was to identify patients where US can assist the management pathway.

Methodology: A prospective study on patients <16yrs suspected of having appendicitis over a period of 18 months was conducted. Modified AS were calculated by a middle grade surgeon in a&e and US performed within 12 hrs. Patients operated without US, were excluded. Operating surgeon was blinded to the scoring & patients followed a standard pathway (observation, appendicectomy or discharge). Four-week follow up took place on all patients.

Results: 119 consecutive patients were enrolled. Median age 10 years. 52 underwent appendicectomy.67 were observed & discharged with none re-admitted within the study period. Positive and negative predictive values of AS+US vs clinical expert judgement in diagnosing appendicitis were 73.3% vs 100% and 89.1% vs 90.5% respectively. The sensitivity of modified AS (accounting for CRP values) in predicting diagnostic US was 97%. AS+US had higher positive predictive value in patients with symptoms onset longer than 48hrs (100% vs 69.2%), negative predictive value 92.3% vs 84%. NAR for the study period was 13.4%.

Conclusions: Clinical prediction rules can be improved by implementing crp & US but they don't reach benchmark performance unless performed more then 48 hrs after symptoms onset. Modified AS in our study demonstrated high sensitivity in predicting a diagnostic US. We suggest that senior review currently remains the most effective tool for reducing NAR without the morbidity of radiation such as CT .

06

CLINICAL RELEVANCE OF THE NON VISUALISED APPENDIX ON ULTRASONOGRAPHY OF THE ABDOMEN IN CHILDREN

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Aim: Ultrasonography(US) is advocated for assessment of children with acute abdomen as it involves no radiation. However, clinicians face a conundrum when the appendix cannot be visualized. We evaluate the clinical relevance of the non-visualised appendix on US assessment of abdominal pain where acute appendicitis is a differential diagnosis.

Methods. With ethical approval, we reviewed all children admitted for abdominal pain in the paediatric surgical unit between January-December 2013 who had abdominal US for evaluation of right-sided and lower abdominal pain. We excluded those imaged for suspected intussusception, or obvious genitourinary symptoms. Demographic data,US findings,final diagnosis and histological reports were recorded. As part of institutional protocol, all patients are contacted 3 days after discharge to evaluate persistent symptoms We defined the following:1)non-visualised appendix:appendix that was sought for but could not be seen,2)completely visualized appendix:appendix could be followed from caecal attachment to tip

Results: Of 1359 admissions,810 had US abdomen and/or pelvis. We excluded 131 with suspected intussusception. Another 38 did not mention evaluating the appendix, leaving 641 reports(Table) for children aged 10.6 years(median,range 1.0-21.3) with 297(46.3%) boys.
Non-visualised appendix (n=160):Seventeen (17/160,10.6%) patients underwent appendicectomy. Of the 17, 14 had US findings suggesting intra-abdominal inflammation (1 of whom had histologically normal appendix), and 3(3/160,1.9%) had normal US reports(all 3 had histologically proven appendicitis).
Partially visualized appendix (n=51):In these, the segment of appendix that could be seen was clearly normal in 34,obviously inflamed in 13,and equivocal in 4.
Overall,232 children underwent appendicectomy,of whom 58 had no US done and 5 had histologically normal appendix(overall negative appendicectomy rate 2.2%).

Conclusion: In the non-visualised appendix with no evidence of intra-abdominal inflammation on ultrasound, the likelihood of appendicitis is less than 2%. In the partially visualized appendix, those abnormal or equivocal on ultrasound are positive for appendicitis.Clinicians may safely use these reports to supplement their clinical assessment

Table: Ultrasound reports of the appendix in 641 children evaluated for abdominal pain

Ultrasound findings	Eventual diagnosis		Total
	Appendicitis	Not appendicitis	
Appendix not visualised	17	143	**160**
Appendix fully visualised	140	290	**430**
Abnormal appendix	124	0	
Equivocal	14	17	
Normal appendix	2	273	
Appendix partly visualized	17	34	**51**
Abnormal appendix	13	0	
Equivocal	4	0	
Normal appendix	0	34	
Total	**174**	**467**	**641**

07

INTUSSUSCEPTION AND ROTAVIRUS VACCINE: INCREASED AWARENESS, INCREASED DEMAND?

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Aims: Ultrasound scan (USS) is the gold standard diagnostic test for intussusception. The rare association between rotavirus vaccine and risk of intussusception has been widely publicised. The aim was to evaluate whether USS referral pattern and outcomes have changed following the introduction of the rotavirus vaccine in the UK vaccination schedule in July 2013.

Methods: The USS referral pattern was determined by retrospective review of USS performed for suspected intussusception during the 2-year periods pre- and post-vaccine introduction. USS referral for pyloric stenosis for the same period was used for comparison. USS of patients with previous intussusception and repeat USS during the same admission were excluded. Data collection included patient demographics and outcome measures (air enema reduction, surgical intervention and bowel resection). Statistical analysis included Fisher's exact test (P<0.05 significant).

Results: 220 USS events were analysed following the exclusion criteria (median age 14 months, 64% males). 93 pre vaccine vs. 127 post vaccine period (37% increase). In comparison, the number of USS looking for pyloric stenosis has remained relatively static (59 pre-vaccine vs. 62 post-vaccine period) (Figure 1).

Of these USS events, 36 patients had intussusception (median 9 months, 69% males). The rate of positive USS detection pre- and post-vaccine period was 12/93 (13%) and 24/127 (20%) respectively; P=0.15.

We compared outcomes pre- and post-vaccine period, respectively:
- Successful air enema reduction: 9/12 (75%) vs. 15/23 (65%);P=0.71
- Frequency of surgery: 3/12 (25%) vs. 9/24 (38%);P=0.71
- Frequency of bowel resection: 2/12 (17%) vs. 2/24 (8%);P=0.59

Conclusion: Since the introduction of the rotavirus vaccine more USS are performed to investigate suspected intussusception. However, the rate at which intussusception is detected and patient outcomes have not changed significantly. If this increased demand persists, optimisation and allocation of resources via a clear strategy is required at our centre and may apply nationally.

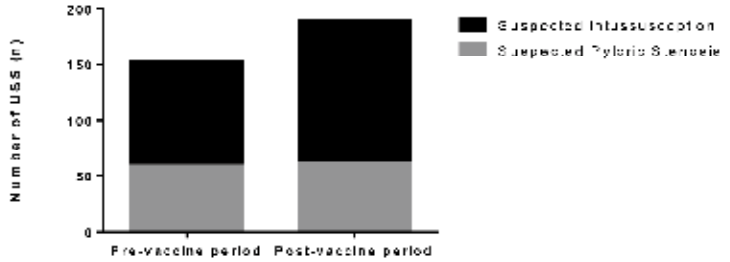

Figure 1. Number of USS during the 2-year periods pre- and post-introduction of rotavirus vaccine

08

"MIS SOLD PPI?" – SEPSIS IN SURGICAL NICU PATIENTS AND THE USE OF ANTACIDS

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Aims: Sepsis is a leading cause of neonatal mortality. Antacids, either H2 receptor blockers or proton pump inhibitors (PPIs), have been reported as independent risk factors for sepsis. Sometimes antacids become necessary following surgery. Our aim was to identify the incidence of sepsis amongst surgical neonates on antacids.

Methods: Retrospective study over 34 months. January 2013 to October 2015. Admissions to the Neonatal Intensive care unit (NICU) were identified using BadgerNet. Sepsis was defined as presence of positive blood culture in the clinical setting of infection. Demographics, diagnosis, comorbidities and use of antacids were recorded. Chi Square test was used for statistical analysis, $p<0.05$ was significant

Main Results: 2589 patients had total of 2710 NICU episodes. 442/2710 episodes were surgical, including all medically managed necrotising enterocolitis (NEC). 21% of all surgical patients were on antacids compared with 3.7% of medical patients ($p<0.05$). The incidence of sepsis overall was 6.3% (171/2710). The total episodes of antacid therapy were 178/2710. In the entire population antacid therapy was not significantly associated with sepsis ($p=0.57$).

There were 51/442 episodes of sepsis amongst surgical patients compared to 120/2268 medical episodes ($p<0.05$).

71%(31/51) of all septic episodes in surgical patients were in context of NEC. The most common pathogens isolated were *Staphylococcus epidermis* (21%), *Enterococcus faecalis* (14%), *Coagulase negative Staphylococcus* (12%) and *Escherichia Coli* (11%).

Only 7/51(14%) septic surgical episodes involved antacid therapy as compared to 44/51 episodes without ($p=0.17$), (Table 1).

Conclusions: In the N CU setting, sepsis was significantly more commonly seen in surgical patients as was the used of antacids. However, antacid therapy was not significantly associated with this higher incidence of sepsis.

Table 1 - Surgical Diagnosis of Patients with Sepsis on an Antacid

Diagnosis	Gestation (Weeks)	Co-morbidities
Inguinal hernia, necrotising enterocolitis	Term	IUGR, VSD
OA/TOF	32-36	Tetralogy of Fallot, IUGR
Gastroschisis, necrotising enterocolitis	Term	IUGR
Incarcerated inguinal hernia	24-27	Chronic lung disease
Necrotising enterocolitis	24 27	IUGR
Necrotising enterocolitis	28 31	Chronic lung disease
Necrotising enterocolitis	32-36	-

09

TESTICULAR TORSION TRANSFER: CAN WE DELIVER?

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Aims: Testicular torsion (TT) is a Urological emergency with organ infarction potentially occurring within four hours from the onset of symptoms. The management of TT traditionally spanned Urology and General Surgery. Concerns over training, competency and expertise added an additional layer of complexity in assessment for these patients. Due to loss of General Surgery cover for TT patients we developed a new clinical pathway to address TT presenting to our multi-site hospital configuration. This involved centralisation of all TT surgery to our established Urology Centre. We wished to assess the impact of the pathway on timings of clinical assessment, duration of transfer, 'knife to skin' time and rate of testis infarction.

Methods: Using electronic clinical records we collected comprehensive data for all patients presenting to our acute service with suspected TT between 1/4/15 and 15/12/15.

There were 83 suspected TT patients. A number continued to present to hospital sites away from the Urology Centre (n=21) From this 17 were transferred urgently for further clinical assessment, median age 17 (range 10-58) years. Seven transferred patients (41%) underwent urgent surgical exploration by the Urology team. Median time from presentation to exploration was 4h32m for those transferred (range 3h08m–7h30m). At exploration, there were two confirmed torsions from the transfer group. In both the testis was salvaged – 'knife to skin' time 4h32m, 3h03m.

Conclusion: Due to new, evolving concerns over who provides care for patients presenting with TT we have been challenged to develop robust clinical pathways. Our data identifies that valuable time is lost in transferring patients with suspected TT. However, time spent on transfer has not resulted in a rise in testis infarction rates. The future management of TT remains a point of controversy for both training and delivery of emergency Urology/General Surgery in the modern era.

10

ULTRASONOGRAPHIC ASSESSMENT FOR ACUTE APPENDICITIS: DEFINING THE FEATURES THAT ENHANCE DIAGNOSTIC ACCURACY

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Aim of the study: The use of ultrasonography (US) as the first line imaging modality of choice in children with suspected appendicitis has gained traction in recent years. However, cited limitations include poor specificity and ambiguity in clinical relevance of features seen on imaging. We aim to identify the components of abdominal US that are significant in confirming the presence of appendicitis.

Methods: This was an ethically approved study reviewing all US reports for children admitted to the paediatric surgical unit in our institution between January-December 2013 in whom acute appendicitis was a differential diagnosis. Reports were scrutinized for the following:Appendix diameter, compressibility of appendix, presence of probe tenderness, increased vascularity, surrounding echogenic fat stranding, presence of lymph node enlargement, presence of extraluminal fluid collection. Demographic data, final diagnosis and histological reports were recorded. Univariate logistic regression analysis was performed to determine covariates that were significant for appendicitis. Statistical significance was set at p<0.05.

Main results: Of 810 US done, we excluded 101 with suspected intussusception and 68 which did not mention evaluating the appendix, leaving 641 reports for analysis in children with median age 10.8 years(range 1.3-21.3) and 297(46.3%) boys. When the appendix could be visualized on the US, compressibility was a negative predictor for appendicitis, and all other factors except lymph node enlargement were positive predictors for appendicitis(Table). When the appendix could not be visualized, only echogenic fat stranding and presence of extraluminal fluid significantly predicted for appendicitis. Neither gender nor age were significant. When all significant factors were included in the model, only 7 patients had complete profiles, which was too small a sample for multivariate analysis

Conclusion: Periappendiceal features assessing for intra-abdominal inflammation are useful in confirming or excluding appendicitis. However, prospective studies using standardized protocols for ultrasonographic assessment that include checklists to ensure complete data entry are required.

Table: Univariate analysis of ultrasonographic features significant for confirming or excluding appendicitis using logistic regression models in 641 ultrasound reports

Variable	Visualised appendix		Appendix not visualised	
	OR (95% C)	P-value	OR (95% CI)	P-valu
Appendix diameter (n=404)	5.48 (3.93, 7.66)	<0.001	NA	NA
Compressibility (n=90)	0.01* (<0.01,0.04)	<0.001	NA	NA
Probe tenderness (n=256)	30.9 (12.3,77.8)	<0.001	5.83 (0.98, 35.8)	0.05
Increased vascularity (n=119)	44.6 (13.4, 147.9)	<0.001	0.46 (0.01,116.2)	0.92
Echogenic fat stranding (n=447)	399.6 (139.8, 999)	<0.001	47.7 (7.13, 318.8)	<0.001
Lymph node enlargement (n=240)	0.76 (0.20, 2.83)	0.68	0.40 (0.04, 3.73)	0.42
Presence of extraluminal fluid (n=406)	4.45 (2.40, 8.26)	<0.001	8.31 (2.11, 32.8)	0.003

* OR < 1 indicates compressibility is a significant negative predictor for appendicitis.
NA=not applicable; OR=Odds ratio; CI=Confidence interval

11

ONE MORE SNIP: REVISION FRENULOTOMY AFTER TONGUE-TIE

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Aims: Ankyloglossia is a common condition with a significant impact on breastfeeding. Frenulotomy has proven benefit. We evaluated recurrence of ankyloglossia following frenulotomy and its impact on breastfeeding.

Methods: A single centre, single surgeon, prospective study between May 2013 and October 2015. Data were collected from dyads with recurrence by questionnaire on attendance and telephone/postal follow up at 8 weeks. This including impact on breastfeeding and any wound care advice initially given. Assessment included severity of ankyloglossia and tongue mobility. All parents who attend our clinic are taught optional active wound management and advised to have a wound and breastfeeding review within a week.

Main Results: 1937 dyads were assessed in this time period. 83 infants (4.28%) were seen for recurrence. 38 patients had their initial frenulotomy at our institution (2.01%, 39/1892), 45 had been undertaken elsewhere (2.32%, 45/1937). Infants with their initial TT variant recorded (n=73), 71.2% had anterior ankyloglossia and 25% Posterior ankyloglossia. Average age at initial frenulotomy 42.1 days (IQR: 10.75-51.75 days) and recurrent frenulotomy 69 days (IQR: 51-107 days). Average time between procedures was 46 days (IQR: 22-57 days). In our current series, 71% of dyads reported nipple pain and 78.5% of dyads reported latching difficulties with the recurrent TT. 73% of all dyads presenting with recurrent ankyloglossia opted for revision frenulotomy.

Conclusions: Recurrent tongue ties can present as much of an impact to breastfeeding as the original tongue tie. It is therefore important that parents are advised of the risk of recurrence.

12

TISSUE CRYOPRESERVATION - EVALUATION OF A NEW SERVICE AND EXPANSION VIA A THIRD PARTY MODEL

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Aims: To conduct a service evaluation of the newly developed Tissue cryopreservation service at our institute initially reported at BAPS in 2015. inorder to assess demand for expansion of the service to third party locations and the nature of information required to support the expansion

Methods: A service evaluation questionnaire was designed . All patients on the tissue cryopreservation data base were contacted by a student working with the team and asked if they would be willing to participate in the service evaluation. The results of the service evaluation were then used to plan the way the service would be expanded and direct the production of information required to support development of the service.

Results: There was over 90% response to the questionnaire. The evaluation showed very high patient satisfaction with all aspects of the service. The majority of parents requested written information whilst the majority of patients (all children under age 17 years) wanted information to be available electronically . Patients wanted the service to be extended and wherever possible for it to be available as close to home as safe

Conclusions: Fertility preservation is a very important issue for young people facing chemotherapy and radiotherapy. The tissue cryopreservation service developed at our institution is rated very highly by patients . Patients would like the service to be extended across England and Wales and would like to be able to access the service as close to home as possible. Provision of high quality age appropriate information is essential. Parents wanted printed information whilst young people want to access information electronically. These findings have helped the development of a third party model of care with website and appropriate information. Surgery can be undertaken locally with the tissue being processed and stored in the authorised tissue bank at our institution.

13

WHAT A PAIN! ARE PAEDIATRIC SURGICAL DAY CASES RECEIVING OPTIMAL ANALGESIA AFTER DISCHARGE?

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Aim: We aimed to evaluate post-operative pain levels in children following simple day case surgery, in the first two days after discharge.

Methods: Children undergoing circumcision, orchidopexy, ligation of patent processus vaginalis (PPV) or inguinal herniotomy were identified prospectively over a 2-month period, from November to December 2015.

At discharge, verbal consent was obtained to contact parents, who were provided with a Wong Baker Facial Grimace score and visual analogue scale that were explained. Parents were then contacted by telephone on the second post-operative day. Subjective incidence of pain, analgesia requirements and objective severity of pain were recorded.

Results: 48 children were included in the study. 7 patients were lost to follow up. Median age at surgery was 6.5 years (range 3 months – 17 years). Analysis was undertaken on 20 circumcisions, 13 herniotomies/PPV ligations and 8 orchidopexies.

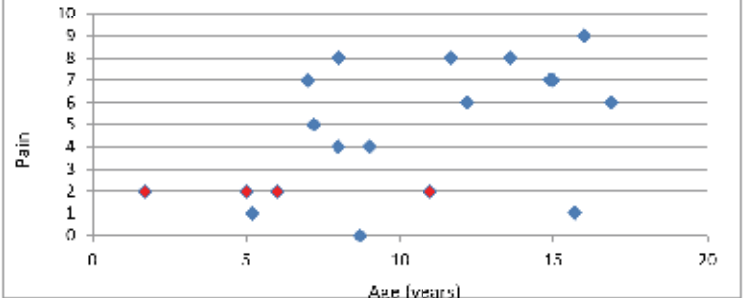
10 (50%) children who had a circumcision, 3 (23%) children who underwent herniotomies/PPV ligations and 3 (38%) children post-orchidopexy reported pain after two days. The maximum mean pain experienced by patients within the first 48 hours after surgery was 4.7, 4.2 and 4.1, for each procedure respectively.

A positive correlation between age and pain score following circumcision was found (Figure 1, Pearson's $r = 0.49$). Patients who received a caudal block for circumcision reported less pain than those who had a penile block ($p = 0.032$, 95% CI 0.33 to 6.47).

Conclusions: The incidence of pain following circumcision, orchidopexy, herniotomy and PPV ligation overall was low. Circumcision was the most painful procedure. A correlation between age and pain following circumcision was demonstrated and caudal blocks appear to provide better pain control than penile blocks.

We plan to revise the advice given to parents regarding analgesia for the postoperative period and evaluate these findings further.

Figure 1 – Pain following circumcision



14

TOPICAL INTRAPERITONEAL PAPAVERINE TO MINIMIZE NON-VIABLE BOWEL RESECTION FROM NON-OCCLUSIVE BOWEL ISCHEMIA IN NEONATAL VOLVULUS: A CASE REPORT

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Background: Nonocclusive mesenteric ischemia (NOMI) is a feed-forward loop of vasoconstriction that aggravates the primary ischemic injury. It is an initially reversible process and a potential point of intervention for preservation of viable bowel. Intravascular papaverine infusion has been used in the management of adult NOMI. We present a modified version of this approach using topical papaverine in the setting of neonatal post-ischemic NOMI, with the goal of minimizing bowel resection.

Case Presentation: The baby boy, delivered at 40+3 weeks from uncomplicated pregnancy, presented at day 11 of life with malrotation and midgut volvulus. An emergent exploratory laparotomy with Ladd procedure and detorsion of malrotation was performed without complication. Subsequently the patient presented on POD 13 with vomiting after feeding and lactic acidosis. Abdominal x-ray showed pneumatosis coli and portal venous gas. The baby was admitted for aggressive resuscitation and emergent exploratory laparotomy. At exploration, ischemia of majority of the small bowel was noted. Topical papaverine was introduced into the peritoneal cavity over the intestines before closing the abdomen. A second look laparotomy was done 24 hours later with the findings of marked bowel improvement.

Result: The use of the topical papaverine in our patient allowed for the reduction of the length of small bowel resection. The length of viable small bowel increased from 62 centimeters (15.6%) to 92 centimeters (23.1%). The baby has been thriving well with normal growth and development without signs of short gut syndrome.

Conclusion: Topical intraperitoneal application of papaverine potentially allowed for reduction of length of small bowel resected, decreasing the risk of morbidity from potential sequelae of extensive small bowel resection. A prospective randomized control study should be considered to investigate potential benefits of topical papaverine administration in the setting of need for massive small bowel resection.

15

GROWTH AND VITAMIN DEFICIENCIES IN CHILDREN WITH INTESTINAL FAILURE RECEIVING LONG-TERM PARENTERAL NUTRITION

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Aim of the study: To quantify the prevalence of growth failure and vitamin deficiencies in children with intestinal failure (IF) receiving long-term parenteral nutrition (PN).

Methods: A retrospective study in all children with IF and ≥ 6 months PN, treated by our IF team between 2000 and 2015. Height for age (HFA), weight for age (WFA) and weight for height (WFH) standard deviation scores (SDS) were calculated. A WFH < -2 SD was defined as underweight and a HFA < -2 SD as growth failure. Target height (TH) SDS and TH range (TH ± 1.6 SD) were calculated. All vitamin measurements were obtained. Data were collected until January 1, 2015.

Main results: Fifty-nine children (27 male) were identified. Twenty-two had short bowel syndrome (SBS), 23 surgical IF but no SBS, 13 functional IF and 1 child a combination. Most common underlying diseases were intestinal atresia (24%) and necrotizing enterocolitis (20%). Median PN duration was 15 months (IQR 9-32 months) and median follow-up duration was 3.6 years (IQR 1.6-7.5 years).
One year after start of PN, 23% of the children still on PN had growth failure and 19% was growing below their TH range (Table 1). Vitamin A and E deficiency were prevalent during PN (35/37 (95%) and 23/27 (62%) respectively) and after weaning (21/24 (88%) and 16/25 (64%)). During PN, 50% (14/28) of the children had a vitamin D <50 nmol/L compared to 59% after weaning (13/22).

Conclusion: One year after the start of PN, 23% of the children still dependent on PN had growth failure. Nineteen percent of the children still on PN were growing below their TH range. Vitamin deficiencies were common, both during PN and after weaning. Close nutritional monitoring and patient tailored adjustment should maximize the potential for growth and prevent vitamin deficiencies.

Table:
Table 1 Anthropometric indices below < -2 SD in children with IF 12 months after start of PN.

Anthropometric variable	Children on PN N (%)	Children weaned off PN N (%)
HFA SDS < -2	7/31 (23)	1/12 (8)
WFA SDS < -2	7/35 (20)	2/12 (17)
WFH SDS < -2	2/31 (7)	1/12 (8)
Below TH range	5/27 (19)	0/10 (0)

HFA: height for age, SDS: standard deviation score, TH: target height, WFA: weight for age, WFH: weight for height.

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BONE HEALTH IN CHILDREN WITH INTESTINAL FAILURE MEASURED BY DUAL ENERGY X-RAY ABSORPTIOMETRY AND HAND RADIOGRAPHY

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Aim of the study: Children with intestinal failure (IF) are at risk of developing low bone mineral density (BMD). A relatively new technique to measure BMD is to obtain a bone health index (BHI) with the BoneXpert® software in hand radiographs. We aimed to evaluate the prevalence of low BMD measured by dual energy X-ray absorptiometry (DXA) and hand radiography and compare these methods in the assessment of low BMD in children with IF.

Methods: Retrospective study including children with IF with ≥ 1 DXA scan or hand radiograph between 2000 and 2015. Standard deviation scores (SDS) of BMD total body (BMDTB), lumbar spine (BMDLS) and BHI were collected. Low BMD was defined as <-2 SDS. Relationship between BMDTB SDS and BHI SDS was analyzed using Spearman correlation coefficient and Cohen's kappa.

Main results: Forty eight patients (22 boys) were identified, of which 21 (44%) with short bowel syndrome. Median parenteral nutrition duration at January 1, 2015 was 49 weeks. At a median age of 6 years, 5/39 patients (13%) had low BMDTB and 6/30 (16%) low BMD_S. At a median age of 5.1 years, 12/25 children (48%) had BHI SDS below -2.
Sixteen children (33%) had DXA and hand radiograph performed within a period of ≤ 6 months. Taking BMDTB SDS as the standard, hand radiography had a sensitivity of 82% and specificity of 92% to detect a low BMD. Positive and negative predictive values were 90% and 86%. Spearman correlation coefficient was 0.856 (p< 0.001) and Cohen's kappa 0.749 (substantial).

Conclusion: The prevalence of low BMD ranged between 13-48%, depending on the method used. Agreement between DXA and hand radiography to detect low BMD in children with IF was good. Hand radiography using the BoneXpert® software seems to be a feasible method for monitoring of bone health in these children.

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LIVER FUNCTION IN A NATIONAL COHORT OF BILIARY ATRESIA PATIENTS SURVIVING WITH NATIVE LIVER

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Aims: We assessed liver function and portal hypertension in a national cohort of biliary atresia (BA) patients surviving with native liver to guide follow-up and transition of care.

Methods: All BA patients surviving with native liver, who were born in the era of pediatric liver transplantation (_TX) since 1987 in one country, where BA treatment was nationally centralized in 2005 were included. Liver biochemistries and abdominal ultrasound (US) were performed in all, and gastroscopy, elastography and liver biopsy in patients aged ≥1 year (n=25). Histological liver fibrosis was graded according to Metavir staging (F0-F4).

Results: The 28 native liver survivors represented 37% of all BA patients treated during the study period, and 63% after centralization. 86% had type 3 BA, while median PE age was 58 (IQR, 32-62) days and mean follow-up age 8.4 (range, 0.5-25) years. Median bilirubin, alanine aminotransferase, prealbumin, prothrombin ratio and platelets were in reference range (**table**), and all of them normal in 32%. In US, fourteen patients (50%) had splenomegaly, whereas none had ascites. Eleven (39%) had received prophylactic sclerotherapy for esophageal varices. Mesenteriro-systemic shunt was performed in one case for massive bleeding after band ligation of gastric varices. In liver biopsies at 7.3±4.8 years 92% had fibrosis, while 56% had only mild or moderate fibrosis (Metavir ≤2).Liver stiffness was increased in 70%. Follow-up age was unrelated to liver fibrosis stage (R=-0.19, P=0.35) or stiffness (r=-0.09, P=0.67), but correlated inversely with platelets (R=-0.40, P=0.039). Although patients with splenomegaly tended to be older (10.2±6.2 vs 6.6±5.2 years, p=0.098), cumulative occurrence of varices was not related to follow-up age (8.8±4.1 vs 9.7±6.5, P=0.96).

Conclusions: Liver fibrosis and complications of portal hypertension including varices, splenomegaly and hypersplenism represented the major manifestation of liver disease in native liver survivors, while biochemistries were well preserved, being normal in 32%.

Table. Liver biochemistries, stiffness and histological fibrosis in native liver survivors

	Bilirubin (µmol/l)	ALT (U/l)	Prealbumin mg/l	Prothrombin (%)	Platelets E9/l	Stiffness (kPa)	Metavir (F0-F4)
Mean	14	48	147	97	159	17.7	2.4
Median	9.5	38	147	93	133	12.7	2.0
IQR	4-16	23-51	110-174	76-117	96-235	6.5-26.6	2.0-4.0
Range	2-56	10-141	70-230	55-169	44-357	3.3-60.9	0-4.0
Reference	<20	<40	>130	>70	>150	≤6	0
Normal (%)	86%	61%	71%	82%	46%	22%	8%

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PREDICTIVE VALUE OF A PERSISTENT TACHYCARDIA TO INDICATE IMPENDING PERFORATION IN NECROTIZING ENTEROCOLITIS

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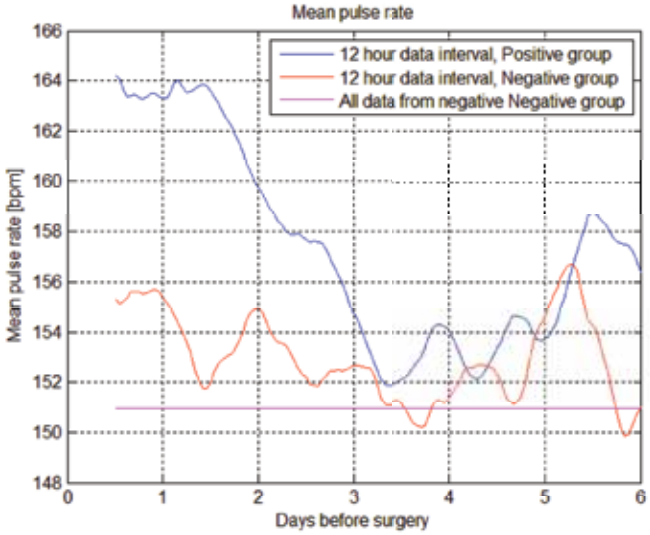
Introduction: Necrotizing enterocolitis (NEC) is a devastating disease of infancy, with surgical intervention often being the only option to prevent mortality. The optimal time to operate on these infants is after the onset of bowel wall necrosis, but prior to perforation with its associated morbidity and mortality.

Aim: To determine whether a persistent tachycardia in a fully resuscitated infant with proven NEC is indicative of full thickness bowel wall necrosis and therefore impending perforation. Allowing clinicians to use this clinical sign as an adjunct to biochemical and radiological parameters may determine the optimal time to operate on these infants.

Methods:Of the 82 neonates admitted to our neonatal ICU with proven NEC, 40 were suitable for analysis. 27/40 progressed to requiring surgery, 13/40 resolved on conservative management. Pulse rate data and operative findings, if applicable, were recorded.

Results:The mean pulse rate and standard deviation from the mean in the surgical group showed a clear upward trend 72 hours prior to surgery, reaching a mean of 165 bpm (SD +/- 19) 24 hours pre-operatively; compared to the population mean of the non-operative group, whom did not exhibit a trend (mean pulse rate of 150 bpm, SD +/-13), p-value <0.05.

Conclusion: This upward trend in pulse rate is indicative of ultimate cardio- circulatory compensation in a patient with systemic sepsis, indicating the need for urgent operative source control.



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PROBIOTICS FOR THE PREVENTION OF NECROTIZING ENTEROCOLITIS: META-ANALYSIS OF SURGICAL OUTCOMES

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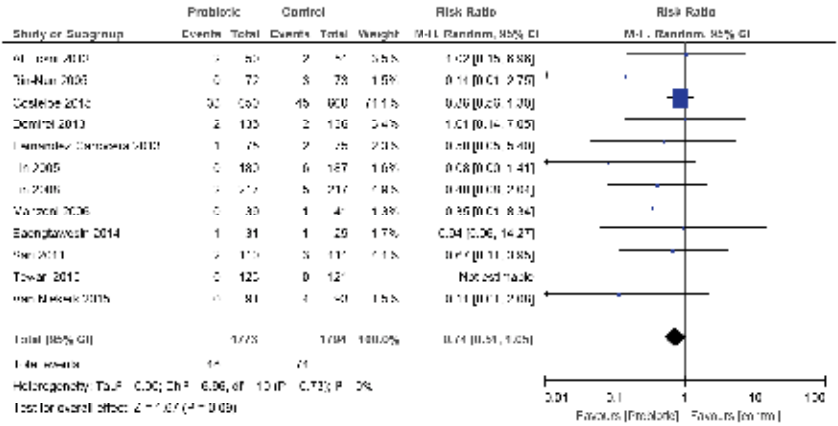
Aim of the Study: Probiotic administration to preterm infants has the potential to prevent necrotizing enterocolitis (NEC). Data from randomized controlled trials (RCTs) are conflicting but in meta-analysis seem to support probiotic administration. To date, these analyses have not focused on surgical outcomes. We aimed to determine the effect of probiotic administration to preterm infants on surgical outcomes of NEC.

Methods: A systematic review of RCTs of probiotic administration to preterm infants was performed. Studies were included if outcomes included any of (i) Bell's Stage III NEC, (ii) surgery for NEC, (iii) deaths attributable to NEC. Article selection and data extraction was performed independently by two authors; conflicts were adjudicated by a third author. Data were meta-analysed using Review Manager 5.3. A random effects model was decided on a priori because of the heterogeneity of study design; data are risk ratio (RR) with 95%CI.

Main Results: Thirty-three RCTs reported NEC as an outcome. However, only 16 reported predefined surgical outcomes; all were included. A variety of probiotic products was administered across studies. Description of surgical outcomes in most studies was poor. Only 6/16 specifically reported incidence of surgery for NEC, 12 reported Bell's stage III and 13 reported NEC-associated mortality. Although there was a trend towards probiotic administration reducing stage III NEC, this was not significant (RR 0.74 [0.52-1.06], p=0.09, Figure). There was no effect of probiotics on the RR of surgery for NEC (RR 0.84 [0.56-1.25], p=0.38). Probiotics did, however, reduce the risk of NEC-associated mortality (RR 0.56 [0.34-0.93], p=0.03).

Conclusion: Despite 33 RCTs on probiotic prevention of NEC, evidence for prevention of surgical NEC is not strong, partly due to poor outcome reporting. In studies included in this meta-analysis, probiotic administration was associated with a reduction in NEC related mortality.



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LIVER DISEASE IN THE SURGICAL NEONATE WITH INTESTINAL FAILURE

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Aim: To evaluate the prevalence, severity, and outcome of intestinal failure-associated liver disease (IFALD) in surgical neonates with intestinal failure (IF).

Methods: Retrospective review of surgical neonates receiving PN for ≥28 days (i.e. Type 1 IF) between Jan. 2004 to Dec.2015. Three sub-groups were defined based on aetiology [gastroschisis(GS), intestinal atresia(IA) and NEC]. Two biochemical indices were chosen and defined using IFALD national guidelines [alkaline phosphatase (ALP) X 1.5 above upper limit (i.e. >750 IU/L) and bilirubin (BILI)>50 µmol/L]. An intestinal failure index was also calculated (0% - no enteral calories, 100% - autonomy). Data are described as median (range) and compared using non-parametric tests. A P value of < 0.05 was regarded as significant.

Results: 84 infants with IF at 1 month [gastroschisis (n=35), intestinal atresia (n=7) and necrotizing enterocolitis (n=22)]. At this point, median BILI=64(6-272) µmol/L and ALP=407(207-870)IU/L with significant difference between groups for BILI (GS< IA< NEC;P <0.0001), less so for ALP(GS< NEC;P<0.05). There was only moderate correlation between the two indices (r_s = 0.37; P<0.001), birth weight [r_s=-0.4 ;P=0.001), r_s = -0.25 (P=0.05) and gestational age [r_s = -0.45(P<0.0002) and r_s= -0.26(P = 0.02)]. There was no correlation with IFI (P = 0.52 and P 0.55 respectively).

Although 36(56%) had BILI>50 at 1 month, using IFALD guidelines only 4 neonates fulfilled complete definition (BILI>50, ALP>750).

At 6 months, 7 infants had persistent raised BILI>50 with only 1 having ALP>750 (this child then died of multi-organ failure). 8 (5 BILI>50) infants with short gut syndrome were still on PN (median IFI=40%).

FIG. 1 shows pattern of resolution of indices within sub-groups over 6 months.

Conclusion: While liver outcome in neonatal intestinal failure is currently excellent the definitions of IFALD considerably underestimate liver dysfunction in this susceptible population and need revision.

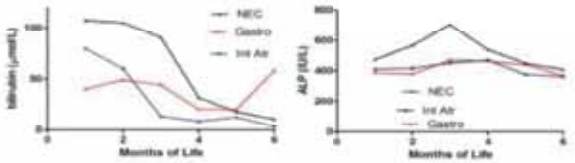

Figure: median bilirubin and ALP at 0 – 6 months

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PNEUMATOSIS INTESTINALIS IN A COHORT OF CHILDREN WITH NEUROLOGICAL IMPAIRMENT: A PATIENT GROUP WITH A MANAGEMENT DILEMMA

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Aim: Pneumatosis Intestinalis (PI) with or without pneumoperitoneum has previously been documented in children with a wide range of conditions. We describe a series of neurologically impaired children with pneumatosis intestinalis. We studied the patient characteristics to formulate an optimum management plan.

Method: We looked retrospectively for children beyond infancy who were referred for surgical opinion with radiographic evidence of pneumatosis intestinalis. Five patients were identified between 2011-2015. We looked into patients demographics, medications, feeding routes and formulas and associated comorbidities, using both patients medical notes and electronic records.

Main results: Five patients (3F:2M) with a median age of 7 years (range 5-9) were referred for surgical opinion with evidence of PI on their abdominal xrays. Four of the patients had an associated pneumoperitoneum. Interestingly, all patients had cerebral palsy, such that they were significantly neurologically impaired and unable to communicate clearly. Four patients had a laparoscopy/laparotomy at first presentation, with no findings of ischaemic bowel, peritoneal soiling or perforation despite the presence of pneumopentoneum on xrays, however, obvious colonic pneumatosis was seen. Four patients were gastrostomy fed, one was jejunally fed. Three patients were medically treated for constipation and two for chronic lung disease (CLD). Four patients had subsequent presentations, which were successfully managed without surgical intervention, despite the presence of pneumoperitoneum.

Conclusion: We describe PI in a subset of patients with a background of neurological impairment where symptoms may be vague and examination unreliable, which can lead to delay in presentation. The presence of pneumoperitoneum doesn't mandate bowel ischaemia and perforation. We suggest a longer period of conservative management as long as patients remain clinically stable, saving surgical intervention for those who deteriorate.

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DONOR CELL ENGINEERING WITH GLYCOGEN SYNTHASE KINASE 3 BETA INHIBITOR-LOADED SYNTHETIC NANOPARTICLES ENHANCES LONG-TERM HAEMATOPOIETIC ENGRAFTMENT FOLLOWING IN UTERO TRANSPLANTATION

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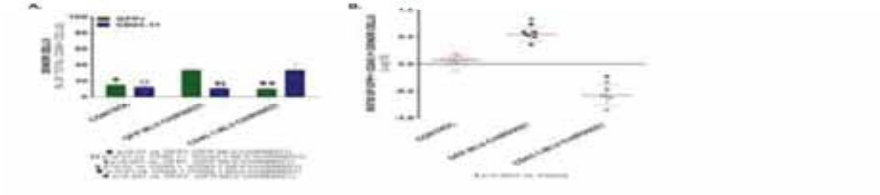
Aim of Study: The aim of the present study was to determine whether donor cell engineering with glycogen-synthase-kinase-3 beta (GSK3β) inhibitor-loaded nanoparticles enhances long-term haematopoietic engraftment following in utero transplantation (IUT).

Methods: GSK3β inhibitor-loaded multilamellar lipid vehicles (MLV-CHIR99021) were synthesized and conjugated to the cell membrane of donor bone marrow mononuclear cells (MNC; B6 GFP- / B6 CD45.1+). IUT was performed in Balb/c mice at E14 (107 MNC/fetus). Donor cell haematopoietic chimerism was assessed in blood for up to 24 weeks following birth by flow cytometry (% GFP+ within CD45+). To investigate whether MLV-CHIR99021-"decoration" enhanced MNC repopulating function via a pseudo-autocrine mechanism, we performed "competitive" IUT using 1:1 mixtures of conjugated/unconjugated GFP+ and CD45.1+ MNC (engraftment assessed blood at 4 weeks; % GFP+ and CD45.1+ within CD45+). Statistical analysis was performed using 1- or 2-way ANOVA with Bonferroni tests.

Results: Sustained (7-day) in vivo release of the inhibitor in MLV-CHIR99021 animals (MLV-CHIR99021-"decorated" MNC; dose: 1.3*10-7μg/cell or 4mg/kg/fetus) resulted in increased donor cell engraftment at 4 weeks of age (mean±SEM; 52.9±2.8%) that was 3 times greater to that observed in control (MNC only; 15.4±1.4%; p<0.0001) and bolus-CHIR99021 (CHIR99021 4mg/kg/fetus bolus with donor MNC; 10.5±2.0%; p<0.001) animals. This was maintained for up to 24 weeks of age (45.5±3.1%; p<0.0001), with multi-lineage hematopoietic differentiation. In our competitive IUHCT, we observed enhanced engraftment of only MLV-CHIR99021-conjugated donor cells (Figure A, B); this is consistent with a competitive advantage of "decorated" cells and a pseudo-autocrine mechanism of action of CHIR99021 released by MLV.

Conclusion. Cell engineering with GSK3β inhibitor-loaded nanoparticles enhances hematopoietic engraftment of MNC following IUT. Prolonged retention of the biodegradable nanocarriers on cell surfaces enables sustained CHIR99021 release and pseudo-autocrine bioactivity. Conjugation of drug-loaded particles directly to donor cells allows targeted augmentation of their repopulating function, and could markedly increase the therapeutic potential of IUT.



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NEONATAL NECROTISING ENTEROCOLITIS: THE ROLE OF COW'S MILK PROTEIN

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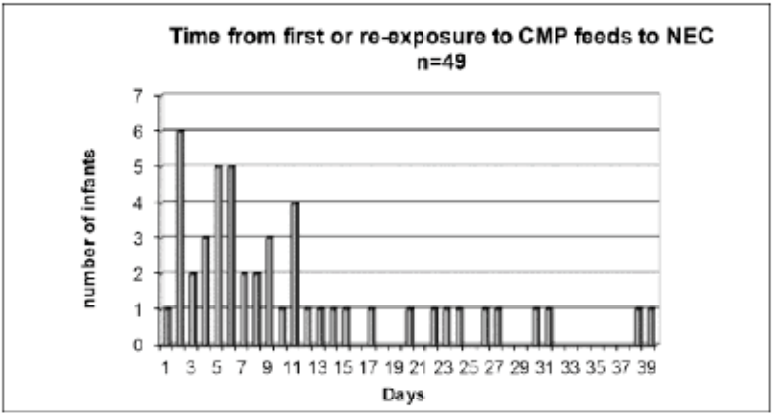
Aims: Anecdotal evidence suggests that necrotising enterocolitis (NEC) is often preceded by a change in feed regime and previous investigators have suggested a reaction to cow's milk protein (CMP) may be involved in NEC pathogenesis. We investigated the relationship between the exposure to feeds containing CMP and the development of surgical NEC in preterm infants.

Methods: A retrospective case-note study was performed of all infants admitted with NEC requiring surgery between January 2007 and September 2015. Infants were excluded if they were not preterm, had a congenital cardiac condition or had previous intestinal pathology. Feeding patterns from birth up to the development of NEC were recorded. Data are median (range)

Results: 55 infants meeting the inclusion criteria developed surgical NEC at 30 (1-61) days. All but 3 infants initially received breast milk (BM) as their initial feed. At diagnosis of NEC 6 infants were receiving BM alone (11%) and the remainder were receiving feeds containing CMP products alone or in combination with BM. In these 49 infants first exposure (or in 2 cases re-exposure) to CMP occurred at 20 (1-54) days and NEC occurred 8 (1-38) days later, within 7 days in 24 (49%) infants (Figure). The 2 infants with re-exposure had received 2 weeks of elemental formula feeding following signs of feed intolerance. Both developed extensive surgical NEC within 2 days of re exposure to CMP and one died.

Conclusion: In this series half the infants who developed surgical NEC whilst receiving CMP did so within 7 days of first exposure or re-exposure to CMP. These data support the hypothesis that CMP may have a causative role in the development of NEC. The development of CMP-free preterm feeds may help decrease the incidence of NEC.



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INSTESTINAL STRICTURE RATE FOLLOWING NECROTIZING ENTEROCOLITIS – RESULTS OF A SINGLE CENTRE

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Aims: Necrotizing Enterocolitis (NEC) continues to be responsible for significant morbidity and mortality in the preterm infant. Post-NEC stricture formation has been reported in the literature to occur in 30-50% of preterm infants [1,2]. Factors such as surgical treatment and severity of NEC are thought to contribute to stricture formation. We undertook a study to assess the current complication rates for infants with proven NEC.

Methods: We undertook an ethically approved retrospective review of all infants admitted to a surgical NICU between Jan 2011 and June 2015, with a proven diagnosis of NEC (modified Bell's Stage ≥ II). Patients were identified using the Badgernet neonatal database. Data collected included gestational age, birth weight, surgical intervention, mortality and incidence of post-NEC strictures. Strictures were identified either by contrast study or on table at laparotomy. Data were analysed using Chi squared or Student T test.

Results: 143 infants with a diagnosis of proven NEC were managed over a four year period, of whom 96 required surgical management (67%). The overall mortality was 19% with a post NEC stricture rate of 13%. In the surgically managed group, mortality was 22% (21/96) with a stricture rate of 18% (17/96). Data were further analysed by gestational age (Table 1). There was a statistically significant difference in mortality by gestational age p =0.01, but no difference in need for surgery or stricture formation. Surrogate markers of disease severity (inotrope use or coagulopathy) were not associated with stricture formation.

Conclusion: This study is one of the largest contemporary single centre datasets for NEC. We have found a substantially lower incidence of post-NEC stricture compared to previous published studies. This may reflect a general trend for improved outcomes for babies requiring neonatal intensive care.

1. Gamer 2003 Ann Surg
2. Shimpl 1994 Acta Paediatrica

Gestational age	Birth weight g (mean {SD})	Surgical intervention	Mortality	Post NEC Stricture
<28 weeks	710 {183}	64/91 (70%)	21/91 (23%)	8/91 (9%)
28-32 weeks	1275 {681}	20/32 (62%)	1/32 (3%)	8/32 (25%)
<37 weeks	2062{315}	4/7 (57%)	3/7 (40%)	0/7
Term	2573 {575}	8/12 (66%)	1/12 (8%)	1/12 (8%)

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IS GENERALISED OEDEMA IS A PREDICTOR OF MORTALITY IN NEONATES UNDERGOING LAPAROTOMY OF NECROTISING ENTEROCOLITIS (NEC)

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Aim: To investigate whether generalised oedema is a predictor of mortality in neonates undergoing laparotomy of Necrotising Enterocolitis (NEC).

Method: Infants treated for NEC between October 2008 and June 2012 were identified using a locally held database. Inclusion criteria were any infant undergoing laparotomy for NEC, with a clinical diagnosis and positive findings of NEC at surgery. Generalised oedema was expressed as a ratio of the breadth of the chest, including soft tissue, at the uppermost level of the diaphragm divided by the internal breadth of the ribcage at the same point measured using chest x-ray. Median values were calculated across four time periods (pre-surgery, immediately post-surgery, 24-48 hours and 5-10 days following surgery) and compared between survivors and non-survivors. Data were analysed using Mann-Whitney U and Wilcoxon paired signed-rank tests. Survival was tracked for 12 months post-procedure. Institutional approval for the study was obtained.

Results: 168 infants were included in the study. Oedema scores ranged between 1.030 and 1.671 (0.641 points total range). The oedema scores for survivors and non survivors at all time points are shown in table 1

Table 1. Comparison of oedema scores in survivors and non-survivors

		Median oedema scores		Difference	P value
		Non survivors	Survivors		
Pre surgery	n=110	1.215	1.207	0.008	0.126
Post surgery	n=132	1.285	1.210	0.075	0.016
24-48 hours post surgery	n=85	1.389	1.282	0.108	0.009
5-10 days post surgery	n=87	1.243	1.165	0.078	0.006

Conclusions: This study demonstrates a significant association between the development of generalized oedema and mortality in infants undergoing emergency laparotomy for NEC. Published data highlight survival statistics for infants undergoing emergency laparotomy for NEC but this data has not been patient specific. If these data proves to be consistent when collected prospectively then it may be possible to be specific for the individual child in terms of their chances of survival and direct therapy appropriately.

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IS STOMA FORMATION IN INFANTS BORN BEFORE 28 WEEKS GESTATION WITH ISOLATED INTESTINAL PERFORATION BEST SURGICAL PRACTICE?

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Aim of study: To evaluate post-operative outcomes of premature infants with isolated intestinal perforation (IIP) with a view to guiding the surgical management.

Method: A retrospective cohort analysis was conducted using a neonatal notes database. Predetermined data sets were collected.

Main results: The records of 122 infants born between January 2010 and December 2014 with a suspected diagnosis of necrotising enterocolitis (NEC) or IIP were analysed.

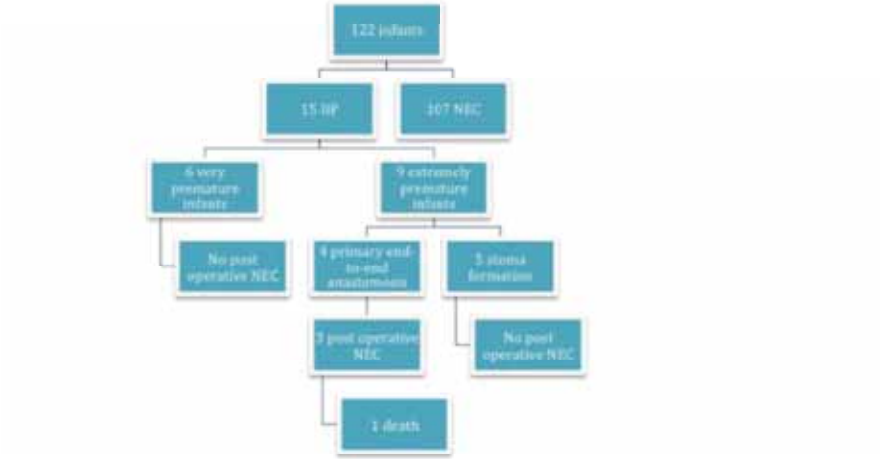
Infants were divided into two cohorts based on gestational age at birth. Group A (extremely premature) born at 23 to 28+0 weeks gestation and Group B (very premature) born at 28+1 to 37+0 weeks gestation. There were 72 infants in Group A and 50 infants in Group B.

9 (12.5%) infants in Group A and 6 (12%) in Group B were diagnosed with IIP. All had surgical management.

4 of the 9 (44%) infants in Group A had a primary end-to-end anastomosis following bowel resection. 3 of these (75%) developed post-operative NEC, including one death. The other 5 babies had a stoma formed at surgery and did not develop NEC. (Figure 1)

No infants with IIP in Group B, regardless of the surgical management, developed post-operative NEC.

Conclusion: This study suggests that extremely premature (<29 weeks gestation) infants undergoing primary end-to-end anastomosis for IIP are likely to develop post-operative complications, including NEC. We would therefore suggest stoma formation in this group of vulnerable neonates and that a multicenter study should be undertaken to examine this further.



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CONGENITAL BILIARY DILATATION AND MALROTATION: AN ASSOCIATION

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Aim of the study: Asymptomatic malrotation is associated with other paediatric surgical diseases on occasion. We attempted to define the incidence of a combination to congenital biliary dilatation (CBD) and discuss the clinical significance of the association.

Methods: Retrospective case note review of all patients admitted to two institutions with a diagnosis of CBD between April 1977 and December 2015. Second surgery for the postoperative intestinal obstruction after abdominal paediatric surgery, including malrotation, was also reviewed.

Main results: Ninety-six patients with CBD were reviewed retrospectively. Five out of the 96 patients (5.2%) had malrotation (4 asymptomatic and 1 symptomatic)(Table). Adhesive intestinal obstruction occurred after excisional surgery in 3 out of 5 (60%) patients after hepaticoduodenostomy. In the case 3, insertion of a long tube could not be achieved beyond the stomach due to a strong curve at the hepaticoduodenal anastomotic site. Although no second surgery was required for intestinal obstruction, long-term postoperative QOL has been disturbed in these patients. The incidence of the postoperative intestinal obstruction was 3/91 (3.3%) in CBD patients without malrotation.

Eleven out of 68 (16.2%) patients with symptomatic malrotation required second surgery for the postoperative intestinal obstruction; adhesiolysis (n=6), intestinal resection (n=3) due to necrosis including one re-midgut volvulus, and gastrojejunostomy (n=2) as a bypass because of severe disturbance of duodenal passage at the duodenojejunal flexure (atypical malrotation). In contrast, the incidence of the second surgery for the postoperative intestinal obstruction was 52/1459 (3.6%) in patients after other pediatric abdominal surgery.

Conclusion: Asymptomatic malrotation was highly associated with patients with congenital biliary dilatation. We have reported that hepaticoduodenostomy should be abandoned because of high postoperative duodenogastric regurgitation (57[1] and 61[1] BAPS). In addition, based on this review, hepaticoduodenostomy would be also avoided as a biliary reconstruction considering the high postoperative intestinal obstruction after Ladd's procedure.

Table Congenital biliary dilatation associated with malrotation

		CBD	Malrotation	Initial surgery				Second Surgery	
Case	Sex	Todani	Type	Year	Age	Procedure	Postoperative Complication	Age	Procedure
1	female	IV-A	non-rotation	1977	9yo	Ladd	Cholangitis after cystduodenostomy 7yo	18yo	Cyst excision,HJ
2	female	Ia	non-rotation	1986	9yo	Cyst excision,HJ/Ladd	none	none	none
3	female	IV-A	non-rotation	1994	81d	Cyst excision,HD/Ladd	Adhesive intestinal obstruction	16yo	HIH
4	male	IV-A	incomplete	1999	11d	Cyst excision,HD/Ladd	Adhesive intestinal obstruction/ DGR	12yo	HIH
5	male	IV-A	incomplete	2000	5yo	Cyst excision,HD/Ladd	Adhesive intestinal obstruction/ DGR	in plan	

HD:hepaticoduodenostomy, HJ:hepaticojejunostomy, HIH:hepatico,ejunostomy at the hepatic hilum
DGR: duodenogastric regurgitation

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PAEDIATRIC HIGH GRADE BLUNT SPLENIC TRAUMA : NON OPERATIVE MANAGEMENT VERSUS OPERATIVE MANAGEMENT

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Aim of the Study: The spleen is the commonest injured organ in blunt abdominal trauma. The purpose of this study is assessing Non operative management (NOM) versus operative management (OM) in high grade (III or higher) splenic trauma with studying the feasibility of NOM.

Methods: A retrospective review of all patients presented with isolated high grade blunt splenic trauma to our hospital between june 2011 to may 2015. Patients were evaluated clinically then radiologically using abdominal ultrasound and computed tomography. Data collected included demographic data,age,sex,vital signs,mode of trauma and splenic injury grading proposed by the American Association for the surgery of trauma.

Main Results: The study included 63 patients (49 male,14 female) Mean age was 6.46 years(1-15). Thirty six patients were grade III (57.14%), 22 grade IV (34.92%) and 5 patients grade V (7.94%) Twelve patients (19.05%) were haemodynamically unstable and underwent immediate surgical intervention while the remaining 51 (80.95%) were stable and treated by NOM with failure in 4 cases (6.35%) those become unstable within the first 12 hours under close monitoring so OM was inevitable . Patients treated by NOM (47/63,74.6%) passed safely without complications, needed less amount of blood transfusion with median hospital stay (7 days,6 in OM) and the most crucial benefit that surgery was avoided.

Conclusion: NOM is better, has numerous advantages mainly splenic preservation and avoidance the risk of overwhelming post-splenectomy infection. NOM is feasible and safe in properly selected cases depending on haemodynamic stability which is the most realiable criterion for patient selection whereas, OM is mandatory in patients with shock unresponsive to resuscitation or failed NOM.

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INJURY TO THE ABDOMINAL AORTA IN CHILDREN RESULTING FROM BLUNT TRAUMA

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Purpose: To enhance recognition of the potential for injury to the abdominal aorta due to blunt abdominal trauma, and discuss associated injuries and surgical approaches to treatment.

Methods: Two cases of children who sustained partial transection of the abdominal aorta secondary to blunt trauma are presented. In one case, actual real-time video of the event was analyzed and dramatically depicts crash impact forces exerted by bicycle handlebars to the upper abdomen. In both cases, computed axial tomographic scans demonstrated a dilated segment of the aorta at the L2-L3 level. Intimal disruption and partial transection of the aortic wall was confirmed by CT angiography. A review of the literature identified 28 additional cases of major aortic disruption resulting from blunt abdominal trauma in children below the age of 16 years.

Results: Our patients underwent abdominal exploration with primary aortic repair (Case 1) and repair utilizing prosthetic material (Case 2). Post-operative angiography demonstrated normal aortic diameter and blood flow. Of 28 reported pediatric patients with aortic injury due to blunt trauma, 24 resulted from motor vehicle accidents, 3 were due to non-accidental trauma, and 1 resulted from a fall. Techniques used for surgical repair were: primary repair (18), prosthetic graft material (4), endovascular repair (2), non operative (3). The incidence of associated intra abdominal and spinal injuries was 87%. Delayed rupture occured in 3 patients.

Conclusion: Recognition of injury to the abdominal aorta associated with blunt trauma in children may not be clinically appparent at the time of initial evaluation. Failure to diagnose this condition has been shown to be associated with limb loss, permanent neurologic impairment and death. A high index of suspicion based upon the mechanism of injury, as well as findings on physical examination should prompt further investigation utilizing vascular imaging studies. There is no consensus as to the optimal surgical approach.

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HANDLEBAR GRIP RELATED INJURY PREVENTION (GRIP) FEASIBILITY STUDY: ARE EXPOSED METAL HANDLEBAR ENDS ON CHILDREN'S BIKES AND SCOOTERS A RISK FACTOR FOR SERIOUS INJURY?

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Aim of the Study: Handlebar-end impact is a well-recognised cause of major abdominal trauma in children. Understanding the risk factors is important, allowing us to guide those responsible for setting safety standards. Ultimately, modifications at the point of manufacture could help reduce the incidence and severity of these injuries.

We prospectively studied the handlebar-end condition on bikes and scooters belonging to injured riders with the specific aim of assessing the feasibility of performing a multi-centre case-control study

Methods: All children attending two UK children's hospitals with any bicycle or scooter injury between March and September 2015 were invited to participate. Mode of injury, injury details, handlebar-end type and handlebar end condition were recorded.

Results: 522 invitations were distributed. Following confirmation of eligibility and attempts to complete missing data, 38 non handlebar-end injures (Controls) and 12 handlebar-end injuries (Cases) were included. Eight Cases had major abdominal injuries. 3 had minor lacerations and one sustained a shoulder injury.

Exposed metal handlebar ends (figure 1) were more prevalent among Cases than Controls (odds ratio 2.7). The same was true for sub-group analysis of bike-riders only (odds ratio 3.6). However, 8 of 12 Cases sustained injuries despite not having an exposed handlebar end. These data confirm that the multi-centre study will require about 5000 invitations to recruit the required sample size of 454 participants.

Conclusion: Handlebar-end impact can cause serious injuries in children. Exposed metal handlebar ends may increase the risk of sustaining serious injuries during falls involving handlebar-end impact. Findings from this feasibility study are essential for proceeding to an appropriately designed and powered multi-centre study providing the necessary data to drive changes in safety standards that will help prevent these injuries or reduce their severity. As serious injuries can occur when grips are intact, other injury prevention solutions should also be developed.

Figure 1: Exposed metal handlebar ends

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OESOPHAGEAL REPLACEMENT WITH STOMACH LEADS TO SERIOUS LONG TERM MORBIDITY

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Aims: To assess the long term function and complications of oesophageal replacement using stomach.

Methods: All children undergoing oesophageal replacement surgery in a regional centre were prospectively studied. Indications for surgery, early and late complications were recorded. Any complication within 30 days of surgery was classified as early.

Results: 9 children underwent oesophageal replacement between 2003 and 2013, for long gap oesophageal atresia 5, caustic ingestion 2, foreign body ingestion 1, and achalasia 1. Four had thoracotomy, 3 had trans-hiatal resection and 2 had laparoscopic trans-hiatal resection. In 3 cases the stomach size was reduced in size by amputation of the lesser curve, 4 had pyloroplasty and 3 had a feeding jejunostomy.

Complications were seen in every case. Three had an early complication and 8 had a late complication. Four children experienced one complication while 5 had three complications.

One child died 8 months after surgery, following perforation after dilatation. Median follow up for the remaining 8 patients was 8 years (range 2.5 years-13 years). Complications within 30d of surgery were: anastomotic leak 2, lung compression by stomach and acute need for stomach reduction, 1. Late complications included anastomotic stricture in 6 children (requiring 8,6,5,4,2 and one dilatation so far), perforation of a jejunostomy 1, and para-gastric hiatal hernia. All 8 surviving children have been anaemic. Biopsies of the remaining native oesophagus have shown inflammation and one case of dysplasia.

Conclusions. Long term follow up of gastric transposition replacement of the oesophagus in children reveals a very high incidence of later stricture, oesophagitis and iron deficiency anaemia. We have found the complication of oesophagitis in the remaining native oesophagus and anaemia to be an intractable problem.

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UNILATERAL LUNG AGENESIS: IMPLICATIONS FOR THE PAEDIATRIC SURGEON

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Background: Unilateral lung agenesis is a rare anomaly, with a paucity of published literature, usually restricted to case reports. We aimed to review our experience to better inform antenatal and postnatal counselling, in terms of respiratory outcome and associated anomalies.

Methods: Retrospective case-notes review of all children at our institution with unilateral lung agenesis 1995-2015.

Results: We identified four patients with unilateral lung agenesis (1 18y, 3 female, 3 right sided). Two had unilateral lung agenesis detected antenatally. One other was initially misdiagnosed as a diaphragmatic hernia, confirmed as isolated lung agenesis with intact diaphragm postnatally.

Patient#1 has right lung agenesis, associated oesophageal atresia (OA, type-C) and underwent repair by right thoracotomy with extra-pericardial approach. She has subsequently required fundoplication and aortopexy (tracheobronchomalacia).

Patient#2 has right lung agenesis, tracheobronchomalacia and reflux (conservatively managed), and a repaired pulmonary artery sling.

Patient#3 has left lung agenesis, left MCDK, and tracheobronchomalacia (conservatively managed).

Patient#4 has right lung agenesis, repaired ASD, right radial club hand/syndactyly, tracheobronchomalacia and reflux (conservatively managed).

Despite frequent admissions during the first few years, the medium term outcome is good without significant respiratory morbidity in the older two patients. All patients are below the 2nd centile for growth and have impaired lung function tests. However one patient's exercise tolerance is good enough to allow him to play badminton and rugby.

Conclusions: Unilateral lung agenesis is rare and may present antenatally. Associated OA can be repaired safely via right thoracotomy in the presence of right lung agenesis. The association of ipsilateral radial deformity and lung agenesis adds weight to this association shown in other reports. Tracheobronchomalacia is universal and reflux is common, both can usually be managed conservatively. Despite impaired lung function tests reasonable exercise tolerance can be anticipated in older children.

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TACROLIMUS IMMUNOSUPPRESSION OF NEW ZEALAND WHITE RABBITS FOR AN EXPERIMENTAL MODEL OF OESOPHAGEAL REPLACEMENT.

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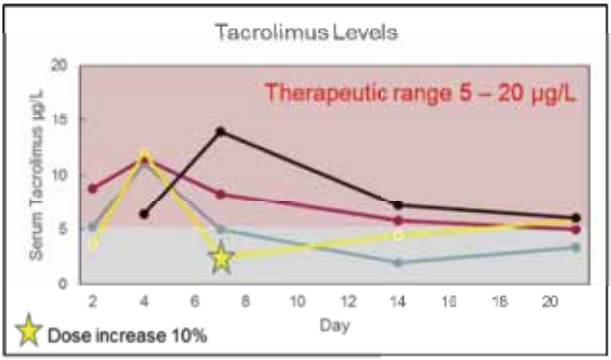
Aims: Human stem cells and scaffolds can be used to produce engineered tissues for oesophageal replacement. Human cell-seeded xenografts require recipient immunosuppression to engraft and survive. This study aims to define tolerability and efficacy of tacrolimus immunosuppression in New Zealand White rabbits (NZWR) for the transplantation of engineered constructs.

Methods.
Tolerability
4 NZWR were given tacrolimus subcutaneously (0.06 mg/kg). Induction involved 4 daily doses and maintenance – alternate day dosing for 21 days. Tacrolimus levels, urea, creatinine and full blood count were measured at day 0, 5, 8, 16 and 21. Rabbits were weighed alternate days.
Efficacy
Decellularised scaffolds were seeded with *in vitro* expanded, human oesophageal epithelial cells and cultured for 3 days. 1x1cm sections of seeded scaffold were implanted into a vascularising muscle flap in the neck of 2 immunosuppressed and 2 non immunosuppressed control animals on day 22. Immunosuppressed rabbits continued on tacrolimus. Animals were observed and culled at day 29. Specimens were fixed, sectioned and stained (H&E). *Statistics - Wilcoxon Signed Rank. (SPSS)*

Results: Tacrolimus was well tolerated with no infective complications. Animals showed different degrees of weight loss due to anorexia, but mean weight difference of 3.12 kg (day 0) to 3.04kg (day 22) was not significant (p=0.68). Tacrolimus levels were therapeutic (5-20 µg/L) after induction (day 4 mean 10.2 µg/L) and in 3 animals at day 22, mean 5.05 µg/L. (Fig 1) No significant difference was seen between day 0 and day 22 in levels of urea, creatinine, neutrophil and white cell count.

Animals survived the efficacy study with no local signs of rejection. Histology showed limited epithelial cell survival and differentiation.

Conclusion: NZWR can be safely immunosuppressed with tacrolimus for the implantation of human cell-derived engineered constructs. Further analyses will be required for longer time points to determine whether immunosuppression prevents xenograft rejection.



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A SINGLE CENTRE 10 YEAR EXPERIENCE OF WILMS TUMOUR

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Aim: Nephroblastoma is one of the commonest childhood malignancies. Outcomes are favourable in high proportions of cases. We reviewed our centres experience over the last decade.

Methods: A retrospective review of a single institutions experience over a 10 year period was carried out. We included all histologically confirmed Wilms tumours from January 2005-December 2015 and excluded those who were operated in different centres. Time to definitive treatment was classified as number of days between diagnosis and surgery. 30 day readmission was classified as unplanned admission (excluding elective admissions for chemotherapy). Remission was classified as being tumour free to date.

Main Results: 26 patients were included. Age ranged from 5 months to ten years (median age 4years 7 months). Distribution of staging was: I: 10, II: 3, III: 9, IV: 4. All patients were treated according to the 2001 WT 5 OP guidelines. Time from diagnosis ranged from 3 to 83 days (median. 41, mean. 38.4). 8 had vascular extension, 6 were removed with the primary tumour, two required adjuvant chemotherapy with complete resolution in one, and nevatomy with extraction of tumour in the other. No immediate intra-operative complications were reported. Mean length of stay was 3.84 days (range 2-6 days). 3 unplanned re-admissions occurred, each due to febrile neutropenia. All cases achieved macroscopic resection with adequate microscopic resection achieved in 85% (22/26) including pre-operative tumour rupture. 5 patients had lung involvement. 3 developed late lung lesions, 2 underwent surgical resection. 2 other recurrences were reported, one liver and one local requiring further resection. Overall recurrence rate was 19.2% (5/26).

Overall, 86% children (20/23, 3 ongoing treatment n=26) are in remission. 3 deaths were reported all from intermediate risk disease.

Conclusions: Outcomes of Wilms tumour remain favourable with limited peri-operative morbidity reported. Local outcomes are in keeping with national figures.

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LARYNGEAL ELECTROMYOGRAPHY AS A PROGNOSTIC INDICATOR OF RECURRENT LARYNGEAL NERVE RECOVERY FOLLOWING INJURY DURING TRACHEO-OESOPHAGEAL FISTULA REPAIR

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Aim of study: Following repair of a low H-type trachea-oesophageal fistula in a 13 day old, a vocal cord palsy was noted on extubation. The recurrent laryngeal nerves were both visualised intra-operatively and retracted. Facing the prospect of tracheostomy, laryngeal electromyography was utilised as a prognostic indicator for recovery of vocal cord function.

Methods: Post-operative extubation resulted in respiratory distress. Examination of vocal cords on re-intubation revealed a bilateral vocal cord palsy. Microlaryngoscopy was performed to assess vocal cord movements. At this time laryngeal electromyography was performed by placing a monopolar needle recording electrode in the posterior cricoarytenoid and thyroarytenoid muscles, and a surface reference electrode over the sternum. The recording was assessed for spontaneous and motor unit activity

Main results: On post operative day 6, rigid bronchoscopy revealed paradoxical movements of the cords on rigid bronchoscopy; therefore an endotracheal tube was left insitu. Laryngeal electromyography was performed on post-operative day 13 and revealed no acute denervation within the posterior cricoarytenoid and thyroarytenoid muscles and no motor unit activity on spontaneous respiration. These findings suggested a neurapraxia as opposed to axonotmesis or neurotmesis type injury of the recurrent laryngeal nerve. Laryngeal electromyography was performed again on post-operative day 27. This revealed normal motor unit activity in the posterior cricoarytenoid and thyroarytenoid muscles with no dyskinesia or synkinesis (non-purposeful movement due to aberrant reinnervation of abductor and adductor muscles). The child was successfully extubated following this assessment.

Conclusion: Recurrent laryngeal nerve injury is a well reported phenomenon during repair of an H-type trachea-oesophageal fistula. Laryngeal electromyography was demonstrated to be safe and reliable. This technique was able to differentiate between a neuropraxia and transection of the nerve (neurotmesis), thereby allowing time for nerve recovery and averting placement of a tracheostomy

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TOTAL OESOPHAGOGASTRIC DISSOCIATION: EXPERIENCE OVER TWO DECADES. OUTCOMES OVER THE LAST TEN YEARS

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Aim: Fundoplication fails in approximately 20% of children with severe neurodisability. We aimed to evaluate total oesophagogastric dissociation (TOGD) as a primary procedure and as a 'rescue' procedure for severely neurologically impaired children with significant swallowing discoordination and gastro-oesophageal reflux disease.

Methods: Casenotes of 38 children with severe neurodisability (25 females, 13 males) who underwent TOGD between 2006 and 2015 were retrospectively reviewed. Of these, 31 were primary procedures and 7 were 'rescue' procedures following failed fundoplication. Median age at the time of procedure was 3 years 7 months (range 1 month to 13 years 11 months).

Main Results: Pre-operatively, 84% of children had symptoms of vomiting or retching and 71% of children had an unsafe swallow. There were 6 immediate complications related to surgery in 5 children requiring surgical intervention (Table 1). One child died following re-laparotomy for oesophago-jejunal anastomotic breakdown due to septic shock and multi-organ failure. Gastrostomy feeding was established by a median of 6 days (range 2 to 2.5 days) and median hospital stay was 10 days (range 4 to 280 days). There were 6 late complications as listed in Table 1. Median follow-up was 13 months (range 1 month to 8 years 4 months). All children have had resolution of gastro oesophageal reflux. Thirteen percent of children experience bloating or pain on feeding and 26% of children experience retching unrelated to gastro-oesophageal reflux. One child has self-induced vomiting, one child has colonic dysmotility and one child has Barrett's oesophagitis. There were 6 late deaths unrelated to surgery.

Conclusion: Total oesophagogastric dissociation should be considered as a primary and definitive procedure in selected children with severe neurodisability who are at higher risk of failure of fundoplication, recurrent aspiration and a reduced quality of life.

Immediate Complications		
	Pyloroplasty leak	1
	Oesophago-gastric anastomotic leak	3
	Wound dehiscence	2
Late Complications	Gastric volvulus	1
	Colonic volvulus	1
	Gastric perforation + internal herniation of small bowel	1
	Superficial wound dehiscence	1
	Oesophageal stricture	1
	Ventral hernia	1

Table 1: Immediate and late post-operative complications related to TOGD surgery

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DOCUMENTING PAEDIATRIC SURGICAL ONCOLOGY WORKLOAD TO INFORM SERVICE PLANNING

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Aim of the study: To document the paediatric general surgery workload involved in supporting a tertiary haematology and oncology service to inform planning and organisation.

Methods: Retrospective review of prospectively collected operative database. All haematology and oncology patients up to 16 years of age who underwent procedures between 1997-2015 inclusive were identified. Patient demographics and operative data were recorded and analysed.

Main Results: Over the time period, 1008 patients were identified (468 (46%) were female).

38% of patients had haematological malignancies, 35% had solid tumours and 26% had CNS tumours.

These patients underwent 2551 general surgical operations, 64% (1628) as an emergency.

71% of the procedures were related to vascular access (1813 operations - 1062 insertions, 751 removals). Lines and ports were used and removed with similar frequency.

Biopsies represented 11% of procedures. Half of the biopsies were performed by open technique (mostly in the first 9-year period). 41% were performed using minimally-invasive surgery and 8% were performed percutaneously, under image-guidance (particularly in the last 9-year period).

178 tumour resections were performed (7% of procedures), with the majority (78%) being performed by open surgery.

Other surgical interventions included procedures for enteral feeding, ureteric stenting and faecal diversion among others.

Conclusions: The vast majority of paediatric surgical oncology practice relates to supportive care in the form of central venous access. Biopsy techniques have evolved over the years with minimally-invasive techniques and image-guided percutaneous techniques superseding traditional open techniques. In addition, there are a number of patients who undergo investigation (including biopsy) for suspected malignancy, who are not included in this cohort, as an oncological diagnosis is ultimately excluded. Although minimally-invasive techniques are employed for tumour resections, careful patient selection is paramount to ensure that excellent outcomes in childhood cancer are not compromised by failure to adhere to oncological surgery principles.

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CCAM TYPE 1 ASSOCIATED WITH MUCINOUS ADENOCARCINOMA: FIRST SURVIVOR OF NEONATAL SURGERY

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Aim of the Study: To report survival in a newborn with CCAM type 1 associated with mucinous adenocarcinoma and *KRAS* mutation in codon 12. Only five paediatric cases of this sporadic association are reported. *KRAS* accounts for 25 % of non-small cell lung cancer, and approximately 97% of *KRAS* mutations involve codons 12 or 13. There is a relationship between *KRAS* mutations and primary resistance to chemotherapy.

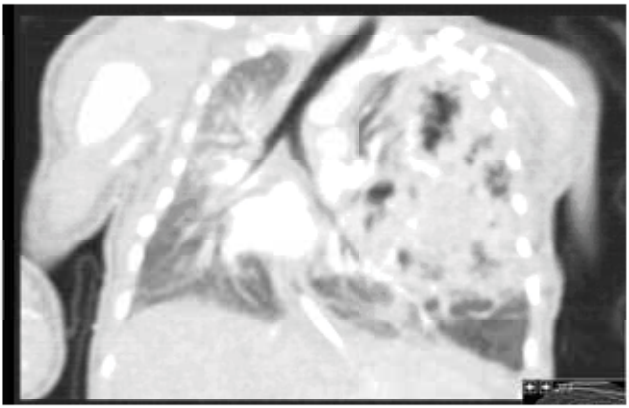
Method: A case report following a retrospective review of 120 patients who underwent resectional surgery for CPAM in our department (1994 - 2015).

Case presentation: A male fetus was diagnosed at 19 weeks of gestation with macrocystic CCAM. He developed significant mediastinal shift and polyhydramnios documented on fetal MR scan. His mother was HIV –ve and he was born by caesarean section at 39 weeks, requiring ventilation immediately after. A chest CT (Figure 1) showed a large lesion occupying the entire left hemithorax. Expedited surgery (left upper lobectomy) was performed on day 4 with uneventful recovery and discharge after 2 weeks.

Histology confirmed CCAM type 1 but also highlighted unsuspected multiple foci of mucinous adenocarcinoma. A somatic point mutation was detected in codon 12 of the *KRAS* gene. Extensive investigations for residual disease included further CT imaging, and negative excision biopsies of two suspicious intrathoracic areas. In view of the chemotherapy resistance associated with *KRAS* mutation, adjuvant therapy was not considered beneficial. At 7 months of life he is well and thriving with no sign of residual or recurrent disease.

Conclusion:

1. Our experience suggests an incidence for the association of CCAM and adenocarcinoma of about 1%.
2. We report the first antenatally-detected survivor for this condition.



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ACQUIRED AND RECURRENT TRACHEA-OESOPHAGEAL FISTULA - REPAIR UTILISING CARDIO - PULMONARY BYPASS AND AN MDT APPROACH.

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Aims: A recent increase in tertiary referrals to our centre for severe traumatic or recurrent congenital TOF has led to repair being undertaken on cardiopulmonary bypass, allowing greater control of oxygenation and airway during difficult procedures. We present our multidisciplinary approach, techniques and summary of cases performed.

Methods: Retrospective data collection was performed on tertiary referrals of acquired or recurrent TOF in 2015. Imaging in all cases included CT thorax, and bronchoscopy and bronchography (B&B). Emergent MDT discussion included cardiothoracic, ENT and paediatric surgeons. Indication for repair on CPB included, defects considered to have a difficult to control airway (large or distal fistulae), multiple previous thoracotomies and those where maximal access to both tracheal and oesophagus was deemed necessary for repair. In 2015, 2 cases of recurrent TOF were managed with thoracotomy and repair whilst 5 cases were repaired on CPB.
Operative detail - cardiothoracic and paediatric surgeon present. Median sternotomy, thymectomy and pericardotomy. Establishment of CPB - (aortic and right atrial / bicaval cannulae). Transverse tracheotomy at site of fistula and definition of posterior wall defect. Dissection of oesophagus from trachealis - preserving trachea. Oesophageal repair (+ trans-anastomotic tube) or closure. Tracheal repair, including, primary or patch repair or slide tracheoplasty.
Post operative care - bilateral pleural drains, mediastinal drain (+/- iodine irrigation) & paralysis for 3-5 days. Follow up imaging included B&B in all cases.
Results: Table 1

Patient	History	Findings	Operative details	Outcome
1. 8 yrs Male	Recurrent, recurrent congenital TOF	Moderate sized fistula	Oesophageal primary repair & sida tracheoplasty. (91min CPB)	Good early result
2. 7 month Male	Long gap OA, elongated TOF	Large fistula + cervical, T/B stricture. Oesophagus not repairable	Oesophageal endoscopy. Tracheal repair – pericardial patch (135 min CPB)	Recurrent distal fistula – fixed oesophagostomy. Proposed air leak – repeat sternotomy on CPB, repair of air leak at cardia. Oesophagostomy
3. 7 yrs Female	Delayed diagnosis of button battery ingestion	Large (2cm), 10H 3 cm above carina	Oesophageal primary repair, pericardial patch & slide tracheal repair	Oesophageal leak – conservatively managed. Oesophageal stenosis - dilated. Tracheal stenosis – stent. Recurrent small 10H – right thoracotomy & repair of 10H oesophagostomy.
4. 5 yrs Male	CDH TOF. Recurrent aT, oesophagus	Multiple small defect in trachea – T/B and mid. 2 TOF	Oesophageal primary repair – very thin. Slide tracheoplasty. Pericardial patch between oesophagus & trachea. (117 min CPB)	Tracheal stenosis and posterior tracheomalacia. Oesophageal stricture. Redo repair on CPB.
5. 2 yrs Female	Button battery ingestion	Moderate sized 10H	Oesophageal primary repair. Slide tracheoplasty & pericardial patch between oesophagus & trachea	Oesophageal stricture – dilatations. Tracheal stenosis – stenting. Wound infection, pericardial abscess

There were no intraoperative or post-operative complications from CPB. Preservation of the oesophagus was attempted in 4/5 case. Currently 2 patients await oesophageal replacement and 2 have severe tracheomalacia

Conclusion: Repair of life threatening large acquired or recurrent TOF on CPB is safe and offers advantages over thoracotomy of improved access, retraction and control of airway and cardiac output. We find this approach easier for repairing complex defects and believe MDT approach is essential.

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WHAT IS SOUTH AMERICA DOING ON OA MANAGEMENT?

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Aim: To evaluate the patterns of practice of oesophageal atresia (OA) in countries of South America (SA) and compare them with an international experience.

Methods: A survey was completed by 76 delegates (from 6 countries) an International South American Meeting and compared with results from an international survey (IS) published in the European Journal of Pediatric Surgery in 2014.

Main results:

About 38% (IS 66%) of respondents perform >5 OA repairs per year, of these 28% have been done thoracoscopically. All open procedures are done as extrapleural techniques and a chest drain is left in 57% (IS 69%).

Postoperative elective paralysis is routinely used by 82% (IS 56%), with a median of 3 days (2-8). About 76% (IS 72%) routinely request a contrast study and (IS 54%) use parenteral nutrition.

72% (IS 90%) routinely leave a trans-anastomotic tube but only 23% (IS 40%) start enteral feeding on the 2nd day post-operatively; even with an NG tube *in situ* 40% still wait at least 5 days to start feeding. Most respondents, 92% (IS 89%) start oral feeding after the 5th post-operative day.

32% (IS 46%) of respondents repair ≥2 pure OA per year. About 26% (IS 24%) opt for an attempt at primary anastomosis with no gastrostomy/no oesophagostomy. Attempted elongation of the ends of the oesophagus is performed in 49% (IS 47%), and the Foker technique is prefered in 51% (IS 43%) of these followed by serial dilatation with bougies in 43% (IS 41%). About 54% (IS 67%) of respondents always attempt an anastomosis.

Gastric interposition is the most popular technique for oesophageal replacement (51% , 51%IS).

Conclusion: The pattern of practice between South American paediatric surgeons and those in the rest of the world is quite similar. Minimally-invasive surgery is unusual and 80% is performed on high volume centers.

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OUTCOME OF OESOPHAGEAL SUBSTITUTION: 15 YEAR EXPERIENCE 2001 - 2015

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Aim: Oesophageal substitution is undertaken in 2-5% of patients with long gap oesophageal atresia, corrosive injury or trauma to the oesophagus. The colon, jejunum and stomach have been used, each organ comprising of its own technical advantages and disadvantages. Our favoured technique involves a right-sided oesophagostomy, sham feeding, gastrostomy feeds and gastric oesophageal substitution after 3 months of age.

The aim of this study was to assess surgical outcomes of patients that underwent a gastric oesophageal substitution.

Method: Retrospective cases series over a fifteen-year period (2001-2015) on patients who underwent gastric oesophageal substitution. Group A constituted corrosive injury and Group B non-corrosive. Complications, mortality and time to full oral feedings were assessed.

Results: Twenty-nine cases were identified. Group A consisted of 9 patients all caustic ingestions and Group B 20 patients (19 long gap OA and 1 iatrogenic oesophageal perforation).

Median age at surgery was 5 years for group A and 8 months for group B. Follow-up for group A was 24 months vs 10 years for group B.

Complications are demonstrated in Table 1.

Conclusion: Our data shows anastomotic leak and infection rates are high in corrosive injuries. In patients with complex co-morbidity time to reach full feeds is delayed but is reached successfully.

Outcome of oesophageal substitution: 15 year experience 2001- 2015

Table 1.

Complications	Group A (%)	Group B (%)	Total (%)
*Anastamotic Leak	3 (33.3%)	1 (5%)	4 (13.8%)
*Wound Infection	4 (44.4%)	0 (0%)	4 (13.8%)
Pleaural Effusion	0 (0%)	1 (5%)	1 (3.4%)
Further Pyloric Surgery	0 (0%)	2 (10%)	2 (6.9%)
Jejunostomy Problems	0 (0%)	4 (20%)	4 (13.7%)
Respiratory problems	2 (22%)	2 (10%)	4 (13.7%)
Mortality	1 (11%)	1 (5%)	2 (6%)
**Full feeds > 6 months	0 (0%)	3 (15%)	3 (10.3%)

*Recovered on non-operative management

** All with complex co-morbidity

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OUTCOME REPORTING HETEROGENEITY IN HIRSCHSPRUNG'S DISEASE RESEARCH - A SYSTEMATIC REVIEW

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Aim: The aim of this work was to identify which outcomes are currently investigated in Hirschsprung's Disease (HD) research, and make an assessment of their quality of reporting.

Methods: A systematic review was conducted according to a pre-specified protocol (CRD42015024996). Titles were eligible for inclusion if they compared two surgical interventions for HD, and reported at least one outcome following the definitive procedure. Studies were excluded if they only reported outcomes following re-do or non-definitive procedures. Eligibility assessments and data extraction were carried out by two researchers working independently.

Primary outcome:

- Identification of outcomes reported by eligible studies

Secondary outcomes:

- The median number of outcomes investigated per study
- The percentage of studies meeting Harman et al's criteria for transparent outcome reporting
- The percentage of studies fully reporting data for every outcome they investigated

Main Results: 696 unique titles related to HD were identified. 35 were deemed eligible for inclusion in the review. Within these 35 studies, 74 outcomes were investigated. Only four outcome measures were investigated in more than 50% of eligible studies - faecal incontinence (32 studies,91%), enterocolitis (23 studies,66%), constipation (20 studies,57%) and length of stay (18 studies,51%). Thirty-three outcomes(45%) were only investigated once. The median number of outcomes reported per study was 11 (IQR6-13)

Seven studies were only available as abstracts and therefore excluded from data reporting assessments. Seven of the remaining studies(25%) met all criteria for complete data reporting, and seven(25%) fully reported data for every outcome measure they investigated.

Conclusion: The need for a core outcome set in HD is highlighted by the substantial outcome reporting heterogeneity and significant risk of reporting bias demonstrated in this review.

The outcomes identified in this review could be used in a robust Delphi process involving patients, parents and clinicians to develop such a core outcome set.

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REVIEW OF SURGICAL PATHOLOGY PRESENTING AS HAEMATURIA TO THE PAEDIATRIC SURGEON

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Aim of the Study: We aim to provide a contemporary review of outcomes for a child referred to paediatric urology clinic with haematuria. We seek to identify predictive factors within the presenting history which facilitate rationalisation of resources.

Methods: This is a single centre retrospective case note review of all children referred to paediatric urology clinic between May 2009 and 2014. Hospital board approval was awarded. Demographic data was collected with the primary outcomes of diagnosis and need for surgical intervention.

Main Results. We identified 61 patients referred for haematuria, median age 8 years (range 3 months to 16 years); 5% were infants. 10% of children had insufficient criteria for paediatric referral, and 45% were referred to surgery with persistent microscopic haematuria.
91% of children underwent ultrasound renal tract; 15% non-invasive bladder studies, 11% of cystoscopy, 3.8% DMSA, and 2.5% micturating cystourethrogram. No children underwent renal biopsy or angiogram.
9 children had cystoscopy of whom 1 had therapeutic polypectomy, 5 confirmed posterior bulbar urethritis, 1 suggested voiding dysfunction and 2 showed no pathology.
The distribution of diagnosis is shown in Table 1. 48% of children were discharged after first clinic with no further investigation. Surgical treatment was required in 6.3%: 2 PCNL, 2 pyeloplasty, 1 circumcision and 1 child received oxybutynin.
Age was not predictive of outcomes. Flank pain and lower urinary tract symptoms increased the likelihood of surgical disease necessitating intervention. History of upper respiratory tract infection was not specific for nephritic disease.

Conclusions: There is place for rationalisation of referral guidelines to paediatric urology. Few children with haematuria in the outpatient setting require surgery.

Table 1. Diagnosis in Children Referred to Paediatric Urology with 'haematuria'.

Diagnosis	N
Non-specific / self-resolving	21
Urinary Tract Infection	14
Idiopathic posterior urethritis	13
Lower Urinary Tract Dysfunction	6
Balanitis / Posthitis	6
Renal Calculi	5
Persistent microscopic haematuria	3
Nephritis	3
Low grade vesico-ureteric reflux	2
Post- Trauma	2
Pelviureteric junction obstruction	2
Post- streptococcal glomerulonephritis	1
Bulbar urethral polyp	1
Bulbar urethral lesion	1

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IMPROVING THE RIGOUR OF VACTERL SCREENING FOR NEONATES WITH ANORECTAL MALFORMATIONS

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Aim of the Study: Screening investigations for the VACTERL (Vertebral, Anorectal, Cardiac, Tracheo-Esophageal, Renal and Limb) association form an important part of the management of neonates with anorectal malformations (ARMs). Clear standards will increase the likelihood that each investigation will be performed appropriately, reported and the results acted on. We developed a proforma to define required investigation and indications for referral. The aim of the current study was to determine the effect of introducing a proforma across multiple centres.

Methods: Four UK centres performed a 3-year retrospective audit of consecutive neonates with ARM. Following introduction of a proforma the same data were collected prospectively for consecutive neonates over a further 2 years. The appropriate investigation of each component of the VACTERL association and the corresponding referral required for each abnormal result were defined. The proportion of patients undergoing appropriate investigation and referral was compared against these standards. An audit standard of 90% was set for each criteria.

Main Results: Prior to implementation of the proforma, 86 patients were audited, with a further 89 patients after. One patient was excluded as the notes were not available for review and 5 patients had clinically justifiable omissions in screening due to early demise (3 tracheal agenesis, 1 extreme prematurity with oesophageal atresia and 1 renal agenesis). The audit standard was met in 7 criteria before introduction of the proforma in comparison to 10 criteria afterwards. Comparison of results before and after introduction of the proforma is shown in table 1.

Conclusion: The completeness of VACTERL screening and its documentation improved following introduction of the proforma. Implementation in other centres may have a similar effect. Performance remains imperfect. Reviewing some criteria (eg the definition of adequate screening of vertebra, indication for echo in low ARM) may help address this.

VACTERL component Test	Before Proforma Test Performed %	After Proforma Test Performed %	Before Proforma Appropriate Referral %	After Proforma Appropriate Referral %
Thoracic to sacral vertebral bodies on AP Xray reported	76	94	80	71
Spinal cord ultrasound	90	91	78	100
Echocardiogram	81	94	100	94
Exclusion of oesophageal atresia documented	91	99	No referral required	No referral required
Urinary tract ultrasound	98	97	100	100
Documented limb examination	94	96	100	100

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THE USE OF BOTULINUM TOXIN IN THE TREATMENT OF CONSTIPATION IN CHILDREN

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Aim: To see the effectiveness of intersphincteric injection of botulinum toxin (Botox) to treat children with intractable constipation.

Method: A retrospective review of children treated with injection of Botox to the internal anal sphincter (IAS) for intractable constipation between November 2012 and December 2015, at a single institute by a single surgeon.

Results: 28 children were treated with injection of up to 450 IU of Botox to the IAS under GA. Median age was 6.5 years (2-16). 16 were girls. 20 (71%) children showed an improvement after Botox injections with decreased use of laxatives, more frequent stools, less pain and bloating. The effects lasted between 4 and 12 months. 14 children had normal rectal biopsies and high IAS pressures (>50mmHg) on anorectal manometry (ARM). 3 children symptomatic with anal fissure did not have rectal biopsies, two had normal ARM and one was not investigated. 3 children had Hirschsprung's disease (post Duhamel pullthrough) and all showed improvement in symptoms and decreased laxative use. Two children had initial loose stool and soiling post treatment, which improved after one month.

8 (29%) children had no improvement. Two of these children had eosinophilic colitis requiring ACE formation, one child had pelvic floor dysfunction with megarectum requiring a colostomy. 3 children required long term laxatives with a background of developmental delay, food allergies and high truncal obesity with very high IAS pressures. One child developed post-pneumonia opiate induced megarectum, with unsuccessful Botox treatment and is being considered for ACE procedure.

9 children had two or more treatments of Botox with good symptomatic control.

Conclusion: The use of Botox injection in the internal anal sphincter is a safe and effective treatment for intractable constipation in children including those with Hirschsprung's disease. Botox for children with allergic phenomena leading to constipation may be less useful.

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RADIOLOGICAL APPEARANCE OF THE COLON IN PREMATURE AND TERM INFANTS ACCORDING TO AGE

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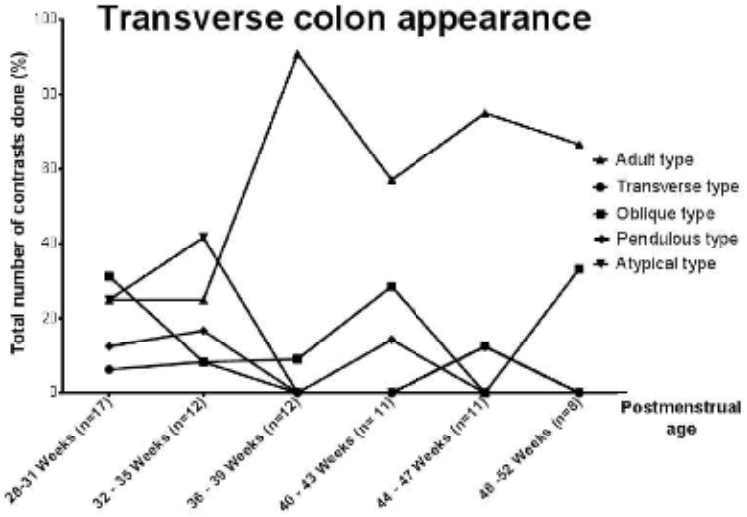
Aim of the study: Contrast enemas are commonly performed in premature and term infants. However, little is known of what is considered normal radiological appearance in these babies whose colonic anatomy may be atypical. This study assesses how contrast enema study patterns differ according to age of the infant.

Methods: We reviewed all contrast enema studies performed in premature and term infants from 2011-2015 done in our institution retrieved from our radiology image library. Ethical approval was obtained. Each infant was grouped by postmenstrual age. Each image was evaluated by 2 independent assessors based on descriptions of fetal colonic appearance by Malas et al:1)transverse colon appearance:adult, transverse, oblique, pendulous, atypical;2)sigmoid colon appearance:normal(adult), short, right-deviated, superior;3)caecal position:iliac crest, above;and 4)ascending colon development:short, normal. Differences of opinion were resolved by consensus.

Main results: There were 71 contrasts done for 67 infants aged 38 weeks(median,range 28-52 weeks). ***Transverse colon:***The 'adult' appearance was the most common after 36 weeks, seen in 57-90% of infants in each age group (Figure). The 'atypical' type was most common at <36 weeks. ***Sigmoid colon:***The 'superior' type was most common at <36 weeks, after which the 'right deviated' type was most common. The 'normal/adult' type was seen in <30% of infants in each age group. ***Caecum:***All infants had the caecum in the right iliac fossa after 36 weeks. ***Ascending colon:***The 'short' colon was most common in all age groups.

Conclusion: The typical adult distribution of the transverse colon only predominates after 36 weeks. The adult type of sigmoid colon is seen in less than a third even after term. The caecum achieves its right iliac fossa position by 36 weeks. Our findings suggest that the colon continues to grow even in late infancy, and may achieve the normal adult distribution only after the first year of life.



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LAPAROSCOPIC PROTACK™ RECTOPEXY (LPR): EARLY EXPERIENCE OF THIS NOVEL TECHNIQUE FOR FULL THICKNESS RECTAL PROLAPSE (FTRP) IN CHILDREN

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Aim of the Study: To review our early experience of laparoscopic ProTack™ rectopexy (LPR) in the management of full thickness rectal prolapse to determine the effectiveness and potential complications for this novel technique in children.

Methods: Retrospective review of all patients undergoing LPR at our institution between 2013 and 2015. Full laparoscopic mobilisation of the rectum was performed from the sacral promontory to the pelvic floor. "Wings" of the lateral mesorectal peritoneum are left attached to the rectum, which are then fixed to the sacral promontory using Protack™. Demographics, associated conditions, previous procedures for rectal prolapse, concurrent procedures, follow up time, length of stay , recurrence, short and long term complications were recorded.

Results: 4 consecutive patients with FTRP underwent LPR. The mean age at procedure was 6 years (23 months - 10 years) with a male to female ratio of 3:1. Associated conditions were cystic fibrosis (1), anorectal malformation (VACTERL association) (1) and chronic idiopathic constipation (2) One patient had undergone unsuccessful sclerotherapy as it was not clear if their rectal prolapse was full thickness. One patient had concurrent gastrostomy insertion. All patients were discharged the following day. 3 patients were discharged on simple oral analgesia, one patient required the addition of gabapentin for pain control. No patient has had recurrence of their rectal prolapse, with a mean length of time since procedure of 684 days (395 - 857 days).

Conclusion: LPR shows promising results in children with FTRP; our early experience has demonstrated it to be a safe and effective procedure even in young children. It negates the risks associated with the use of mesh as well as the higher risk of failure reported with suture rectopexy. Although the majority require only simple analgesics, some may require additional pain medication.

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LAPAROSCOPY FOR INTRA-ABDOMINAL TESTES - DO WE ALWAYS HAVE TO SACRIFICE THE VESSELS?

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Aim of the Study: Currently most UK centres recommend laparoscopic two-staged Fowler Stephens Orchidopexy (FSO) as the operation of choice for management of intra-abdominal testes (IAT). Historically, rat study demonstrated a staggering degree of testicular tubular atrophy correlating with a poor paternity rate of 18% in those animals undergone division of testicular artery and vein. No paternity outcome is yet available for FSO. Literature suggested laparoscopic Testicular Vessels Intact Orchidopexy (TVIO) is as good if not superior in selected IAT. We reviewed the long term outcome of a single surgeons' experience.

Methods: TVIO has been the procedure of choice for the senior author. Retrospective review of casenotes was performed during the period of 1997-2014. Inclusion criteria were impalpable testes indicated for laparoscopic exploration. Once a viable IAT was identified, those <2cm from the internal ring underwent TVIO; the rest FSO. Long term follow-up noting testicular volume measured using orchidometer expressed as % of contralateral testis has been recorded.

Main results: Laparoscopy was performed for 84 impalpable testes, of which 31 were viable for laparoscopic orchidopexy. 22 of those situated <2cm from the internal ring underwent TVIO; the remaining 9 testes underwent one or two staged FSO (3 and 6 testes respectively). Median follow up 5 years (range 1.5-17 years). In the TVIO group, 21 viable testes were found in scrotal position at follow-up; 1 hypotrophied but doppler flow and testicular tissue confirmed by ultrasound. This compared to 1/3 and 3/6 atrophy observed in single and 2-staged FSO. Prepubertal boys retained 100% testicular volume of their TVIO side compared to contralateral, whilst growth of the affected testes decelerated during puberty down to 70% at latest follow-up.

Conclusion: Upon laparoscopy for IAT, distance of testis from internal ring should be measured and TVIO considered for those <2cm, avoiding staged procedure and high atrophy rate.

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PREDICTING THE NEED FOR ACE IN ARM: AT THE EXTREMES

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Aim of the Study: The Malone antegrade continence enema (ACE) procedure effectively manages intractable constipation and faecal incontinence in children. Data regarding the need for ACE relative to anorectal malformation (ARM) type is scarce. This paper aims to investigate the relationship between ACE and type of ARM.

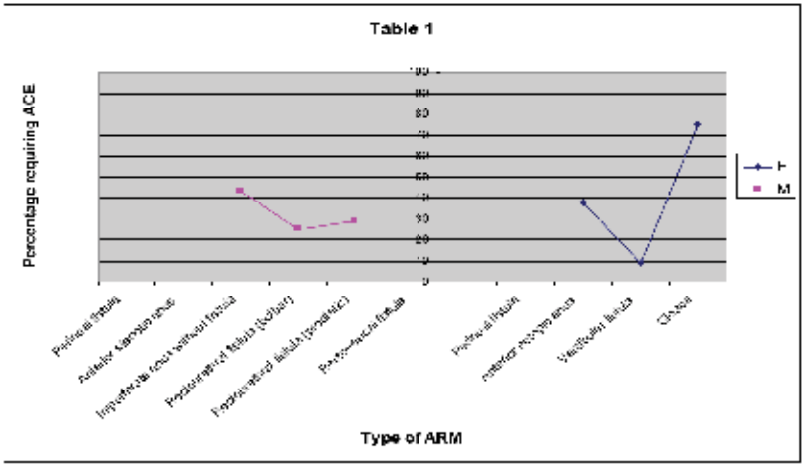
Methods: A retrospective case review of patients older than 5 years of age (1996 to 2010), with ARM and ACE was performed. Data regarding gender, type of ARM, current age/follow up and presence of ACE was collected.

Results: Over the study period, 123 patients were identified; 86 were eligible for inclusion. 39/86 (45%) were female. Median age and follow up was 11.2 years (range 5.4 to 19.6). Types of ARM were: perineal fistula (11 patients), imperforate anus without fistula (7), anterior stenotic anus (13), vestibular fistula (22), rectourethral (bulbar) fistula (12), rectourethral (prostatic) fistula (14), rectovesical fistula (3), and cloaca (4).

20/86 (23%) had an ACE. The group was divided according to gender; 10 were male. The percentages of children requiring ACE in each subtype of ARM are shown in Table 1.

Conclusion: This paper demonstrates that there is an association between the severity of ARM and the need for an ACE. It appears that an ACE is more commonly used in the both genders at the extremes of severity of ARM – for constipation and faecal incontinence. This data highlights the children with ARM who are more likely to require an ACE and has value in counselling patients/families. It may enable more timely institution of effective bowel management with the potential of reducing morbidity.

Table 1



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THE ROLE OF URINARY TRACT ULTRASOUND SCAN IN CHILDREN AFTER A SINGLE EPISODE OFF ACUTE EPIDIDYMITIS

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Aim: Acute epididymitis is uncommon in the paediatric population. However, children diagnosed with acute epididymitis often undergo a follow-up urinary tract ultrasound scan (USS) to detect urinary tract abnormalities. The role of USS in identifying urinary tract abnormalities is still unclear. Our aim was to look for clinical efficacy of this follow-up imaging.

Methods: Retrospective chart review of children aged 0-16 years with diagnosis of acute epididymitis/epididymo-orchitis in the last three years (2012-2015) was done. Records were retrieved from Trust database (EPIC, LARDER and EMR) after approval. Children with known urinary tract abnormalities before the episode of acute epididymitis were excluded

Results: Seventy children were identified. Seven patients with known urinary tract abnormalities were excluded. There was a bimodal distribution of age at diagnosis, 13 patients presented at less than one year of age and nine patients presented at 10 years old. Most of the older patients present with a tender, indurated, erythematous scrotum, while patients less than one-year-old presented with swelling and erythema. 19 patients were diagnosed using ultrasound, 43 diagnosed at operation whilst five had both ultrasound and operation. 50 patients (79%) had follow-up ultrasound, three are still pending.

There were no significant urinary tract abnormalities detected. Three cases showed epididymal cysts, one of which had normal follow-up study. One case showed absent right ureteric jet. Another case showed mild right upper pole pelvi-calyceal dilatation. However, these findings were not significant enough requiring any further follow up. Therefore none of the USS added to clinical management.

Conclusion: Follow-up urinary tract USS does not show any significant renal tract abnormality in children presenting with a single episode of acute epididymitis. We suggest follow up urinary tract USS after a single episode of acute epididymitis is of limited use.

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EARLY EXPERIENCE OF ROBOTIC RECTOPEXY IN THE PAEDIATRIC POPULATION

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Introduction and aims: A number of procedures have been described for the management of refractory full thickness rectal prolapse (FTRP). Trans-abdominal rectopexy (TARP) or laparoscopic assisted rectopexy (LARP) are standard approaches currently. The need for precise dissection, insertion of multiple sutures, and the use of a single operative field lends itself to robotic surgery. Experience in robotically assisted rectopexy (RARP) has been obtained in adult practice demonstrating favourable outcomes. Little is known for paediatric practice. The aim of this study was to review early experience from a single unit.

Methods: Under the proctorship of an adult colorectal surgeon with considerable experience with this procedure, all children with refractory FTRP underwent RARP from June 2014-December 2015. Details including length of procedure, length of stay, early complications were retrospectively reviewed.

Results: 5 children (4 male; 1 female), mean age 10.5 years (5-14.5) underwent RARP in the time period of the study. All had FTRP but 4 had associated problems: Ehlers danlos 1, severe autism 2, OCD 2, neurological abnormalities 1, urinary problems 1. The mean operative time was 156 mins (range 90- 180) and the mean in-patient stay was 2.5 days (range 1-4). With a mean follow up of 12.2 months (3-19) there has been one limited recurrence in a child who has ritualistic straining behaviour. Other complications included one urinary tract infection and one patient with known pre-existing urinary problems who had postoperative urinary retention.

Conclusion: Robotic rectopexy is a feasible operation in children. The operative time and length of stay are acceptable. The complications are no greater than those published for TARP or LARP. As with all minimally invasive procedures there is a learning curve, but this is a procedure where robotic surgery may confer benefit.

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POST HYPOSPADIAS URETHROCUTANEOUS FISTULA REPAIR COMPARISON BETWEEN PATIO AND OTHER TECHNIQUES

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Aim of study: To evaluate the outcome of the procedures involved in correcting post hypospadias repair complicated by urethrocutaneous fistula and compare the results of PATIO (Preserve The Tract And Turn It Inside Out) and other procedures.

Methods: We collected data of 39 boys who underwent urethrocutaneous fistula repair. Parameters studied including age, meatal location, age at first urethroplasty, hypospadias repair technique, number of urethroplasties required, location of fistula, time gap between urethroplasty and fistula repair, method of fistula repair and outcome of fistula repair. Patients were divided in two groups PATIO group and other fistula repair methods

Results: Mean age of the studied patients was 97 months (11 to 211 months). Type of hypospadias was subcoronal–16,coronal–6, distal penile–2,midpenile–4,proximal penile–2, penoscrotal–3 and unknown (not recorded)=2 patients. 28 patients had single urethroplasty, 6 patients had 2 and 2 patients had 3 urethroplasties. Average age at urethroplasty was 24 months (10-113months). 22 patients had Snodgrass repair, Mathieu =2, MACPI=1, tubularised plate=2,Mathieu+Snodgrass =1,two stage in 6 and undefined method of repair in 5patients Location of fistula was coronal=15,subcoronal=18, glanular=1,midpenile=1, penoscrotal=3,unknown=1.Time of fistula repair after urethroplasty was 6-145 months (average=30 months). Method of fistula repair was PATIO=12. Simple closure=15, Redourethroplasty=3, excision-pursestring closure of fistula and division of skin bridge =3, No. known = 3 patients. Fourteen of 33 patients had recurrent fistula (2 patio,p=0.032). Redofistula repair was done in 7 patients ((1 PATIO, 3 simple closure, 2 redo urethroplasty). Average follow up was 18.9 months (3 to 52 months) available for 33 patients.

Conclusions:

1. PATIO method for repair of urethrocutaneous fistula was quicker and associated with significantly low recurrence when compared with other methods

2. Fistula recurrence was not associated with age at urethroplasty, type of hypospadias, number of urethroplasties, method of urethroplasty, gap between urethroplasty and fistula repair and location of fistula.

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RECOGNISING TRUE RECTOVAGINAL FISTULA: LESSONS LEARNT

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Introduction: True rectovaginal fistula is the rarest form of female anorectal malformation (ARM), representing less than 1% of all cases. The diagnosis is often missed or is difficult. We present three term female infants with true rectovaginal fistula presenting to our institution within two months and discuss lessons learnt during their management. All had EUA and a split sigmoid colostomy at day two.

Main Results:

Patient 1:

EUA revealed two perineal openings: the superior draining urine and the inferior draining meconium. With the possibility of absent müllerian structures, Magnetic Resonance Imaging (MRI) of the pelvis was performed which demonstrated a müllerian structure between bladder and rectum. Posterior Sagittal Anorectoplasty (PSARP) at 12 months revealed a septate vagina with two hemicervices and the rectum opening high into the septum.

Patient 2:

EUA and cystovaginoscopy demonstrated two perineal openings. On flushing the mucous fistula, saline was seen to escape via the posterior opening. MRI pelvis showed müllerian structure duplication with obstructed right hemivagina. PSARP at 4 months showed the rectum opening between the two hemivaginas, with uterus didelphys.

Patient 3:

EUA and cystovaginoscopy demonstrated two perineal openings. PSARP at 5 months revealed a normal vagina with the rectum opening high into the posterior wall.

At PSARP all patients underwent a repair of posterior vaginal wall and an introitoplasty along with the rectal pull through and anoplasty. Patients with hemivaginas had the septum divided.

Conclusion: Rectovaginal fistula must be considered in females with only two perineal openings. Differentiation from cloaca and rectovestibular fistula can be difficult, but EUA with catheters can help. Pre-operative MRI can identify associated müllerian anomalies. Two of our three cases had associated müllerian, renal and spinal anomalies suggesting that true rectovaginal fistula is closer to cloaca on the ARM spectrum.

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AN UNEXPECTED HIGH PREVALENCE OF INTRONIC RET PROMOTER VARIATIONS IN BLACK AFRICAN HIRSCHSPRUNG DISEASE PATIENTS

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Introduction: The RET promoter region contains common ancestral RET gene variations which regulate transcription and are thought to be causative by increasing the Hirschsprung (HSCR) susceptibility risk. Hirschsprungs disease is not uncommon in African patients but inter-ethnic variation of the predisposing intronic *RET* susceptibility alleles exists and is reported to be virtually absent in Africa (< 5%). This study evaluates the *RET* promoter region variations in Black African patients with HSCR and the as compared to other ethnic groups

Patients and methods: Following ethical approval, DNA was extracted from whole blood samples of comparative HSCR patients in 3 main ethnic groups. PCR products were screened for genetic variation of the *RET* by direct sequencing analysis. Black African HSCR patients(n=14)] were compared with a comparative sample of 20 HSCR patients from the other 2 main ethnic groups (viz: Caucasian (10), mixed (Coloured) (10)].

Results: HSCR patients were clinically comparative in terms of aganglionic length and syndromic expression.

Extracellular RET variations in Black HSCR patients were not dissimilar from those seen in other Hirschsprungs patients. 13 detected RET promoter variants were many of which were common to those found in other population groups

However, against expectations 79% of Black patients had RET promoter variations which included the intronic variant SNP2 (rs 2435357) in a 71%of Black HSCR patients (88% homozygous) and SNP1 (rs2506004) in 79% (70% homozygous).

However, 3 patients had a combination of different RET promoter variants and 4 of the 13 (31%) were homozygous variations were specific to the Black African population .

Conclusions: Specific disease-related *RET* variations were identified in the promoter region in an unexpectedly high proportion of Black African patients in a South African sample. This challenges previously held concepts of a low incidence and adds to our understanding in Hirschsprung pathogenesis.

Video **1**

HOW TO ACHIEVE A 3% LEAK RATE IN ILEO-ANAL POUCH SURGERY

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Aims: The construction of an ileo-anal pouch in children requires a different procedure to the double stapling technique used in adults. A video describing the author's technique is presented, emphasising technical steps which have led to a low leak rate.

Technical differences.

- 1. The procedure commences with the child prone.
- 2. Gelpi retractors are inserted into the anus.
- 3. The dissection is submucosal to the top of the anus, commencing either 5mm above the ano-cutaneous margin for non-polyposis cases, or at the ano-cutaneous margin for polyposis.
- 4. The dissection breaks into the close rectal plane at the top of the anus; there is no "muscle cuff".
- 5. Dissection continues to the peritoneum in this plane.
- 6. Child is turned into Lloyd-Davies.
- 7. Laparoscopically, with the harmonic scalpel, dissection proceeds inside the mesorectum: this is different to the TME plane. The different planes are illustrated.
- 8. The two fields are united and the rectum is retrieved into the peritoneum.
- 9. The ileal J pouch is passed through the pelvis using a laparoscopic grasper.
- 10. The pouch is anastomosed within the anus with PDS sutures.
- 11. No drains are used.
- 12. The pouch is diverted for 6 weeks then the ileostomy is closed.

Outcomes: 99 children have had 102 ileal pouches constructed with this technique. There have been three anastomotic leaks and two pouch vaginal fistulae. The results suggest this technique is preferable to double stapling in children.

Video 2

NOVEL USE OF PRE FORMED SILO FOR LAPAROSTOMY

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Aim of Study: We report the novel use of the pre-formed silo (PFS) for laparostomy (LST).

Methods: Indications for LST; high ventilation pressures and/or cardio-respiratory instability precluding standard closure following laparotomy. Consecutive patients (2011-2015) were reviewed. Partial fascial closure was undertaken and PFS (Medicina ®) applied. Bowel was fed into the silo, the spring-loaded end inserted ovoid into the abdominal cavity and allowed to spring into its circular shape without bowel entrapment. Safe bowel orientation was confirmed and PFS flanges sutured to the skin (**Figure 1**). Outcomes: time to closure, duration of ventilation and ICU stay, complications and mortality. Data; median with (ranges).

Results: 9 children aged 40 days (3 days-19 months), underwent PFS LST. Weight at laparotomy was 2.3 (0.7-13) Kg.

Diagnoses: NEC (n=3), CDH (n=3), volvulus (n=1), biliary peritonitis (n=1) and tense pneumoperitoneum (n=1). Instability requring rapid closure [(n=4) (two on NICU), and preventing overt compartment syndrome (n=5). Following PFS, the bowel was visible in all with minimal fluid leak.

7 cases (78%) survived to second-look laparotomy, and achieved abdominal closure after 5 (2-11) days. ITU stay: 31 (1-185) days, postoperative ventilation 18 (0-46) days. 30-day mortality [(n=3, 33%)]: those were post-volvulus bowel infarction related septicaemia, severe chronic lung disease resistant to medical therapy and withdrawal of care for hypoxic-ischaemic brain injury.

Conclusion:

- PFS LST is simple to fashion, allows inspection of intra-abdominal contents, and avoids fluid loss
- Selected children including newborns may benefit from PFS LST to manage or avoid abdominal compartment syndrome

Video **3**

A SURGICAL TECHNIQUE FOR THE CORRECTION OF PERINEAL BODY DISRUPTION AND FECAL INCONTINENCE VIA A POSTERIOR SAGITTAL APPROACH WITH RECTAL MOBILIZATION

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Background: We present an operative technique for correction of perineal body disruption using posterior sagittal rectal mobilization, a technique routinely used in the repair of congenital anorectal malformations (ARMs) including perineal and rectovestibular fistulae, in our center.

Case: We present the case of a 34yr old female who presented with fecal incontinence following a normal vaginal delivery complicated by a 4th degree laceration which went unrecognized.

She presented with daily soiling. On examination she was found to have an inadequate perineal body with disruption of the sphincter mechanism. The vaginal introitus and urethra were normal.

Perineal body reconstruction was performed at our center and we present a video demonstrating the operative technique via a posterior sagittal approach. This technique is similar to that used for congenital anorectal malformations and acquired anatomical problems, which includes:

1. Complete mobilization of the anterior rectal wall off the posterior vaginal wall
2. Lateral rectal mobilization to allow the rectum to be repositioned within the sphincter complex
3. Repair of the anterior sphincter muscles
4. Reconstruction of the perineal body

At follow-up she had perfect bowel control, and had remained continent throughout a post-operative diarrheal episode.

Discussion: In our center we see a large number of children who have complex pelvic and anorectal malformations. A large proportion of our workload is dedicated to performing redo surgery and the anatomical variants in this case are comparable to those seen in the female newborn infants with congenital ARMs, in particular those requiring redo/secondary corrective intervention. In these cases the anus is often anteriorly mislocated with an inadequate perineal body, secondary to incomplete mobilization of the rectum at the time of primary repair, resulting in tension on suture lines and wound breakdown.

Video **4**

REPAIR OF A RECTOVAGINAL H-TYPE FISTULA

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Aims and Background: We present the operative video of a female infant who underwent transanal, full thickness rectal mobilization with placement of an ischiorectal fat pad to repair an H-Type rectovaginal fistula.

Methods/Case presentation: A 6-month old female presented with stool passing from the vagina. Previous evaluation, at an outside institution, did not demonstrate a fistula and the conclusion was that stool was refluxing into the vaginal vault. Our evaluation revealed the typical location of a fistula; located in the midline (from the vestibule) and opening into an anal crypt consistent with a congenital H-type recto-vaginal fistula. It can be difficult to diagnose, as seen in this case. Contrast studies typically do not demonstrate the fistula. The video demonstrates our previously published technique: full thickness rectal mobilization, closure of the fistula with interposition of a vascularized ischiorectal fat pad between rectum and vagina. The goal of full mobilization and interposition of a fat pad is to ensure healthy tissue over the previous fistulous tract.

Results: Post operatively the child did well and at one month had a satisfactory functional and cosmetic result. She is now 6-months post-surgery and there has been no recurrence of the fistula, and she is stooling appropriately.

Conclusion: The ischiorectal fat pad is easily visualized and mobilized via a transanal approach. It provides a good, well-vascularized protective layer to prevent fistula recurrence in this area. This procedure is a safe and effective operation in the hands of experienced pediatric surgeons.

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