Final Program

APSA 38th

ANNUAL MEETING

May 24–27, 2007

JW Marriott Orlando Grande Lakes

Orlando, FL USA

American Pediatric Surgical Association

PLEASE BRING THIS PROGRAM WITH YOU

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Membership Directory

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Educational Objective

The APSA Annual Meeting is designed to provide four days of comprehensive continuing education in the field of pediatric surgery. It is APSA's intent to bring together the world's leading authorities to present and discuss the most recent clinical and research efforts.

The program will begin with two half-day symposia; the first dealing with quality in practice and the second addressing disaster planning and management. Meeting attendees will also view and discuss video and selected poster presentations on this day. The topics at these sessions have been selected jointly by the Program and Education committees and are based on member requests from recent surveys and journal articles about what is relevant to their practices. The scientific sessions consist of basic research and practical clinical presentations. The poster sessions allow investigators an opportunity to share preliminary research.

This meeting covers the breadth of pediatric surgery and is intended to acquaint attendees with the latest research findings, clinical discoveries and trends that influence the day-to-day practice of pediatric surgery.

Accreditation Statement

APSA is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

Credit Designation

APSA designates this educational activity for a maximum of 19.25 *AMA PRA Category 1 Credits*™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

Policy on Faculty Disclosure

It is the policy of the ACCME and APSA that the faculty disclose and resolve real or apparent conflicts of interest relating to the content of the educational activity, and also disclose discussions of unlabeled/unapproved uses of drugs or devices during their presentations.

The following faculty members have disclosed a financial relationship with an industry partner. The relationship was proven not to have an impact on the science presented at this annual meeting. All of these faculty members have agreed not to mention products or services provided by the industry partner during their presentations. All other faculty indicated that they have no financial relationships to disclose.

Jorge Correia-Pinto, M.D. —POEI/SAU

Hugh W. Grant, M.D. — Shire Pharmaceuticals

George W. Holcomb, III, M.D., MBA will be discussing off-label uses for biosynthetic mesh and for U-clips during his video presentations.

Robert E. Kelly, Jr., M.D. — Merk, GlaxoSmithKline, Walter Lorenz Surgical

Danielle Patterson, M.D. — Biogen Idec, Inc.

Steven Rothenberg, M.D. — Volleylab, Storz

Commercial Support

APSA would like to thank the *Journal of Pediatric Surgery* for its educational grant for the *Journal of Pediatric Surgery Lecture* and its educational grant for the transcription of the annual meeting technical sessions. APSA also thanks the current supporters and exhibitors for their unrestricted educational grants.

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Silver Supporters

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2007 Exhibitors *This list is current as of March 6, 2007*

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Bentec Medical
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St. Joseph's Hospital
Stryker Endoscopy

Exhibit Hours

Friday, May 25	6:45 a.m. – Noon
Saturday, May 26	7:00 a.m. – 12:30 p.m.

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APSA would like to thank the following people for their contribution to the APSA annual meeting program:

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Schedule at a Glance

Wednesday, May 23

Noon – 5:00 p.m.	APSA Board of Governors meeting	*La Serena Boardroom*
2:00 p.m. – 5:00 p.m.	Committee meetings	*Cordova 2, 3, 5, 6* *Segura 6, Del Lago 3, 4*
3:00 p.m. – 6:00 p.m.	Registration open	*Mediterranean Foyer*
6:00 p.m. – 10:00 p.m.	Publications Committee meeting/dinner	*Del Lago 1 & 2*
6:30 p.m. – 10:00 p.m.	APSA Board of Governors dinner	*Primo's Restaurant*

Thursday, May 24

6:30 a.m. – 8:00 a.m.	Committee meetings	*Cordova 2, 3, 5, 6* *Del Lago 1, 2* *La Serena Boardroom*
7:00 a.m. – 5:30 p.m.	Registration open	*Mediterranean Foyer*
8:00 a.m. – 11:45 a.m.	Symposium: Improving the Quality of Patient Care in Pediatric Surgery: to Seek, to Strive, and Not to Yield	*Mediterranean Salons 4 & 5*
11:45 a.m. – 1:15 p.m.	Lunch with video session	*Mediterranean Salons 4 & 5*
1:15 p.m. – 1:30 p.m.	Refreshment break	*Mediterranean Foyer*
1:30 p.m. – 4:00 p.m.	Symposium: Disaster Planning and Management	*Mediterranean Salons 4 & 5*
4:00 p.m. – 5:30 p.m.	Poster Presentations/ Poster Viewing Area: Authors in Attendance	*Mediterranean Salon 1* *Mediterranean Salon 2*
5:30 p.m. – 6:30 p.m.	Exhibit set-up	*Mediterranean Foyer*
6:30 p.m. – 8:30 p.m.	Welcome Reception	*Valencia Lawn*

Friday, May 25

6:00 a.m. – 7:30 a.m.	Annual Fun Run	*Citron Restaurant* *Entrance — Jogging Path*
6:30 a.m. – 10:00 a.m.	Poster set-up	*Mediterranean Salon 1* *Mediterranean Salon 2*
6:30 a.m. – 7:30 a.m.	Committee meetings	*Cordova 1, 2, 3, 5, 6* *Del Lago 1, 2*
6:30 a.m. – 1:00 p.m.	Registration open	*Mediterranean Foyer*
6:45 a.m. – 7:30 a.m.	Continental breakfast in the exhibit area	*Mediterranean Foyer*
6:45 a.m. – Noon	Exhibits open for viewing	*Mediterranean Foyer*
7:30 a.m. – 9:00 a.m.	Welcome/Scientific Session 1	*Mediterranean Salons 4 & 5*
9:00 a.m. – 10:00 a.m.	Robert E. Gross Lecture: Francisco Cigarroa, M.D.	*Mediterranean Salons 4 & 5*
10:00 a.m. – 10:30 a.m.	Refreshment break	*Mediterranean Foyer*
10:30 a.m. – 11:45 a.m.	Scientific Session 2	*Mediterranean Salons 4 & 5*

Schedule at a Glance

Friday, May 25 (continued)

11:45 a.m. – 12:45 p.m.	Welcome New Members/ Presidential Address: Pat Donahoe, M.D.	*Mediterranean Salons 4 & 5*
1:30 p.m.– 3:00 p.m.	Benji Brooks Luncheon	*Del Lago 1*
2:00 p.m.	Golf Tournament	*The Ritz Carlton Golf Club*
2:00 p.m.	Tennis Tournament	*Tennis Courts*
5:00 p.m. – 6:30 p.m.	New Member Reception	*President's Suite*

Saturday, May 26

6:30 a.m. – 8:00 a.m.	Member business meeting and breakfast	*Mediterranean Salons 4 & 5*
6:30 a.m. – 1:00 p.m.	Registration open	*Mediterranean Foyer*
7:00 a.m. –12:30 p.m.	Posters and Exhibits open for viewing	*Mediterranean Salon 1* *Mediterranean Salon 2* *Mediteranean Foyer*
7:00 a.m. – 8:00 a.m.	Continental breakfast (nonmembers)	*Mediterranean Foyer*
8:00 a.m. – 10:00 a.m.	Scientific Session 3	*Mediterranean Salons 4 & 5*
10:00 a.m. – 10:30 a.m.	Refreshment break	*Mediterranean Foyer*
10:30 a.m. – Noon	Scientific Session 4	*Mediterranean Salons 4 & 5*
Noon – 1:00 p.m.	International Guest Lecture: Claire Nihoul-Fékété, M.D.	*Mediterranean Salons 4 & 5*
12:30 p.m. – 5:00 p.m.	Exhibits dismantle	*Mediterranean Foyer*
1:00 p.m. – 1:30 p.m.	Refreshment break	*Mediterranean Foyer*
1:30 p.m. – 3:00 p.m.	Unedited Video Session with lunch	*Mediterranean Salons 4 & 5*
3:00 p.m. – 5:00 p.m.	Posters dismantle	*Mediterranean Salon 1* *Mediterranean Salon 2*
3:00 p.m. – 4:30 p.m.	COG Surgeons Meeting (open to all APSA meeting attendees)	*Mediterranean Salons 6 & 7*
6:30 p.m. – 10:30 p.m.	President's Banquet	*Mediterranean Salons 4 & 5*

Sunday, May 27

7:30 a.m. – 8:00 a.m.	Continental breakfast	*Mediterranean Foyer*
7:30 a.m. – 11:30 a.m.	Registration open	*Mediterranean Foyer*
8:00 a.m. – 8:15 a.m.	APSA Foundation Scholar: James Dunn, M.D.	*Mediterranean Salons 4 & 5*
8:15 a.m. – 9:15 a.m.	*Journal of Pediatric Surgery* Lecture: Alan Flake, M.D.	*Mediterranean Salons 4 & 5*
9:15 a.m. – 11:30 a.m.	Scientific Session 5	*Mediterranean Salons 4 & 5*
11:30 a.m.	Annual Meeting Adjourns	

General Information

Registration

All authors presenting a paper at the APSA 38th Annual Meeting are required to pay a registration fee.

The onsite registration fees for the annual meeting are:

APSA Member	$640 USD
Physician Non-Member	$740 USD
Student/Resident/Fellow*	$365 USD
Nurse/Allied**	$365 USD
Companion	$340 USD

** Students, residents and fellows must have a letter from their chief of service to qualify for the reduced registration fee.*

*** Registration for the APSA 38th Annual Meeting only; APSNA registration is by separate subscription.*

APSA Registration Desk

Registration will be located at the Mediterranean Foyer during the following times:

Wednesday, May 23	3:00 p.m. – 6:00 p.m.
Thursday, May 24	7:00 a.m. – 5:30 p.m.
Friday, May 25	6:30 a.m. – 1:00 p.m.
Saturday, May 26	6:30 a.m. – 1:00 p.m.
Sunday, May 27	7:30 a.m. – 11:30 a.m.

Scientific Sessions

All educational sessions will be held in Mediterranean Salons 4 & 5. The daily dress code is business or business casual attire.

Poster Viewing

Scientific posters will be located in Mediterranean Salon 1 and Mediterranean Salon 2 and available for viewing during the following hours:

Thursday, May 24	4:00 p.m. – 5:30 p.m.
Friday, May 25	10:00 a.m. – Noon
Saturday, May 26	7:00 a.m. – 12:30 p.m.

Authors are requested to be in attendance on Thursday evening, during continental breakfasts and during morning breaks to answer audience questions.

Speaker-ready Room

The Speaker-ready Room will be available daily in the Mediterranean Salon 3. Computers will be provided for speakers to review their presentations.
The hours that the Speaker-ready Room will be open are:

Thursday, May 24	7:00 a.m. – 5:00 p.m.
Friday, May 25	6:30 a.m. – 1:00 p.m.
Saturday, May 26	6:30 a.m. – 1:00 p.m.
Sunday, May 27	7:00 a.m. – 10:30 a.m.

Presentation Check-In

Speakers must use Microsoft PowerPoint® slides during their presentations; 35mm slides will not be accepted. Refer to the Guide for Speakers distributed in January and available on the APSA Web site (www.eapsa.org) for information about preparing your presentation. Speakers must submit their computer presentations to the technician in the Speaker-ready Room (Mediterranean Salon 3) by 1 p.m. the day before they are scheduled to speak. Those speaking on Thursday may submit their materials at 7 a.m. on Thursday.

Exhibits

Commercial exhibits will be located in the Mediterranean Foyer and will be open during the following hours:

Friday, May 25	6:45 a.m. – Noon
Saturday, May 26	7:00 a.m. – 12:30 p.m.

Continental breakfast and scheduled coffee breaks will be served in the exhibit area on Friday and Saturday. For a list of exhibitors and booth assignments, see pages A175–A182.

APSA Business Meeting

The APSA Business Meeting will be held from 6:30 – 8:00 a.m. on Saturday, May 26, in Mediterranean Salons 4 & 5. This is a breakfast meeting and is for APSA members only.

Welcome Reception

A Welcome Reception for all registrants will take place on the Valencia Lawn from 6:30 – 8:30 p.m. on Thursday, May 24. Tickets for this reception will be included in your registration packet and will be required for admission to the reception. All guests 12 years and older will require a ticket to be admitted to the Welcome Reception. Casual attire is appropriate.

President's Banquet

The President's Banquet will be held in Mediterranean Salons 4 & 5 on Saturday, May 26. The reception will begin at 6:30 p.m. in the Mediterranean Foyer, and dinner will begin at 7:15 p.m. After dinner, you are invited to join us for dancing. Tickets for the reception and banquet are included in your registration packet and will be required for admission. All guests 12 years and older will require a ticket to be admitted to the banquet. Business or cocktail attire is requested.

Child Care Services

Babysitting services are available at any time by contacting the JW Marriott Orlando, Grande Lakes Resort's concierge at 407/393-4005. The Ritz Kids Program is designed to make your child's stay as memorable as yours. This supervised program is available to young guests ages 5 to 12, offering a wide variety of activities. Caring counselors are certified in infant, child and adult CPR, basic first aid, and water safety to ensure fun and safety for all. Reserving a place for your child(ren) in advance is strongly recommended. Contact The Ritz Kids Program directly for program activities, times and cost at 407/393-4977.

Companions' Hospitality Suite

The hospitality suite, Palazzo A & B, will be open Friday from 9 – 11 a.m., Saturday from 8 – 10:30 a.m. and Sunday from 8 – 10:30 a.m. Continental breakfast will be served each morning for registered accompanying guests. Badges are requested for entry to the hospitality suite.

Recommended Activity

If you are looking for a unique activity during one of the afternoons when free time is provided to meeting attendees, we invite you to explore Discovery Cove. Located just five minutes from the JW Marriott Orlando, Grande Lakes, Discovery Cove is a one-of-a-kind tropical hideaway. Relax on pristine beaches as you find yourself surrounded by acres of lush greens and deep blues and feel the lure of the sparkling lagoons, reefs and grottos. Here you can touch, feed and get acquainted with hundreds of colorful tropical birds and fascinating sea creatures. Feel a unique mixture of calm and captivation as you snorkel amid thousands of rays and exotic fish and explore the splendor of coral reefs and grottos. It's an experience as vivid as the colors you'll encounter.

All-day and afternoon packages are available. Meals, beverages and snacks are included. For more information, or to book your adventure, visit www.discoverycove.com.

Benji Brooks Meeting and Luncheon

Join us for a luncheon meeting of the Benji Brooks Society in Del Lago 1. We will discuss issues that women are currently facing in the pediatric surgery arena and talk about the society's future.

We urge you to attend this informal session, to be held Friday, May 25 from 1:30 – 3 p.m. A buffet lunch and an agenda will be provided to those who register. We welcome discussion topic suggestions: e-mail your agenda suggestions to Diana Farmer, M.D. at farmerd@surgery.ucsf.edu no later than May 4, 2007. All guests 12 years and older will require a ticket to be admitted to the meeting and luncheon.

Optional Athletic Activities

5K Fun Run

The Annual 5K Fun Run will be on Friday, May 25, at 6 a.m. Sign-in will begin at 5:15 a.m. on the jogging path outside the Citron Restaurant entrance with an organized warm up and stretch at 5:40 a.m. The run will be on a hard surface (not sand nor gravel), so bring appropriate running shoes.

The participation fee is $70 U.S. and includes a Fun Run T-shirt, water stations along the route, directional arrows placed along the course with a staff member on a bicycle leading runners through the course, a light breakfast after the run, and awards in a number of categories.

Golf Tournament

The 2007 APSA Golf Tournament will be a shotgun start at the Ritz Carlton Golf Club at 2 p.m. on Friday, May 25. The tournament fee is $192 USD per golfer and includes cart, greens fees, caddy-concierge, gratuity, bag handling, use of the practice facility (including range balls), a boxed lunch with a non-alcoholic beverage, and awards for the top players. It is a five-minute walk from the JW Marriott to the Ritz Carlton Golf Club.

Tennis Tournament

The APSA Annual Tennis Tournament will be round-robin and begins at 2 p.m., Friday, May 25, at the JW Marriott Orlando, Grande Lakes tennis courts. The tournament fee is $68 USD, per player, and includes light refreshments, snacks, a tennis pro to officiate the event and awards for the top players.

Messages

A message board will be maintained in the registration area during registration hours. Check the board frequently, as there will be NO PAGING during the meeting. To contact the message center, dial the hotel operator or 407/206-2300 and request the APSA Registration Desk.

Guidelines for Authors and Discussants

1. Authors presenting papers are reminded that the presentations shall be limited to six minutes, four minutes and three minutes (as indicated) for case presentations.

2. Computer disks and CDs must be turned in to the technician in the Speaker-Ready Room by 1 p.m. the day before they are to be presented. Those speaking on Thursday may submit materials at 7 a.m. on Thursday.

3. Posters: Posters have been sorted into four sessions, each scheduled on Thursday, May 24, between 4 and 5:30 p.m. Oral presentations for each poster will be presented at this time, but posters will not be on display until the following morning. Refreshments will be available during the Poster Sessions on Thursday.

   Scientific posters will be hung on Friday morning (following the oral poster presentations) between 6:30 and 10 a.m. and will be available for viewing after that. Authors are requested to be in attendance during the general session breaks each day to discuss their presentations.

   Four "Posters of Distinction" will be awarded following the presentations on Thursday.

4. Discussants from the floor should state their name and affiliation prior to their remarks. The discussions will be audio recorded for transcription and printing in the *Journal of Pediatric Surgery.*

5. Typed discussion should be limited to a maximum of 200 words. Typed discussions that exceed 200 words will be edited before they are submitted to the *Journal of Pediatric Surgery* for publication.

6. Discussants will have the opportunity to edit a transcript of their remarks following the meeting. The Publications Committee reserves the right to edit the typed discussion before it is submitted to the *Journal of Pediatric Surgery.*

American Pediatric Surgical Foundation

The American Pediatric Surgical Association Foundation would like to thank the following APSA members who have contributed to the Foundation. The list is up-to-date as of January 17, 2007.

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Past APSA Annual Meeting Dates and Locations

37th Annual Meeting
May 21–24, 2006
Marriott Beach & Golf Resort
Hilton Head, South Carolina

36th Annual Meeting
May 29–June 1, 2005
JW Marriott Desert Ridge Resort & Spa
Phoenix, Arizona

35th Annual Meeting
May 27–30, 2004
Sawgrass Marriott Resort
Ponte Vedra Beach, Florida

34th Annual Meeting
May 25–28, 2003
Marriott Harbor Beach Resort & Spa
Ft. Lauderdale, Florida

33rd Annual Meeting
May 19–22, 2002
The Arizona Biltmore Resort and Spa
Phoenix, Arizona

32nd Annual Meeting
May 20–23, 2001
The Registry Resort
Naples, Florida

Past APSA Annual Meeting Dates and Locations (continued)

31st Annual Meeting
May 25–28, 2000
Walt Disney World Swan
Lake Buena Vista, Florida

30th Annual Meeting
May 16–19, 1999
Westin Mission Hills
Rancho Mirage, California

29th Annual Meeting
May 10–13, 1998
The Hyatt Regency
Hilton Head, South Carolina

28th Annual Meeting
May 18–21, 1997
The Registry Resort
Naples, Florida

27th Annual Meeting
May 19–22, 1996
The Hyatt Regency
San Diego, California

26th Annual Meeting
May 20–23, 1995
The Boca Raton Resort and Club
Boca Raton, Florida

25th Annual Meeting
May 14–17, 1994
Loews Ventana Canyon Resort
Tucson, Arizona

24th Annual Meeting
May 15–18, 1993
The Hyatt Regency
Hilton Head, South Carolina

23rd Annual Meeting
May 12–16, 1992
The Broadmoor
Colorado Springs, Colorado

Future Meetings

39th Annual Meeting
May 29–June 1, 2008
JW Marriott Desert Ridge Resort & Spa
Phoenix, Arizona

40th Annual Meeting
May 28–31, 2009
El Conquistador Golf Resort & Casino
Las Croabas, Puerto Rico

41st Annual Meeting
May 16–19, 2010
Loews Portofino Bay Hotel
Orlando, Florida

42nd Annual Meeting
May 22–25, 2011
JW Marriott Desert Springs Resort & Spa
Palm Desert, California

Invited Speakers

Past Annual Meeting Robert E. Gross Lecturers

2006
Diana Bianchi, M.D.
"Fetomaternal Cell Trafficking: A Story that Begins with Prenatal Diagnosis and May End with Stem Cell Therapy"

2005
W. Hardy Hendren, M.D.
"Looking Back 50 Years"

2004
Giulio (Dan) D'Angio
"The Role of the Surgeon in the Past, Present and Future of Pediatric Oncology"

2003
Lucien Leape, M.D.
"Safe Health Care — Are We Up to It?"

2002
Harold Shapiro, Ph.D.
"The Ethical Dimensions of Scientific Progress"

2001
Judah Folkman, M.D.
"Angiogenesis-Dependent Diseases"

2000
J. Bruce Beckwith, M.D.
"Pediatric Renal Tumors at the New Millennium: Myths, Misunderstandings, Controversies and Opportunities"

1999
Samuel A. Wells, Jr., M.D.
(Title not available)

1998
Richard M. Satava, M.D.
"Medicine in the 21st Century"

1997
Douglas W. Wilmore, M.D.
"Will Organ Growth Replace Transplantation? Lessons from Patients with Short Bowel Syndrome"

1996
Robert H. Bartlett, M.D.
"Surgery, Science and Respiratory Failure"

1995
David A. Williams, M.D.
"The Role of Interleukin-II on the Pathophysiology of the Small Intestine"

1994
W. French Anderson, Ph.D.
"Human Gene Therapy"

1993
Judah Folkman, M.D.
"Clinical Applications of Angiogenesis Research"

1992
Warren Zapol, M.D.
"Inhaled Nitric Oxide: A Selective Vaso-Dilator"

1991
Joel Cooper, M.D.
"History and Current Status of Lung Transplantation"

1990
Richard Simmons, M.D.
"Role of the Gut Flora in Surgery"

Past Annual Meeting Overseas/International Guest Lecturers

2005
Prof. Frans W.J. Hazebroek, M.D., Ph.D.
"Is Continuation of Life Support Always the Best Option for the Surgical Neonate?"

2004
David A. Lloyd, M.D., FRCS
"Tomorrow's Surgeons: Who Cares for the Patient?"

2003
Claire Nihoul-Fékété, M.D.
"Modern Surgical Management of Congenital Hyperinsulinemic Hypoglycemia"

2002
Takeshi Miyano, M.D.
"Biliary Tree: A Gardener's 30-Year Experience"

2001
Pedro Rosselló, M.D.
"One Nation, with Liberty and Justice…and Healthcare for All"

2000
Leela Kapila, FRCS
"Are These the Children of a Lesser God?"

1999
Bernardo Ochoa, M.D.
"Pediatric Surgery in Latin America"

1998
Prof. Sidney Cywes
"Some of the Little Things We Do — Something Old, Something New"

1997
Justin Kelly
"Bladder Exstrophy — Problems and Solutions"

1996
Prem Puri
"Variant Hirschsprug's Disease"

1995
Sir Lewis Spitz, M.D., Ph.D., FRCS
"Esophageal Atresia — Past, Present and Future"

1994
Sean J. Corkery, M.D.h, FRCSI, FRCSEng
"In Pursuit of the Testis"

1993
Edward M. Kiely, FRCSI, FRCS
"The Surgical Challenge of Neuroblastoma"

1992
Yann Revillon, M.D.
"Intestinal Transplantation in France"

1991
Shemuel Nissan, M.D.
"The History of Surgery and Medicine in the Holy Land from the 19th Century"

1990
Jan C. Molenaar, M.D.
"Congenital Diaphragmatic Hernia — What Defect?"

Past Annual Meeting
Journal of Pediatric Surgery Lecturers

2006
Pedro Rosselló, M.D.
"The Unfinished Business of American Healthcare"

2005
Alberto Peña, M.D.
"Luck and Serendipity, the History of a Surgical Technique"

2004
R. Scott Jones, M.D.
"The American College of Surgeons Initiatives for Safety and Quality Improvement"

2003
Patricia Donahoe, M.D.
"Sustained Inquiry and Perseverance in the Clinic and at the Bench"

2002
Michael Harrison, M.D.
"Fetal Surgery: Trials, Tribulations and Territory"

2001
Joseph P. Vacanti, M.D.
"The History and Current Status of Tissue Engineering"

2007 Invited Speakers

Robert E. Gross Lecture:
Francisco G. Cigarroa, M.D.
"Leading an Academic Health Center in the 21st Century:
A Pediatric Surgeon's Perspective"

Francisco G. Cigarroa, M.D. is a nationally renowned pediatric and transplant surgeon who was educated at Yale, Harvard and Johns Hopkins. Dr. Cigarroa is the first Hispanic in the United States to lead a health science university.

A native of Laredo, Dr. Cigarroa earned a bachelor's degree from Yale in 1979 and received his medical degree from The University of Texas Southwestern Medical Center at Dallas in 1983. He was elected to Alpha Omega Alpha, the national honor medical society. During his 12 years of postgraduate training, Dr. Cigarroa was chief resident at Harvard's teaching hospital, Massachusetts General in Boston, and completed a fellowship at Johns Hopkins Hospital in Baltimore.

Dr. Cigarroa is a Fellow of the American College of Surgery and a Diplomate of the American Board of Surgery and has received a certificate in pediatric surgery from the American Board of Surgery. He is an accomplished researcher who has published scientific papers on principles of surgery in infants and children. His many professional affiliations include the American Medical Association, Texas Medical Association, Bexar County Medical Society and the J. Bradley Aust Surgical Society. He is chairman-elect of the Board of Directors of the Greater San Antonio Chamber of Commerce and a member of the Board of the McNay Art Museum, and United Way of San Antonio and Bexar County. In 2006 he was elected as a member of the distinguished Institute of Medicine of the National Academies.

Journal of Pediatric Surgery Lecture:
Alan W. Flake, M.D.
"Stem Cell Biology and Pediatric Surgery — Deciphering the Venn Diagram"

Alan W. Flake, M.D. is a Professor of Surgery and Obstetrics & Gynecology at the University of Pennsylvania School of Medicine and is the Ruth and Tristram C. Colket Chair in Pediatric Surgery, Pediatric Surgery Residency Training Program Director, and Director of the Children's Fetal Research Center at the Children's Hospital of Philadelphia. He received his medical degree from the University of Arkansas in 1981, completed his general surgery residency at the University of California, San Francisco in 1988, and completed his pediatric surgery fellowship at the Children's Hospital Medical Center in Cincinnati in 1990. He returned to UCSF as a faculty member until 1994, and spent two years at the Children's Hospital of Michigan before his recruitment to CHOP in 1996. He has a long-standing clinical and research interest in fetal therapy that began during surgical residency with a research fellowship in fetal surgery in Dr. Michael Harrison's laboratory. He has been instrumental in the development of the field of fetal surgery and has been a leading investigator in the areas of prenatal stem cell transplantation and gene therapy.

In addition to an active surgical practice, Dr. Flake has authored or co-authored more than 200 peer reviewed publications and 90 chapters and review articles. He holds editorial positions on multiple journals and is an Associate Editor for *Experimental Hematology*. He has served on 14 NIH study sections and his laboratory has been continuously funded by the NIH since 1993. Dr. Flake is also Program Director of a T32 Institutional Training Grant at CHOP titled "Fetal Biology and Therapy".

International Guest Lecture:
Claire Nihoul-Fékété, M.D.
"Is Regionalism of Complex Pediatric Malformations Desirable and Feasible? The Example of Disorders of Sexual Development"

Claire Nihoul-Fékété completed her medical studies in Paris, France, in 1966 and has served as chief of the Department of Pediatric Surgery at the Hopital des Enfants Malades in Paris since 1990. Dr. Nihoul- Fékété was the General Secretary of the French Society of Pediatric Surgery (SFCP) from 1975 to 1980, and served as President from 1990–1993. She was a member of the European Union of Specialists from 1992–1999 and has served as an expert at the Court of Appeal of Paris for fetal medicine and pediatric surgery since 1994.

Dr. Nihoul- Fékété is a member of numerous scientific associations, including the Académie Francaise de Chirurgie, the Association Francaise de Chirurgie, the Societe Francaise de Chirurgie Pediatrique, the British Association of Pediatric Surgery and the American Academy of Pediatrics, Section of Surgery. She received the Chevalier de l'Ordre National du Merite in 1980 and the Chevalier de l'Ordre de la Legion d'Honneur in 1999.

PROGRAM IN DETAIL

Wednesday, May 23

Noon – 5:00 p.m.	APSA Board of Governors meeting	*La Serena Boardroom*
2:00 p.m. – 5:00 p.m.	Committee meetings	*Cordova 2, 3, 5, 6* *Segura 6, Del Lago 3, 4*
3:00 p.m. – 6:00 p.m.	Registration open	*Mediterranean Foyer*
6:00 p.m. – 10:00 p.m.	Publications Committee meeting/dinner	*Del Lago 1 & 2*
6:30 p.m. – 10:00 p.m.	APSA Board of Governors dinner	*Primo's Restaurant*

Thursday, May 24

6:30 a.m. – 8:00 a.m.	Committee meetings	*Cordova 2, 3, 5, 6* *Del Lago 1, 2* *La Serena Boardroom*
7:00 a.m. – 5:30 p.m.	Registration open	*Mediterranean Foyer*
8:00 a.m. – 11:45 a.m.	Symposium: Improving the Quality of Patient Care in Pediatric Surgery: to Seek, to Strive, and Not to Yield	*Mediterranean Salons 4 & 5*

[Moderator]
R. Lawrence Moss, M.D.
Yale University School of Medicine, New Haven, CT, USA

[Educational Objectives]
This symposium will focus on current efforts designed to help pediatric surgeons evaluate our outcomes and to deliver the best available care for our patients. The symposium will highlight APSA's leadership role in bringing the National Surgical Quality Improvement Project (NSQIP) to pediatric surgery and educate the audience regarding its potential role in this effort. By the end of this symposium it is expected that the participant will:

- Understand the distinction between quality assurance and quality improvement and their specific relevance to the practicing pediatric surgeon.
- Understand the development, design and operational aspects of the National Surgical Quality Improvement Project (NSQIP) and learn of the impact the NSQIP has had in the reduction in morbidity and mortality in surgical patients.
- Understand the effort led by the American College of Surgeons (ACS) to expand NSQIP to academic and private medical institutions nationwide and the sub-specialties including pediatric surgery.
- Learn about the relative advantages and limitations of administrative databases and their relevance to evaluating outcomes and quality.
- Become familiar with the partnership between APSA and the ACS to develop a NSQIP module for pediatric surgery.

[Instructors]
Shukri Khuri, M.D.; Keynote Speaker
National Surgical Quality Improvement Project, Boston, MA, USA

Darrell A. "Skip" Campbell, Jr., M.D.
Univ. of Michigan Hospitals, Ann Arbor, MI, USA

Peter W. Dillon, M.D.
MS Hershey Medical Center, Hershey, PA, USA

Kurt F. Heiss, M.D.
Emory Children's Center, Atlanta, GA, USA

Kurt D. Newman, M.D.
Children's National Medical Center, Washington, DC, USA

[Program]
QUALITY IMPROVEMENT AND QUALITY ASSESSMENT:
HOW DO THESE HELP MY PATIENT?
Kurt F. Heiss, M.D.

THE HISTORY OF NSQIP AND ITS VALUE FOR PEDIATRIC SURGEONS
Shukri Khuri, M.D.

MAKING A BUSINESS CASE FOR QUALITY
Darrell A. "Skip" Campbell, Jr., M.D.

DATABASES AND BENCHMARKING FOR PEDIATRIC SURGERY
Kurt D. Newman, M.D.

ACS NSQIP FOR PEDIATRIC SURGERY: WHERE WE ARE AND WHERE WE ARE GOING
Peter W. Dillon, M.D.

11:45 a.m. – 1:15 p.m. Lunch with video session *Mediterranean Salons 4 & 5*

[Moderators]
Frederick J. Rescorla, M.D.
Daniel von Allmen, M.D.

[Educational Objectives]
Session attendees will:
- Acquire knowledge of open and minimally invasive techniques for the treatment of pediatric surgical problems.
- Expand the various therapeutic options to approach common pediatric surgery problems.
- Develop an understanding of various new pediatric surgical techniques.

V1 SERIAL TRANSVERSE ENTEROPLASTY
Avery Ching, M.D., Biren Modi, M.D., Tom Jaksic, M.D., Ph.D, Heung Bae Kim, M.D.
Children's Hospital Boston, Boston, MA, USA.

V2 ENDOSCOPIC OBLITERATION OF A RECURRENT TRACHEOESOPHAGEAL FISTULA USING A BIOSYNTHETIC MESH
George W. Holcomb, III, M.D., MBA[1], Casey M. Calkins, M.D.[2], Shawn D. St. Peter, M.D.[1]
[1]Children's Mercy Hospital, Kansas City, MO, USA, [2]Children's Hospital of Wiscosin, Milwaukee, WI, USA.

V3 LAPAROSCOPIC DUODENAL ATRESIA REPAIR WITH U-CLIPS
George W. Holcomb, III, M.D., MBA, Shawn D. St. Peter, M.D.
Children's Mercy Hospital, Kansas City, MO, USA.

V4 TOTAL INTRACORPOREAL RESECTION OF A CHOLEDOCHAL CYST WITH ROUX-EN-Y CHOLEDOCHAL JEJUNOSTOMY
Steven S. Rothenberg, M.D.
The Mother and Child Hospital at P/SL, Denver, CO, USA.

V5 MIXED GONADAL DYSGENESIS - REPAIR OF AN AMBIGUOUS GENITALIA
Guido Seitz, Steven W. Warmann, Joerg Fuchs.
Univ. Childre's Hospital, Tuebingen, Germany.

V6 LAPAROSCOPIC DISTAL PANCREATECTOMY FOR PANCREATIC TRANSECTION IN A 10 YEAR-OLD BOY
Kenneth Gow, M.D., FACS, FAAP.
Emory Univ., Atlanta, GA, USA.

V7 EXIT-TO-ECMO FOR FETAL AIRWAY OBSTRUCTION: DEMONSTRATION AND CASE REPORT
Shaun A. Steigman, M.D., Dario O. Fauza, M.D., Jay M. Wilson, M.D., Russell W. Jennings, M.D.
Children's Hospital, Boston, Boston, MA, USA.

V8 LAPAROSCOPIC CYSTOGASTROSTOMY FOR DRAINAGE OF PANCREATIC PSEUDOCYST
Shawn D. St. Peter, M.D., Daniel J. Ostlie, M.D.
Children's Mercy Hospital, Kansas City, MO, USA.

1:15 p.m. – 1:30 p.m.	Refreshment break	*Mediterranean Foyer*
1:30 p.m. – 4:00 p.m.	Symposium: Disaster Planning and Management	*Mediterranean Salons 4 & 5*

[Moderator]
Kenneth S. Azarow, M.D.
Madigan Army Medical Center, Tacoma, WA, USA

Underlining denotes the author scheduled to present at the meeting.

[Educational Objectives]
This symposium is designed to provide up to date, practical information that will be useful to pediatric surgeons who find themselves thrust into disaster scenarios, or who are given the responsibility of helping their hospital/community prepare for a disaster. Specifically, the session will:

- Review the current APSA membership's experience with disaster management.
- Review the historical lessons learned from the Oklahoma Federal Building bombing.
- Review the issues surrounding large scale evacuation.
- Introduce to the membership a scientific method of approaching disaster situations.

[Instructors]
Dennis Amundson, M.D.
Balboa Naval Hospital San Diego, CA, USA

Christopher P. Coppola, M.D.
Wilford Hall Air Force Medical Center, San Antonio, TX, USA

David W. Tuggle, M.D.
Univ. of Oklahoma Health Science Center, Oklahoma City, OK, USA

Jeffrey S. Upperman, M.D.
Children's Hospital of Los Angeles, Los Angeles, CA, USA

Raffi Udassain, M.D.
Hadassah Medical Center, Hebrew Univ., Jerusalem, Israel

[Program]
Update from the APSA Disaster Management Survey
Jeffrey S. Upperman, M.D.

The Oklahoma City Bombing: and Killer Tornados
David W. Tuggle, M.D.

Large Scale Evacuation
Christopher P. Coppola, M.D.

Israel: Lessons Taught in Wars and Suicide/Terror Attacks
Raffi Udassain, M.D.

The Science Behind Disaster Management
Dennis Amundson, M.D.

Underlining denotes the author scheduled to present at the meeting.

4:00 p.m. – 5:30 p.m.	Poster Presentations: Authors in Attendance	
4:00 p.m. – 4:45 p.m.	Poster Session 1: Trauma/ Critical Care/Oncology	*Mediterranean Salon 2*

[Moderator]
Mary L. Brandt, M.D.

[Educational Objectives]
Upon completion of this session the participants will recognize:

- The effect of "at risk" behaviors on morbidity and mortality following trauma in the pediatric age group.
- Recent insights into the molecular events associated with tumor growth and differentiation.
- Possible applications for sentinel lymph node biopsies and proto-oncogene testing in pediatric patients.

P1 ATV-RELATED INJURIES IN CHILDREN: HELMETS ARE NOT ENOUGH
Ashley Humphries, M.D.[1], Mike Honigberg[2], Jeff Izant[2], Martin Eichelberger, M.D.[2], Cynthia A. Gingalewski, M.D.[2]
[1]Bethesda Naval Medical Center, Bethesda, MD, USA, [2]Children's National Medical Center, Washington, DC, USA.

P2 ALARMING TRENDS IN THE IMPROPER USE OF MOTOR-VEHICLE RESTRAINTS IN CHILDREN
Shawn J. Rangel, M.D., Colin Martin, Rebeccah L. Brown, M.D., Victor F. Garcia, M.D., Richard A. Falcone, Jr., M.D.
Cincinnati Children's Hospital, Cincinnati, OH, USA.

P3 DRUG AND ALCOHOL USE AMONG ADOLESCENT BLUNT TRAUMA VICTIMS
John M. Draus, Jr., M.D., Ariel P. Santos, M.D., MPH, Glen A. Franklin, M.D., David S. Foley, M.D.
Univ. of Louisville School of Medicine, Louisville, KY, USA.

P4 DO PEDIATRIC TRAUMA VICTIMS HAVE REDUCED MORTALITY RATES WHEN TREATED IN DESIGNATED TRAUMA CENTERS?
Joseph J. Tepas, III, M.D.[1], Etienne E. Pracht, Ph.D.[2], Barbara L. Orban, Ph.D.[2], Pamela Pieper, MSN, ARNP[3], Lisa Simpson, MB, BCh, MPH[4], Lewis M. Flint, M.D.[5]
[1]Univ. of Florida College of Medicine, Jacksonville, FL, USA, [2]Univ. of South Florida College of Public Health, Tampa, FL, USA, [3]Univ. of Florida College of Nursing, Jacksonville, FL, USA, [4]Univ. of South Florida College of Public Health, Tampa, FL, USA, [5]Univ. of South Florida College of Medicine, Tampa, FL, USA.

P5 APOPTOSIS VIA THE P38 PATHWAY IS DIRECTED THROUGH THE P75 RECEPTOR IN THE NGF TRANSFECTED SK-N-SH CELL LINE
Mary Beth Madonna, M.D., Rashmi Kabre, M.D., Yi Yong Qiu, M.D.
Children's Memorial Hospital, Chicago, IL, USA.

Underlining denotes the author scheduled to present at the meeting.

P6 OVARIAN SOMATIC STEM CELLS, OVARIAN CANCER, AND THE ROLE OF MULLERIAN INHIBITING SUBSTANCE
Paul P. Szotek, M.D.[1], Henry Chang, M.D.[1], Rafael Pieretti-Vanmarcke, M.D.[1], Kristen Brennand, Ph.D.[2], Xainlin Li[2], Matthew Wallenstein, BS[2], David Dombkowski[1], Frederic Preffer, M.D.[1], Douglas Melton, Ph.D.[1], David T. MacLaughlin, Ph.D.[1], Jose Teixeira, Ph.D.[1], Patricia K. Donahoe, M.D.[1]
[1]Massachusetts General Hospital/Harvard Medical School, Boston, MA, USA, [2]Harvard Univ., Boston, MA, USA.

P7 IMMUNOHISTOCHEMICAL SURVEY OF PEDIATRIC LIVER CANCER
Daniel N. Rutigliano, D.O., Hikmat Al-Ahmadie, M.D., Mark L. Kayton, M.D., William L. Gerald, M.D., Michael P. La Quaglia, M.D.
Memorial Sloan-Kettering Cancer Center, New York, NY, USA.

P8 COMBINED CYCLOOXYGENASE-2 AND VEGF INHIBITION DISRUPTS TUMOR VASCULAR ARCHITECTURE THROUGH DIFFERENTIAL EFFECTS ON VASCULAR MURAL CELLS
Jason C. Fisher, M.D., Jianzhong Huang, M.D., Rashida Jefferson, M.D., Darrell Yamashiro, M.D., Ph.D., Jessica J. Kandel, M.D.
Morgan Stanley Children's Hospital of New York Presbyterian, Columbia Univ. Medical Center, New York, NY, USA.

P9 EXPERIENCE WITH 30 SENTINEL LYMPH NODE BIOPSIES FOR PEDIATRIC CARCINOMAS AND SARCOMAS
Mark L. Kayton, M.D., Ruby Delgado, M.D., Klaus Busam, M.D., Hiram S. Cody, III, M.D., Edward A. Athanasian, M.D., Daniel Coit, M.D., Michael P. La Quaglia, M.D.
Memorial Sloan-Kettering Cancer Center, New York, NY, USA.

P10 RET PROTO-ONCOGENE TESTING IN INFANTS PRESENTING WITH HIRSCHSPRUNG DISEASE IDENTIFIES 2 NEW MEN 2A KINDRED
Elizabeth A. Fialkowski, M.D.[1], Mary K. DeBenedetti, RN[1], Jeffrey F. Moley, M.D.[1], Bert E. Bachrach, M.D.[2]
[1]Washington Univ. School of Medicine, St. Louis, MO, USA, [2]Univ. of Missouri Children's Hospital, Columbia, MO, USA.

4:00 p.m. – 4:45 p.m. Poster Session 2: Gastrointestinal Basic and Clinical *Mediterranean Salon 1*

[Moderator]
Kerilyn K. Nobuhara, M.D.

[Educational Objectives]
Participants in this session will be able to:
- Recognize molecular events involved in intestinal cellular growth, differentiation and survival.
- Describe alterations that are associated with several common pediatric gastrointestinal and hepatobiliary diseases.
- Cite recent observations regarding the treatment of morbidly obese adolescents.

Underlining denotes the author scheduled to present at the meeting.

P11 ABNORMAL DISTRIBUTION AND MATURATION OF INTERSTITIAL CELLS OF CAJAL IN GASTROSCHISIS MICE LACKING AORTIC CARBOXYPEPTIDASE-LIKE PROTEIN MIMICS THE HUMAN CONDITION
Enrico Danzer, M.D.[1], Shincy Schegu[1], Matthew D. Layne, Ph.D.[2], Portia Kreiger, M.D.[1], Antoneta Radu[1], N. Scott Adzick, M.D.[1], Alan W. Flake, M.D.[1]
[1]The Children's Hospital of Philadelphia, Philadelphia, PA, USA, [2]Brigham and Women's Hospital, Boston, MA, USA.

P12 THE CYTOPLASMIC DOMAIN OF VE CADHERIN REGULATES ENDOTHELIAL JUNCTIONAL MORPHOLOGY
Ian C. Mitchell, M.D., Dorit Nahari, Ph.D., Zijuan Liu, Ph.D., Christine Ingle, B.Sc., Laurie B. Task, B.Sc., Lance S. Terada, Ph.D., Fiemu Nwariaku, M.D., FACS.
Univ. Texas Southwestern Medical Center, Dallas, TX, USA.

P13 TOLL-LIKE RECEPTOR 4 ACTIVATION REGULATES PHOSPHORYLATION OF FOCAL ADHESION KINASE AND BARRIER INTEGRITY CONTRIBUTING TO THE PATHOGENESIS OF NEC
Cynthia L. Leaphart, M.D., Jun Li, Theresa Dubowski, David J. Hackam, M.D., Ph.D.
Children's Hospital of Pittsburgh, Pittsburgh, PA, USA.

P14 FGF10/FGFR2B SIGNALING PROMOTES GOBLET CELL DIFFERENTIATION IN ADULT MURINE ILEAL EPITHELIUM
Cindy C. Tai, M.D., Jennifer L. Curtis, M.D., Frederic G. Sala, MS, Henri R. Ford, M.D., Kasper S. Wang, M.D., Saverio Bellusci, Ph.D.
Children's Hospital Los Angeles, Los Angeles, CA, USA.

P15 MOLECULAR MECHANISMS CONTRIBUTING TO GLUTAMINE-INDUCED INTESTINAL CELL SURVIVAL
Shawn D. Larson, Dai H. Chung, B. Mark Evers.
The Univ. of Texas Medical Branch, Galveston, TX, USA.

P16 INTEGRIN ALPHA-V, BETA-6 EXPRESSION IS UPREGULATED IN THE PROLIFERATING BILE DUCTS OF CHILDREN WITH BILIARY ATRESIA
Danielle Patterson[1], Shelia Violette, Ph.D.[2], Paul Weinreb, Ph.D.[2], Michael Lewis, M.D.[3], Margaret S. Magid, M.D.[3], M. Alba Greco, M.D.[1], Evan P. Nadler, M.D.[1]
[1]New York Univ., New York, NY, USA, [2]Biogen Idec, Cambridge, MA, USA, [3]Mt. Sinai School of Medicine, New York, NY, USA.

P17 HB-EGF KNOCKOUT MICE HAVE DELAYED ANGIOGENESIS AFTER INTESTINAL ISCHEMIA/REPERFUSION INJURY
Osama N. El-Assal, M.D., Ph.D., Andrei Radulescu, M.D., Ph.D., Heather N. Paddock, M.D., Gail E. Besner, M.D.
Children's Hospital, Children's Research Institute, Columbus, OH, USA.

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P18 BODY COMPOSITION AND METABOLIC CHANGES ASSOCIATED WITH MASSIVE INTESTINAL RESECTION
Niramol Tantemsapya, Jareen Meinzen-Derr, Brad W. Warner, M.D.
Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA.

P19 URIC ACID PREDICTS LIVER INFLAMMATION IN OBESE ADOLESCENTS
Megan K. Fuller, B.S., Molly S. Bray, Ph.D., Milton J. Finegold, M.D., Daniel I. Feig, M.D., Mary L. Brandt, M.D., Michael A. Helmrath, M.D.
Baylor College of Medicine, Houston, TX, USA.

P20 A RATIONAL DEFINITION OF SUPEROBESITY FOR ADOLESCENT BARIATRIC PATIENTS: A BMI> 45 kg/m^2?
Barney E. Dillard, III, Justin Hering, Piero M. Fisichella, Mark Holterman, M.D., Allen Browne, M.D., Carlos Galvani, Nancy Browne, Santiago Horgan, Ai-Xuan L. Holterman, M.D.
Univ. of Illinois at Chicago, Chicago, IL, USA.

P21 AN UPDATE ON 66 U.S. OBESE PEDIATRIC PATIENTS TREATED WITH LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING
Evan P. Nadler, M.D., Heekoung A. Youn, RN, Christine J. Ren, M.D., George A. Fielding, M.D.
New York Univ., New York, NY, USA.

4:45 p.m. – 5:30 p.m. Poster Session 3: Outcomes Research/Fetal and Neonatal Diseases *Mediterranean Salon 1*

[Moderator]
David L. Sigalet, M.D., Ph.D, FRCS(c), FACS

[Educational Objectives]
Participants in this session will be updated on:
- Outcomes associated with new and standard approaches to managing common pediatric surgical problems.
- Positive and negative impacts of new operative, diagnostic and management strategies for treating pediatric surgical diseases.
- Recent observations regarding the development and diagnosis of surgical diseases of the fetus.

P22 OUTCOME AFTER CAUSTIC INGESTION IN CHILDREN
Line G. Johansen, BA[1], Mark McOmber, M.D.[2], Megan E. Fitch, BS[3], Mark Gilger, M.D.[2], Michael A. Helmrath, M.D.[3], Mary L. Brandt, M.D.[3]
[1]Univ. of Miami Miller School of Medicine, Miami, FL, USA, [2]Baylor College of Medicine, Dept of Pediatrics, Houston, TX, USA, [3]Baylor College of Medicine, Houston, TX, USA.

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P23 GLOBAL IMPACT OF ANTENATAL DIAGNOSIS OF ANOMALIES ON OUTCOMES AND HEALTH CARE SYSTEM: ANALYSIS OF PROSPECTIVE POPULATION-BASED FETAL ALERT NETWORK (FAN) DATABASE
The Fetal Alert Network, Peter Kim, M.D.
Hospital for Sick Children, Toronto, ON, Canada.

P24 IMPROVED SURVIVAL IN A MULTIDISCIPLINARY SHORT BOWEL SYNDROME PROGRAM
Biren P. Modi, M.D.[1], Monica Langer, M.D.[1], Stephen D. Waterford, MS[1], Julie Iglesias, PNP[1], Debora Duro, M.D.[2], Christopher Duggan, M.D., MPH[2], Tom Jaksic, M.D., Ph.D.[1]
[1]Center for Advanced Intestinal Rehabilitation (CAIR) and Department of Surgery, Children's Hospital Boston and Harvard Medical School, Boston, MA, USA, [2]Center for Advanced Intestinal Rehabilitation (CAIR) and Division of Gastroenterology and Nutrition, Children's Hospital Boston and Harvard Medical School, Boston, MA, USA.

P25 RISK FACTORS FOR NEGATIVE APPENDECTOMY IN CHILDREN: BASIS FOR THE ESTABLISHMENT OF A CLINICAL PATHWAY IN THE DIAGNOSIS OF PEDIATRIC APPENDICITIS
Pascal Rheaume[1], Pascale Prasil[1], Guillaume Boiteau[1], Ghislain Brousseau[1], Ari-Nareg Meguerditchian.[2]
[1]Centre Hospitalier Univ. de Quebec, Quebec City, PQ, Canada, [2]Roswell Park Cancer Institute, Buffalo, NY, USA.

P26 RESIDENCY TRAINING IN PYLOROMYOTOMY: A SURVEY OF 331 PEDIATRIC SURGEONS
Graham H. Cosper, M.D., Rema Menon, Ph.D., Mary Sue Hamann, Ph.D., Don K. Nakayama, M.D., M.B.A.
Coastal Area Health Education Center, New Hanover Regional Medical Center, Univ. of North Carolina School of Medicine, Wilmington, NC, USA.

P27 LIVER TRANSPLANTATION FOR PULMONARY COMPLICATIONS OF PEDIATRIC END-STAGE LIVER DISEASE
Corey W. Iqbal, M.D., Tuan H. Pham, M.D., Ph.D., Angela M. Hanna, M.D., Michael J. Krowka, Michael B. Ishitani, M.D.
Mayo Clinic Rochester, Rochester, MN, USA.

P28 INTERMEDIATE TERM PATENCY OF UPPER ARM ARTERIOVENOUS FISTULAE FOR HEMODIALYSIS ACCESS IN CHILDREN
Ramanath N. Haricharan, MBBS, MPH, Charles J. Aprahamian, M.D., Traci L. Morgan, RN,BSN, Carroll M. Harmon, M.D., Ph.D., Douglas C. Barnhart, M.D., MSPH.
Univ. of Alabama at Birmingham, Birmingham, AL, USA.

P29 PROTEOMIC APPROACH TO FETAL DISEASES
Raul A. Cortes, M.D., Olga Miroshnychenko, Ph.D., Alan Jew, Susan Fisher, Ph.D., Hanmin Lee, M.D.
Univ. of California, San Francisco, San Francisco, CA, USA.

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P30 C-MET IS UP-REGULATED IN A RABBIT MODEL OF GASTROSCHISIS
Matthew S. Clifton, M.D., Jacob T. Stephenson, Prema S. Idumalla, MS, Edgar Sy, M.D., Shinsuke Ohashi, M.D., Susmita Chatterjee, SRA-III, Erich J. Grethel, M.D., Raul A. Cortes, M.D., Denise Ventura, M.D., Amy J. Wagner, Kerilyn K. Nobuhara, M.D.
Univ. of California, San Francisco, San Francisco, CA, USA.

P31 POSTOPERATIVE FOLLOW-UP: IS A PHONE CALL ENOUGH?
Marcene R. McVay, M.D., Karen R. Kelley, RN, Donna L. Mathews, RN, Evan R. Kokoska, M.D., Richard J. Jackson, M.D., Samuel D. Smith, M.D.
Arkansas Children's Hospital, Little Rock, AR, USA.

P32 NITROFEN INDUCES A POTENT CYTOXICITY INDEPENDENT OF RETINOIC ACID SIGNALING
David E. Kling, Ph.D., Amanda J. Cavicchio, B.S., Christina A. Sollinger, B.S., Thomas Bernard Kinane, M.D., Patricia K. Donahoe, M.D., Jay J. Schnitzer, M.D., Ph.D.
Massachusetts General Hospital, Boston, MA, USA.

4:45 p.m. – 5:30 p.m. Poster Session 4: Surgical Innovation *Mediterranean Salon 2*

[Moderator]
Robert E. Kelly, Jr., M.D.

[Educational Objectives]
After attending this session, participants will able to:
- Cite recent developments in applying new approaches to treating and diagnosing a variety of common pediatric surgical problems.
- Identify several potential benefits and drawbacks of a number of minimally invasive surgical procedures.
- Define how diagnostic studies have been used to justify and to predict successful treatment of chest wall deformities.

P33 LAPAROSCOPIC PYLOROMYOTOMY: EFFECT OF RESIDENT TRAINING ON COMPLICATIONS
Ramanath N. Haricharan, MBBS, MPH, Charles J. Aprahamian, M.D., Ahmet Celik, M.D., Carroll M. Harmon, M.D., Ph.D., Keith E. Georgeson, M.D., Douglas C. Barnhart, M.D., MSPH.
Univ. of Alabama at Birmingham, Birmingham, AL, USA.

P34 THORACOSCOPIC VERSUS OPEN RESECTION OF CONGENITAL CYSTIC ADENOMATOID MALFORMATIONS OF THE LUNG
Lan T. Vu, M.D., Diana Farmer, M.D., Michael Harrison, M.D., Kerilyn Nobuhara, M.D., Doug Miniati, M.D., Hanmin Lee, M.D.
Univ. of California, San Francisco, San Francisco, CA, USA.

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P35 LAPAROSCOPIC NISSEN FUNDOPLICATION MAINTAINS PULMONARY FUNCTION IN PATIENTS WITH CYSTIC FIBROSIS
Sean J. Barnett, MS, M.D., Robert D. Acton, M.D., Carlos Milla, M.D., Warren Regelmann, M.D., Daniel A. Saltzmann, M.D., Ph.D.
Univ. of Minnesota, Minneapolis, MN, USA.

P36 FURTHER EXPERIENCE WITH INJECTION OF MUSCLE PRECURSORS IN THE GASTROESOPHAGEAL JUNCTION
Francesco Fascetti Leon, M.D.[1], Alberto Malerba, Ph.D.[1], Luisa Boldrin, Ph.D.[1], Libero Vitiello, Ph.D.[2], Enrico Talenti, M.D.[3], Giovanni Franco Zanon, M.D.,Prof[4], Pier Giorgio Gamba, M.D.[4], Agostino Pierro, Prof[1], Paolo De Coppi, M.D., Ph.D.[1]
[1]Institute of Child Health-Surgery Unit, Great Ormond Street Hospital for Children, London, United Kingdom, [2]Gene Transfer Laboratory, Department of Biology, Padova, Italy, [3]Institute of Radiology Az. Ospedaliera, Padova, Italy, [4]Pediatric Surgery Department, Padova, Italy.

P37 MINIMALLY INVASIVE CLOSURE OF PEDIATRIC UMBILICAL HERNIAS
Alexander Dzakovic, M.D., Neil R. Feins, M.D.
Children's Hospital Boston, Boston, MA, USA.

P38 INTRASPHINCTERIC INJECTION OF BOTULINUM TOXIN FOR THE TREATMENT OF REFRACTORY CONSTIPATION IN CHILDREN WITH ANAL ACHALASIA
Allan M. Goldstein, M.D., Katayun Irani, M.D., Daniel P. Doody, M.D., Leonel Rodriguez, M.D.
Massachusetts General Hospital, Boston, MA, USA.

P39 COMPRESSIVE ORTHOTIC BRACING IN PECTUS CARINATUM: THE USE OF RADIOGRAPHIC MARKERS TO PREDICT SUCCESS
Jacob T. Stephenson, M.D., Jeffrey J. Du Bois, M.D.
David Grant Medical Center, Travis AFB and Kaiser Permanente Health System, Sacramento, CA, USA.

P40 CXR AS PRIMARY MODALITY FOR PRE-OPERATIVE IMAGING OF PECTUS EXCAVATUM
Claudia Mueller, M.D., Ph.D., Sarah Bouchard, Dickens Saint-Vil, M.D., Ph.D.
St. Justine Hospital, Montreal, PQ, Canada.

P41 REAL TIME DIAGNOSIS OF NEUROBLASTOMA AND GANGLIONEUROMA USING RAMAN SPECTROSCOPY
Raja Rabah, M.D.[1], Gulay K. Serhatkulu[2], Rachel Weber[2], Alex Cao[2], Abhilash Pandya[2], Ratna Naik[2], Gregory Auner[2], Janet Poulik[1], Michael Klein, M.D.[1]
[1]Wayne State Univ. and Children's Hospital of Michigan, Detroit, MI, USA, [2]Wayne State Univ., Detroit, MI, USA.

P42 MURINE BONE MARROW STROMAL PROGENITOR CELLS ELICIT AN *IN VIVO* CELLULAR AND HUMORAL ALLOIMMUNE RESPONSE
Andrea Badillo, M.D., Kirstin Beggs, BS, Elisabeth Javazon, Ph.D., Alan Flake, M.D.
Children's Hospital of Philadelphia, Philadelphia, PA, USA.

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Thursday, May 24 (Continued)

5:30 p.m. – 6:30 p.m.	Exhibit set-up	*Mediterranean Foyer*
6:30 p.m. – 8:30 p.m.	Welcome Reception	*Valencia Lawn*

Friday, May 25

6:00 a.m. – 7:30 a.m.	Annual Fun Run	*Citron Restaurant Entrance—jogging path (meeting place)*
6:30 a.m. – 10:00 a.m.	Poster set-up	*Mediterranean Salon 1 Mediterranean Salon 2*
6:30 a.m. – 7:30 a.m.	Committee meetings	*Cordova 1, 2, 3, 5, 6 Del Lago 1, 2*
6:30 a.m. – 1:00 p.m.	Registration open	*Mediterranean Foyer*
6:45 a.m. – 7:30 a.m.	Continental breakfast in the exhibit area	*Mediterranean Foyer*
6:45 a.m. – Noon	Exhibits open for viewing	*Mediterranean Foyer*
7:30 a.m. – 9:00 a.m.	Welcome/Scientific Session 1: General Pediatric Surgery and Nutrition	*Mediterranean Salons 4 & 5*

[Moderators]
Mary L. Brandt, M.D.
Daniel H. Teitelbaum, M.D.

[Educational Objectives]
Following this session, attendees will:

- Be able to define long term effects of surgery for less common pediatric surgical processes; including congenital adrenal hyperplasia and portal hypertension.
- Recognize complications associated with surgical disorders including abdominal wall defects, inguinal hernias and factors contributing to surgical adhesions and perioperative infections.
- Be able to define various approaches to feed neonates and appreciate potential approaches to avoid parenteral nutrition associated liver disease.

1 THE ROLE OF PERIOPERATIVE ANTIBIOTICS IN NEONATAL SURGICAL SITE INFECTIONS (3 MINUTE)
Lan T. Vu, M.D., Diana Farmer, M.D., Michael Harrison, M.D., Kerilyn Nobuhara, M.D., Douglas Miniati, M.D., Hanmin Lee, M.D.
Univ. of California, San Francisco, San Francisco, CA, USA.

2 FORMULA FORTIFIED WITH LIVE PROBIOTIC CULTURE REDUCES PULMONARY AND GASTROINTESTINAL BACTERIAL COLONIZATION AND TRANSLOCATION IN A NEWBORN ANIMAL MODEL (3 MINUTE)
Marcene R. McVay, M.D., Cristiano Boneti, M.D., Christine M. Habib, M.D., Jennifer E. Keller, M.D., Evan R. Kokoska, M.D., Richard J. Jackson, M.D., Samuel D. Smith, M.D.
Univ. of Arkansas for Medical Sciences, Arkansas Children's Hospital, Little Rock, AR, USA.

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3 PARENTERAL NUTRITION-ASSOCIATED LIVER DISEASE AND OMEGA-3 LIPID EMULSIONS: PRELIMINARY FINDINGS ON SAFETY AND EFFICACY (6 MINUTE)
Sang Lee, M.D., Kathleen M. Gura, Pharm.D., Danielle A. Arsenault, B.S., Sendia Kim, M.D., Robbert A. M. Strijbosch, Drs., Biren P. Modi, M.D., Suzanne Lopes, R.N., Clarissa Valim, M.D., Sc.D., Christopher P. Duggan, M.D., Mark Puder, M.D., Ph.D.
Children's Hospital Boston, Boston, MA, USA.

4 ADHESIONS FOLLOWING LOWER ABDOMINAL SURGERY IN CHILDREN (6 MINUTE)
H. W. Grant[1], M. C. Parker[2], M. S. Wilson[2], D. Menzies[2], G. Sunderland[2], J. N. Thompson[2], D. N. Clark[3], A. D. Knight[2], A. M. Crowe[2], H. Ellis.[2]
[1]John Radcliffe Hospital, Oxford, United Kingdom, [2]SCAR Panel, London, United Kingdom, [3]NHS Information Services, Scotland, Glasgow, United Kingdom.

5 RECENT TRENDS IN THE EXPERIENCE OF PEDIATRIC SURGEONS WITH INFANT INDEX CASES (3 MINUTE)
Xiaonan Sun, BA, Thomas V. Whalen, M.D., Randall S. Burd, M.D., Ph.D.
UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ, USA.

6 CLOSURE OF GIANT OMPHALOCELES BY THE ABDOMINAL WALL COMPONENTS SEPARATION TECHNIQUE (3 MINUTE)
Ivo de Blaauw, M.D., Ph.D., Floortje C. van Eijck, M.D., Paul N. Rieu, M.D., Ph.D., Marc H. Wijnen, M.D., Ph.D., Frans H. van der Staak, M.D., Ph.D., Rene S. V. M. Severijnen, M.D., Ph.D., Rene M. H. Wijnen, M.D., Ph.D.
Univ. Medical Centre St. Radboud, Nijmegen, The Netherlands.

7 CAPSNET: A POPULATION-BASED PEDIATRIC SURGICAL NETWORK AND DATABASE FOR ANALYZING INCIDENCE, TREATMENT AND OUTCOME OF SURGICAL BIRTH DEFECTS: THE FIRST 90 CASES OF GASTROSCHISIS (3 MINUTE)
Erik D. Skarsgard, M.D.[1], Sarah Bouchard, M.D.[2], Peter Kim, M.D.[3], Jean-Martin Laberge, M.D.[7], Shoo K. Lee, M.D.[4], Douglas McMillan, M.D.[5], Peter von Dadelszen, M.D.[6], Natalie Yanchar, M.D.[5]
[1]BC Children's Hospital, Vancouver, BC, Canada, [2]St. Justine Hospital, Montreal, PQ, Canada, [3]Hospital For Sick Children, Toronto, ON, Canada, [4]Univ. of Alberta, Vancouver, AB, Canada, [5]IWK Children's Health Centre, Halifax, NS, Canada, [6]BC Women's Hospital, Vancouver, BC, Canada, [7]Montreal Children's Hospital, Montreal, QC, Canada.

8 PREVIOUS PORTAL HYPERTENSION SURGERY NEGATIVELY AFFECTS RESULTS OF MESENTERIC TO LEFT PORTAL VEIN BYPASS (3 MINUTE)
Anthony Chin, M.D., Fiona Thow, Riccardo Superina, M.D.
Children's Memorial Hospital, Chicago, IL, USA.

9 LAPAROSCOPIC INGUINAL HERNIA REPAIR DOES NOT IMPAIR TESTICULAR PERFUSION (3 MINUTE)
Felix Schier, Salmai Turial, Thomas Hückstädt, Ullrich Klein.
Univ. Medical Center, Mainz, Germany.

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10 LONGTERM PSYCHOLOGICAL OUTCOMES OF FEMALE CONGENITAL ADRENAL HYPERPLASIA PATIENTS (3 MINUTE)
Daniel H. Teitelbaum, M.D., Shelly Scheier, Ph.D., Jennifer Maschin, BS, Ariel U. Spencer, M.D., Robert A. Drongowski, MS, Arnold G. Coran, M.D.
Univ. of Michigan, Ann Arbor, MI, USA.

9:00 a.m. – 10:00 a.m.	Robert E. Gross Lecture: Francisco Cigarroa, M.D.	*Mediterranean Salons 4 & 5*
10:00 a.m. – 10:30 a.m.	Refreshment break	*Mediterranean Foyer*
10:30 a.m. – 11:45 a.m.	Scientific Session 2: Cancer/ Oncology Basic and Clinical	*Mediterranean Salons 4 & 5*

[Moderators]
Stephen J. Shochat, M.D.
Daniel von Allmen, M.D.

[Educational Objectives]
This session will help attendees:
- Gain a better understanding of the technique and results of sentinel lymph node biopsies in children with melanoma.
- Develop a knowledge base for some of the more novel experimental modalities for neuroblastoma.
- Cite some of the various approaches to benign neoplasms of vascular or lymphatic origin.

11 MULTI-MODAL MANAGEMENT OF MASSIVE HEPATIC HEMANGIOMA — IMPACT ON TRANSPLANT AVOIDANCE (3 MINUTE)
Ivan R. Diamond, M.D., Haley Draper, Michael Temple, M.D., Sanjay Mahant, M.D., Philip John, M.D., Vicky Ng, M.D., Annie Fecteau, M.D.
Hospital for Sick Children, Toronto, ON, Canada.

12 DEFINITIVE PERCUTANEOUS TREATMENT OF LYMPHATIC MALFORMATIONS OF THE TRUNK AND EXTREMITIES (3 MINUTE)
William E. Shiels, II, D.O., Donna A. Caniano, M.D., Brian D. Kenney, M.D., Gail E. Besner, M.D.
Children's Hospital, Columbus, OH, USA.

13 TECHNIQUES AND FINDINGS IN 47 PEDIATRIC SENTINEL LYMPH NODE BIOPSIES FOR MELANOMA AND ATYPICAL MELANOCYTIC/SPITZ LESIONS (3 MINUTE)
Mark L. Kayton, M.D.[1], Ruby Delgado, M.D.[1], Klaus Busam, M.D.[1], Shuang Wang, Ph.D.[2], Mary Sue Brady, M.D.[1], Dennis Kraus, M.D.[1], Daniel Coit, M.D.[1], Michael P. La Quaglia, M.D.[1]
[1]Memorial Sloan-Kettering Cancer Center, New York, NY, USA, [2]Mailman School of Public Health, Columbia Univ., New York, NY, USA.

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Friday, May 25 (Continued)

14 RETROPERITONEAL TERATOMAS — POTENTIAL FOR SURGICAL MISADVENTURE (6 MINUTE)
Niall M. Jones, Edward M. Kiely.
Great Ormond Street Hospital for Children, London, United Kingdom.

15 PHOSPHATIDLYSERINE EXPRESSION BY NEUROBLASTOMA PROMOTES TUMOR GROWTH *IN VIVO* (6 MINUTE)
Kara Doffek, B.S., Xiaocia Yan, Ph.D., Michael Phillips, B.S., Bryon Johnson, Ph.D., Sonia Sugg, M.D., Joel Shilyansky, M.D.
Medical College of Wisconsin, Milwaukee, WI, USA.

16 THE COMBINATION OF INTERFERON-BETA AND TRICHOSTATIN A INHIBIT NEUROBLASTOMA GROWTH *IN VITRO* AND IN A MURINE MODEL OF NEUROBLASTOMA (3 MINUTE)
John B. Hamner, M.D., Aaron Cutshaw, MS, Thomas Sims, M.D., Cathy Ng, Andrew M. Davidoff, M.D.
St. Jude Children's Research Hospital, Memphis, TN, USA.

11:45 a.m. – 12:45 p.m.	Welcome New Members/ Presidential Address: Pat Donahoe, M.D.	*Mediterranean Salons 4 & 5*
1:30 p.m.– 3:00 p.m.	Benji Brooks Meeting and Luncheon	*Del Lago 1*
2:00 p.m.	Golf Tournament	*The Ritz Carlton Golf Club*
2:00 p.m.	Tennis Tournament	*Tennis Courts*
5:00 p.m. – 6:30 p.m.	New Member Reception	*President's Suite*

Saturday, May 26

6:30 a.m. – 8:00 a.m.	Member business meeting and breakfast	*Mediterranean Salons 4 & 5*
6:30 a.m. – 1:00 p.m.	Registration open	*Mediterranean Foyer*
7:00 a.m. – 12:30 p.m.	Posters and Exhibits open for viewing	*Mediterranean Salon 1* *Mediterranean Salon 2*
7:00 a.m. – 8:00 a.m.	Continental breakfast (nonmembers)	*Mediterranean Foyer*
8:00 a.m. – 10:00 a.m.	Scientific Session 3: Gastroenterology	*Mediterranean Salons 4 & 5*

[Moderators]
David L. Sigalet, M.D., Ph.D., FRCS (c), FACS
John K. Gosche, M.D., Ph.D.

[Educational Objectives]
This session will enable attendees to:
- Appraise alternative approaches to the diagnosis and management of common GI processes including pyloric stenosis, Hirschsprung's disease and biliary diseases.

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- Recognize various complications associated with the postoperative course of patients with Hirschsprung's disease and ulcerative colitis.
- Appreciate the complications associated with various common GI processes including ulcerative colitis, imperforate anus and cloacal exstrophy.
- Understand newer or experimental approaches to the management of patients with necrotizing enterocolitis.

17 EFFICACY OF LAPAROSCOPIC CHOLECYSTECTOMY FOR BILIARY DYSKINESIA IN THE PEDIATRIC POPULATION (3 MINUTE)
Sabina Saddiqui, M.D.[1], Daniel Alterman, M.D.[1], Scott Newbrough, M.D.[1], Alan Anderson, M.D.[2], Alfred P. Kennedy, Jr., M.D.[2]
[1]Univ. of Tennessee, Knoxville, TN, USA, [2]East Tennessee Children's Hospital, Knoxville, TN, USA.

18 SMALLER SCARS — WHAT'S THE BIG DEAL: A SURVEY OF THE PERCEIVED VALUE OF LAPAROSCOPIC PYLOROMYOTOMY (3 MINUTE)
Ramanath N. Haricharan, MBBS, MPH, Charles J. Aprahamian, M.D., Traci L. Morgan, RN, BSN, Carroll M. Harmon, M.D., Ph.D., Keith E. Georgeson, M.D., Douglas C. Barnhart, M.D., MSPH.
Univ. of Alabama Birmingham, Birmingham, AL, USA.

19 ULTRASOUND AS A DIAGNOSTIC TOOL USED BY SURGEONS IN PYLORIC STENOSIS (3 MINUTE)
Cristiano Boneti, M.D., Marcene R. McVay, M.D., Evan R. Kokoska, M.D., Richard J. Jackson, M.D., Samuel D. Smith, M.D.
Arkansas Children's Hospital, Little Rock, AR, USA.

20 PERITONEAL DRAINAGE OR LAPAROTOMY IN NEONATAL BOWEL PERFORATION? A RANDOMISED CONTROLLED TRIAL (6 MINUTE)
Clare M. Rees, MBChB, MRCS[1], Simon Eaton, Ph.D.[1], A. Kate Khoo, BSc, MBBS, MRCS[1], Edward M. Kiely, FRCSI, FRCS, FRCPCH (Hon)[2], Agostino Pierro, M.D., FRCS (Engl), FRCS (Edin), FAAP (Hon).[3]
[1]Institute of Child Health, London, United Kingdom, [2]Great Ormond Street Hospital for Children NHS Trust, London, United Kingdom, [3]Institute of Child Health & Great Ormond Street Hospital for Children NHS Trust, London, United Kingdom.

21 ORALLY APPLIED POLYETHYLENE GLYCOL CO-POLYMER (PEG 15-20) AS A SURROGATE MUCIN: THE EVOLUTION OF A MUCOSAL PROTECTIVE STRATEGY AGAINST NECROTIZING ENTEROCOLITIS (3 MINUTE)
Donald C. Liu, M.D., Ph.D.[1], Loretto Glynn, M.D.[1], Adam Suchar, B.S.[1], Jonathan Kohler, M.D.[1], Richard Wu, M.D.[1], Hongjin Lee, M.D.[2], Kelly Snider[1], John Alverdy, M.D.[1]
[1]Univ. of Chicago, Chicago, IL, USA, [2]Hanyang Univ., Seoul, Republic of Korea.

Underlining denotes the author scheduled to present at the meeting.

22 MID-TERM POSTOPERATIVE CLINICO-RADIOLOGICAL ANALYSIS OF SURGERY FOR HIGH TYPE IMPERFORATE ANUS: PROSPECTIVE COMPARATIVE STUDY BETWEEN GEORGESON AND PEÑA PROCEDURES (6 MINUTE)
Chizue Ichijo, Kazuhiro Kaneyama, Tadaharu Okazaki, Yoshifumi Kato, Hiroyuki Kobayashi, Yoshihisa Kurosaki, Atsuyuki Yamataka.
Juntendo Univ. School of Medicine, Tokyo, Japan.

23 OUTCOMES IN PEDIATRIC PATIENTS UNDERGOING STRAIGHT VERSUS J-POUCH ILEOANAL ANASTOMOSIS: A MULTICENTER ANALYSIS (6 MINUTE)
Rupa Seetharamaiah, M.D.[1], Risto Rintala, M.D.[2], Mikko Pakarinen, M.D., Ph.D.[2], Antti Koivusalo, M.D., Ph.D.[2], Donald C. Liu, M.D., Ph.D.[3], Ariel Spencer, M.D.[3], James D. Geiger, M.D.[1], Ronald B. Hirschl, M.D.[1], Arnold G. Coran, M.D.[1], Daniel H. Teitelbaum, M.D.[1]
[1]C S Motts Children's Hospital, Univ. of Michigan, Ann Arbor, MI, USA, [2]Hospital for Children and Adolescents, Univ. of Helsinki, Helsinki, Finland, [3]Univ. of Chicago Comer Children's Hospital, Chicago, IL, USA.

24 EXPERIENCE WITH 12 CONSECUTIVE INTESTINAL TRANSPLANTS FOR TOTAL INTESTINAL AGANGLIONOSIS (TIA) (6 MINUTE)
Frederique Sauvat, M.D.[1], Fabio Fusaro, M.D.[1], Florence Lacaille, M.D.[1], Laurent Dupic, M.D.[1], Nathalie Bourdaud, M.D.[1], Virginie Colomb, M.D.[1], Dominique Jan, M.D.[1], Jean-Pierre Cezard, M.D.[2], Yves Aigrain, M.D.[2], Olivier Goulet, M.D.[1], Yann Revillon, M.D.[1]
[1]URF Necker-Enfants Malades, Univ. Rene Descartes Paris V, Paris, France, [2]Hopital Robert Debre, Univ. Paris VII, Paris, France.

25 EXSTROPHY-PULL-THROUGH OR PERMANENT STOMA? A REVIEW OF 53 PATIENTS (6 MINUTE)
Grace Z. Mak, M.D., Marc A. Levitt, M.D., Richard A. Falcone, M.D., Alberto Peña, M.D.
Cincinnati Children's Hospital, Cincinnati, OH, USA.

26 LAPAROSCOPIC NEAR TOTAL PANCREATECTOMY FOR DIFFUSE CONGENITAL HYPERINSULINISM OF INFANCY (3 MINUTE)
Agostino Pierro, M.D., FRCS, FAAP, Virpi Smith, Ph.D., Michael Ashworth, M.D., Khalid Hussain, M.D.
Institute of Child Health and Great Ormond Street Hospital, London, United Kingdom.

27 HOSPITAL ADMISSIONS FOR RESPIRATORY SYMPTOMS AND FAILURE TO THRIVE BEFORE AND AFTER NISSEN FUNDOPLICATION (3 MINUTE)
Steven L. Lee, M.D., Hooman Shabatian, M.D., Jin-Wen Y. Hsu, Harry Applebaum, M.D., Philip I. Haigh, M.D.
Kaiser Permanente, Los Angeles Medical Center, Los Angeles, CA, USA.

10:00 a.m. – 10:30 a.m. Refreshment break *Mediterranean Foyer*

Underlining denotes the author scheduled to present at the meeting.

10:30 a.m. – Noon Scientific Session 4: Thoracic *Mediterranean Salons 4 & 5*

[Moderators]
Alan W. Flake, M.D.
Robert E. Kelly, Jr., M.D.

[Educational Objectives]
In this session, attendees will:
- Acquire knowledge of the quality of life after pectus excavatum correction.
- Gain insight and knowledge into common problems with the management of pectus excavatum.
- Be able to describe some of the minimally invasive approaches to intrathoracic disorders in children, including lobectomy and Heller myotomy.
- Develop an appreciation for the perinatal therapeutic approach to patients with congenital diaphragmatic hernias.
- Define the experience and management of patients treated with extracorporeal membrane oxygenation.

28 MECHANISM OF BAR DISPLACEMENT AND CORRESPONDING BAR FIXATION TECHNIQUES IN NUSS REPAIR OF PECTUS EXCAVATUM (3 MINUTE)
Hyung Joo Park, Won-Jae Chung, Won-Min Jo, Jae Seung Shin, In Sung Lee, Kwang Taik Kim.
Korea Univ. Ansan Hospital, Ansan, Republic of Korea.

29 QUALITY OF LIFE AFTER BAR REMOVAL IN PATIENTS WHO HAD UNDERGONE THE NUSS PROCEDURE FOR PECTUS EXCAVATUM (3 MINUTE)
Hyun Koo Kim, Sr., M.D., Ph.D., Young Ho Choi, Sr., M.D., Ph.D., Jae Hoon Shim, Sr., M.D., Man Jong Baek, Sr., M.D., Ph.D., Young Sang Sohn, Sr., M.D., Ph.D., Hark Jei Kim, Sr., M.D., Ph.D.
Guro Hospital, Korea Univ. Medical Center, Seoul, Republic of Korea.

30 PROSPECTIVE MULTICENTER STUDY OF SURGICAL CORRECTION OF PECTUS EXCAVATUM: DESIGN, PERIOPERATIVE COMPLICATIONS, PAIN AND BASELINE PULMONARY FUNCTION FACILITATED BY INTERNET-BASED DATA COLLECTION (6 MINUTE)
Robert E. Kelly, Jr., M.D.[1], Robert C. Shamberger, M.D.[2], Robert Mellins, M.D.[3], Karen Mitchell, RN[1], Louise Lawson, Ph.D.[4], Keith T. Oldham, M.D.[5], Richard G. Azizkhan, M.D.[6], Andre Hebra, M.D.[7], Donald Nuss, MB, ChB1, Michael J. Goretsky, M.D.[1], Ronald J. Sharp, M.D.[8], George W. Holcomb, III, M.D.[8], Walton K. T. Shim, M.D.[9], Barry Hicks, M.D.[10], Lawrence Moss, M.D.[11], Annie H. Fecteau, M.D.[12], Paul M. Colombani, M.D.[13], Traci Bagley, RN, BSN[1], Alan Moskowitz, M.S.[1]
[1]Children's Hospital of the King's Daughters, Norfolk, VA, USA, [2]Children's Hospital Boston, Boston, MA, USA, [3]Children's Hospital of New York-Presbyterian, New York, NY, USA, [4]Kennesaw State Univ., Kennesaw, GA, USA, [5]Children's Hospital of Wisconsin, Milwaukee, WI, USA, [6]Children's Hospital Medical Center, Cincinnati, OH, USA, [7]Pediatric Surgical Group, St. Petersburg, FL, USA, [8]Children's Mercy Hospital, Kansas City, MO, USA, [9]Children's Surg Ltd., Honolulu, HI, USA, [10]Children's Medical Center Dallas, Dallas, TX, USA, [11]Yale Univ. School of Medicine, New Haven, CT, USA, [12]Univ. of Toronto, Toronto, ON, Canada, [13]Johns Hopkins Univ. Hospital, Baltimore, MD, USA.

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31 IS EPIDURAL ANESTHESIA THE BEST PAIN MANAGEMENT STRATEGY AFTER PECTUS EXCAVATUM REPAIR? (3 MINUTE)
Shawn D. St. Peter, M.D., Kathryn Weesner, M.D., Troy L. Spilde, M.D., Ronald J. Sharp, M.D., Susan W. Sharp, Ph.D., Daniel J. Ostlie, M.D., George W. Holcomb, III, M.D. , MBA.
Children's Mercy Hospital, Kansas City, MO, USA.

32 EXPERIENCE IN THE MANAGEMENT OF 82 NEWBORNS WITH CONGENITAL DIAPHRAGMATIC HERNIA TREATED WITH HIGH FREQUENCY OSCILLATORY VENTILATION AND DELAYED SURGERY WITHOUT THE USE OF EXTRACORPOREAL MEMBRANE OXYGENATION (3 MINUTE)
Delphine Mitanchez, M.D., Ph.D.[1], Valerie Datin-Dorriere, M.D.[2], Veronique Rousseau, M.D.[2], Elisabeth Walter-Nicolet, M.D.[1], Sophie Parat, M.D.[2], Alexandra Benachi, M.D.[2], Pierre Taupin, M.D.[2], Claire Nihoul-Fékété, M.D.[2], Philippe Hubert, M.D.[2], Yann Revillon, M.D.[2]
[1]Hopital Armand Trousseau, Paris, France, [2]Hopital Necker Enfants-Malades, Paris, France.

33 IMPROVED SHORT TERM OUTCOMES WITH THORACOSCOPIC NEONATAL CONGENITAL DIAPHRAGMATIC HERNIA (3 MINUTE)
David M. Gourlay, Thomas T. Sato, M.D., Dave Lal, M.D., Laura Cassidy, Ph.D., Marjorie J. Arca, M.D.
Children's Hospital of Wisconsin, Milwaukee, WI, USA.

34 CENTRAL VENOUS CATHETER PLACEMENT AT THE TIME OF ECMO DECANNULATION: IS IT SAFE? (3 MINUTE)
Thomas P. Rauth, M.D., B. Paul Scott, RN, Cynthia K. Thomason, RN, Randall E. Bartilson, RN, Tracy M. Hann, RN, John B. Pietsch, M.D.
Vanderbilt Univ., Nashville, TN, USA.

35 A 21-YEAR EXPERIENCE WITH GLOBAL EXTRACORPOREAL MEMBRANE OXYGENATION TRANSPORT (3 MINUTE)
Christopher P. Coppola, M.D., Karen V. Larry, Robert J. Digeronimo, Melissa M. Tyree.
Wilford Hall Medical Center, San Antonio, TX, USA.

36 FIRST DECADE'S EXPERIENCE WITH THORACOSCOPIC LOBECTOMY IN INFANTS AND CHILDREN (6 MINUTE)
Steven S. Rothenberg, M.D.
The Mother and Child Hospital atP/SL, Denver, CO, USA.

37 INTRAOPERATIVE MANOMETRY DURING LAPAROSCOPIC HELLER MYOTOMY IMPROVES OUTCOME IN PEDIATRIC ACHALASIA (3 MINUTE)
Mubeen Jafri, Maria Alonso, Ajay Kaul, John Racadio, Fredrick Ryckman, Gregory Tiao.
Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA.

Noon – 1:00 p.m.	International Guest Lecture: Claire Nihoul-Fékété, M.D.	*Mediterranean Salons 4 & 5*
12:30 p.m. – 5:00 p.m.	Exhibits dismantle	*Mediterranean Foyer*
1:00 p.m. – 1:30 p.m.	Refreshment break	*Mediterranean Foyer*

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Saturday, May 26 (Continued)

1:30 p.m. – 3:00 p.m.	Unedited Video Session: Laparoscopic Heller Myotomy with Dor Fundoplication George W. Holcomb, III, M.D., MBA	*Mediterranean Salons 4 & 5*
3:00 p.m. – 5:00 p.m.	Posters dismantle	*Mediterranean Salon 1* *Mediterranean Salon 2*
3:00 p.m. – 4:30 p.m.	COG Surgeons Meeting (open to all APSA meeting attendees)	*Mediterranean Salons 6 & 7*
6:30 p.m. – 10:30 p.m.	President's Banquet	*Mediterranean Salons 4 & 5*

Sunday, May 27

7:30 a.m. – 8:00 a.m.	Continental breakfast	*Mediterranean Foyer*
7:30 a.m. – 11:30 a.m.	Registration open	*Mediterranean Foyer*
8:00 a.m. – 8:15 a.m.	APSA Foundation Scholar: James Dunn, M.D.	*Mediterranean Salons 4 & 5*
8:15 a.m. – 9:15 a.m.	*Journal of Pediatric Surgery* Lecture: Alan W. Flake, M.D.	*Mediterranean Salons 4 & 5*
9:15 a.m. – 11:30 a.m.	Scientific Session 5: Basic Science and Fetal/Embryonic Studies; Trauma	*Mediterranean Salons 4 & 5*

[Moderators]
Alan W. Flake, M.D.
Anthony Stallion, M.D.

[Educational Objectives]
This session will allow attendees to:

- Improve their knowledge of embryonic growth, stem cells and fetal healing.
- Better understand the basic science of hematopoietic stem cells.
- Better understand the pathophysiologic basis for the formation of inflammatory processes with the gastrointestinal tract.
- Gain a better appreciation for the therapeutic and management approaches to children with blunt visceral injury to the abdomen.

38 THE EXTRACELLULAR MATRIX DEGRADATION INHIBITORS TIMP-1 AND PAI-1 ARE UPREGULATED IN EXPERIMENTAL BILIARY ATRESIA (4 MINUTE)
Danielle Patterson, Evan P. Nadler, M.D.
New York Univ., New York, NY, USA.

39 TUMOR NECROSIS FACTOR-ALPHA INDUCES INTESTINAL MITOCHONDRIAL DYSFUNCTION DURING NECROTIZING ENTEROCOLITIS (6 MINUTE)
Naira Baregamian, John Papaconstantinou, B. Mark Evers, Dai H. Chung.
Univ. of Texas Medical Branch, Galveston, TX, USA.

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40 MUCOSAL TOLL-LIKE RECEPTORS 2 AND 4 MAY INITIATE CHRONIC PROINFLAMMATORY STATE IN A TWO-HIT MODEL OF SHORT BOWEL SYNDROME AND SEPSIS (4 MINUTE)
Charles J. Aprahamian, Andrea L. Stanus, Ying-kui Yang, M.D., Ph.D., Carroll M. Harmon, M.D., Ph.D.
Univ. of Alabama Birmingham, Birmingham, AL, USA.

41 ANGIOTENSIN-CONVERTING ENZYME INHIBITOR REDUCES THE SEVERITY OF INFLAMMATION AND APOPTOSIS IN A MOUSE COLITIS MODEL (4 MINUTE)
Hiroyuki Koga, M.D., Hua Yang, M.D., Ph.D., Xiaoyi Y. Sun, M.D., Keisuke Nose, M.D., Daniel H. Teitelbaum, M.D.
Univ. of Michigan, Ann Arbor, MI, USA.

42 HEPATOCYTE SURVIVAL AND FUNCTION IN A TISSUE ENGINEERED IMPLANTABLE LIVER ASSIST DEVICE *IN VITRO* AND *IN VIVO* (4 MINUTE)
Wen-Ming Hsu, M.D.[1], Katayun Irani, M.D.[1], Amedeo Carraro, M.D.[1], Katherine Kulig, BA[1], Eleanor Pritchard, BA[2], Kimberly Bonner, BA[2], Brian Orrick, MBA[2], Kimberly Morgan, BA[1], Mohammed Kaazempur-Mofrad, Ph.D.[3], Eli Weinberg, MS[3], Jeffrey Borenstein, Ph.D.[2], Joseph Vacanti, M.D.[1]
[1]Massachusetts General Hospital, Boston, MA, USA, [2]Draper Laboratories, Cambridge, MA, USA, [3]Massachusetts Institute of Technology, Cambridge, MA, USA.

43 HAPLOIDENTICAL *IN UTERO* HEMATOPOIETIC CELL TRANSPLANTATION AND POSTNATAL MINIMALLY MYELOABLATIVE TRANSPLANTS IN A CANINE MODEL (6 MINUTE)
William H. Peranteau, M.D.[1], Todd E. Heaton, M.D.[1], Andrea T. Badillo, M.D.[1], Yuchen Gu, Ph.D.[2], Susan Volk, DVM, Ph.D.[1], Laura Tuschong[2], Thomas R. Bauer, Ph.D.[2], Mark P. Johnson, M.D.[1], Dennis D. Hickstein, M.D.[2], Alan W. Flake, M.D.[1]
[1]The Children's Hospital of Philadelphia, Philadelphia, PA, USA, [2]National Cancer Institute, Bethesda, MD, USA.

44 THE IMPACT OF SURGICAL RESECTION ON CIRCULATING HEMATOPOIETIC PROGENITOR CELLS (6 MINUTE)
Daniel N. Rutigliano, D.O.[1], Rosandra N. Kaplan, M.D.[2], Hannah K. Lederman, B.A.[3], Philip Cawkwell[3], Michael P. La Quaglia, M.D.[1], David Lyden, M.D., Ph.D.[2]
[1]Memorial Sloan-Kettering Cancer Center, New York, NY, USA, [2]Weill Cornell Medical College of Cornell Univ., Memorial Sloan-Kettering Cancer Center, New York, NY, USA, [3]Children's Blood Foundation, Weill Cornell Medical College of Cornell Univ., New York, NY, USA.

45 EMBRYONIC ESSENTIAL MYOSIN LIGHT CHAIN REGULATES FETAL LUNG DEVELOPMENT IN RATS (4 MINUTE)
Marta Santos[1], Rute Moura, Ph.D.[1], Cristina Nogueira-Silva[1], Steffen Ohlmeier, Ph.D.[2], Jorge Correia-Pinto, M.D., Ph.D.[1]
[1]Life and Health Sciences Research Institute, School of Health Sciences, Univ. of Minho, Braga, Portugal, [2]Proteomics Core Facility, Biocenter Oulu, Department of Biochemistry, Univ. of Oulu, Oulu, Finland.

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46 ANGIOPOIETIN-1 MEDIATES VASCULAR RECOVERY AND TUMOR RECURRENCE DURING POTENT VEGF BLOCKADE (6 MINUTE)
Jianzhong Huang, Jae-O Bae, Judy Tsai, Darrell Yamashiro, Jessica Kandel, M.D.
Columbia Univ. College of Physicians & Surgeons, New York, NY, USA.

47 PEDIATRIC BAYESIAN LOGISTIC INJURY SEVERITY SCORE (P-BLISS): AN ACCURATE AND GENERALIZABLE METHOD FOR PREDICTING MORTALITY IN INJURED CHILDREN (3 MINUTE)
Randall S. Burd, M.D., Ph.D.[1], Ming Ouyang, Ph.D.[1], David Madigan, Ph.D.[2]
[1]UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ, USA, [2]Rutgers Univ., Piscataway, NJ, USA.

48 RECOMBINANT FACTOR VIIa AS AN ADJUNCT IN NON OPERATIVE MANAGEMENT OF SOLID ORGAN INJURIES IN CHILDREN (3 MINUTE)
Saleem Islam, M.D., MPH[1], Laura R. Vick, M.D.[2], Rupa Seetharamiah, M.D.[2]
[1]Univ. of Florida, Gainesville, FL, USA, [2]Univ. of Mississippi, Jackson, MS, USA.

49 JUSTIFICATION FOR AN ABBREVIATED PROTOCOL IN THE MANAGEMENT OF BLUNT SPLEEN AND LIVER INJURY (3 MINUTE)
Shawn D. St. Peter, M.D., Troy L. Spilde, M.D., George W. Holcomb, III, M.D., MBA, Scott J. Keckler, M.D., Daniel J. Ostlie, M.D.
Children's Mercy Hospital, Kansas City, MO, USA.

50 PANCREATIC INJURY IN CHILDREN: GOOD OUTCOME OF NONOPERATIVE TREATMENT (3 MINUTE)
Ivo de Blaauw, M.D., Ph.D., Johan Blickman, M.D., Ph.D., Rene S. V. M. Severijnen, M.D., Ph.D., Rene M. H. Wijnen, M.D., Ph.D.
Univ. Medical Centre St. Radboud, Nijmegen, The Netherlands.

11:30 a.m. Annual Meeting Adjourns

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ABSTRACTS

Videos

V1 SERIAL TRANSVERSE ENTEROPLASTY

Avery Ching, M.D., Biren Modi, M.D., Tom Jaksic, M.D., Ph.D, Heung Bae Kim, M.D.
Children's Hospital Boston, Boston, MA, USA.

The serial transverse enteroplasty (STEP) procedure is a novel surgical option for the treatment of short bowel syndrome (SBS). By applying staplers in an alternating and overlapping fashion, the small intestine is both lengthened and tapered. Animal and clinical studies suggest that the STEP operation improves enteral nutritional tolerance and decreases bacterial overgrowth. This video features a 19 year old male with SBS due to neonatal necrotizing enterocolitis. At the time of the STEP operation he had feeding intolerance and required full parenteral nutritional support. During the STEP, there were 31 staple firings, and his small bowel length increased from 145 cm to 325 cm. The patient had a smooth post-operative recovery and is now completely transitioned to enteral nutrition. This video highlights key principles of the operation, including: maintaining proper bowel orientation, appropriate positioning of the stapling device, overlap of the stapler firings, avoidance of the mesenteric blood supply, prevention of leaks, and maintenance of adequate channel width.

Notes:

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V2 ENDOSCOPIC OBLITERATION OF A RECURRENT TRACHEOESOPHAGEAL FISTULA USING A BIOSYNTHETIC MESH

George W. Holcomb, III, M.D., MBA[1], Casey M. Calkins, M.D.[2], Shawn D. St. Peter, M.D.[1]
[1]Children's Mercy Hospital, Kansas City, MO, USA, [2]Children's Hospital of Wiscosin, Milwaukee, WI, USA.

This patient is now 2-1/2 years old and was born with esophageal atresia and tracheoesophageal fistula. She underwent thoracoscopic repair shortly after birth and recovered uneventfully until six months later when she presented with evidence of a recurrent tracheoesophageal fistula. She then underwent a right extra-pleural thoracotomy with repair of the recurrent tracheoesophageal fistula and interposition of parietal pleura between the esophageal and tracheal suture lines. Five months later, she returned with coughing symptoms and an esophagram suggested a small recurrent tracheoesophageal fistula. She was taken to the operating room for bronchoscopy at which time a fibrin glue was introduced into the depths of the fistula. This was unsuccessful in obliterating the fistula. She then underwent a repeat bronchoscopy at which time three pieces of 8-ply biosynthetic mesh were cut into a 1 x 1cm circle and introduced into the fistula tract. This technique has been successful in that she has not developed a recurrent fistula with over a one year follow-up. The salient features of the technique of introduction of the biosynthetic mesh into the tracheoesophageal fistula will be depicted.

Notes:

V3 LAPAROSCOPIC DUODENAL ATRESIA REPAIR WITH U-CLIPS

George W. Holcomb, III, M.D., MBA, Shawn D. St. Peter, M.D.
Children's Mercy Hospital, Kansas City, MO, USA.

A two day old female was diagnosed with duodenal atresia on an abdominal radiograph. She was taken to the operating room for laparoscopic duodenal atresia repair. After trying a variety of port positions, we have settled on positioning our instruments and cannulas as follows:

A 5 mm cannula is placed in the umbilicus for insertion of the telescope. Two stab incisions are made in the right lower abdomen, one for a grasping forceps, and one for a dissecting instrument and a needle driver. A transabdominal suture is placed extracorporeally around the ligament of Treitz to help elevate the liver. In addition, a 3 mm liver retractor is also introduced in the right upper abdomen.

The salient features of our approach are depicted in the video including the utilization of U-clips for performing the anastomosis. An upper GI contrast study was performed on the sixth postoperative day which showed no evidence of anastomotic complications. Oral feedings were started that day and the baby was discharged two weeks postoperatively. She has not developed any problems in the three months that she has been followed after the operation.

Notes:

V4 TOTAL INTRACORPOREAL RESECTION OF A CHOLEDOCHAL CYST WITH ROUX-EN-Y CHOLEDOCHAL JEJUNOSTOMY

Steven S. Rothenberg, M.D.
The Mother and Child Hospital at P/SL, Denver, CO, USA.

Purpose:
To show a completely intracorporeal laparoscopic technique for resection of a choledochal cyst with roux-en-y drainage

Methods:
Using a four port technique (3 5mm and 1 12mm) a five year old, 22 kg female underwent laparoscopic resection with roux-en-y choledochal jejunostomy. The bowel anastomosis was performed using running 3-0 vicryl and the biliary anastomosis with 5-0 PDS.

Results:
The procedure was completed successfully laparoscopically. Operative time was 150 minutes. there were no intra-operative or post-operative complications. An NG was left in place for 24 hours and feeds were started on post-op day two. Discharge was post-op day four. Total bilirubin is 1.1 at 18 months.

Conclusions:
Complete intra-corporeal resection and reconstruction is a safe and viable technique for children with choledochal cyst and eliminates the pain and morbidity of a large laparotomy incision.

Notes:

V5 MIXED GONADAL DYSGENESIS — REPAIR OF AN AMBIGUOUS GENITALIA

Guido Seitz, Steven W. Warmann, Joerg Fuchs.
Univ. Children's Hospital, Tuebingen, Germany.

Mixed gonadal dysgenesis is a rare case in childhood. Management of these children is difficult and a multidisciplinary decision must be made when raising these children whether as male or female individuals. We present a 6 month old child with intersexual genitalia with hypospadic micropenis, divided scrotum, cryptorchism on the left side and a dysplastic gonad on the right side. Chromosomal analysis revealed a mixed gonadal dysgenesis with a chromosomal mocaicism consisting of 64% 46XY and 36% 45X0. Ultrasound examination showed a horseshoe kidney and a small uterus. Genitography revealed a urogenital sinus, normally configurated vagina and the presence of a uterine cavity. Decision was made to raise the child as a girl and therefore, laparoscopic gonadectomy and genitoplasty was performed in a one step procedure. The postoperative outcome was uneventful. The video illustrates the essential steps of this combined procedure.

Notes:

V6 LAPAROSCOPIC DISTAL PANCREATECTOMY FOR PANCREATIC TRANSECTION IN A 10 YEAR OLD BOY

Kenneth Gow, M.D., FACS, FAAP.
Emory Univ., Atlanta, GA, USA.

Purpose:
The options for management of pancreatic transection include observation, laparotomy, and now laparoscopic techniques. The author presents a case to illustrate the steps involved in laparoscopic distal pancreatectomy.

Methods:
A 10 year old boy was struck by a car while riding his bicycle. A CT scan of the abdomen demonstrated a transection of the body of the pancreas. He underwent a laparoscopic approach. A 10 mm port was inserted in the umbilicus. Three 5 mm ports were placed in the upper abdomen. Entry into the lesser sac was performed by division of the gastrocolic ligaments. We had excellent visualization of the pancreatic injury. The superior, inferior and posterior attachments were dissected with hook electrocautery. Care was made to preserve the spleen, splenic vein, and splenic artery. The distal pancreas was removed via and endocatch pouch. The remaining pancreas was oversewn with a running silk suture to prevent pancreatic duct leak.

Results:
The patient had his NG tube removed on the third post-operative day and he was discharged on the fifth post-operative day. At one year follow-up, he is doing well with no complications.

Conclusions:
Laparoscopic distal pancreatectomy should be considered for management of traumatic transection of the pancreas as it can be performed safely and with good results.

Notes:

V7 EXIT-TO-ECMO FOR FETAL AIRWAY OBSTRUCTION: DEMONSTRATION AND CASE REPORT

Shaun A. Steigman, M.D., Dario O. Fauza, M.D., Jay M. Wilson, M.D., Russell W. Jennings, M.D.
Children's Hospital, Boston, Boston, MA, USA.

The ex-utero intra-partum procedure (EXIT) allows for continuation of uteroplacental support to the fetus until neonatal gas exchange can be independently established. Initially developed for fetuses that had undergone tracheal occlusion in congenital diaphragmatic hernia, the role of the EXIT procedure has been expanded to include other diagnoses in which the neonatal airway or pulmonary function may be compromised at birth. The EXIT procedure also allows for elective placement of a neonate on ECMO (EXIT-to-ECMO) until the underlying anomaly can be addressed.

This video demonstrates an EXIT-to-ECMO procedure for a fetus with congenital high-airway obstruction syndrome (CHAOS). Routine ultrasound screening at 16 weeks gestation discovered an intrathoracic mass. This was further defined on serial ultrasounds and fetal MRI to be located at the carina. As the mass grew to a maximum of 1.8 cm, tracheal occlusion led to pulmonary hyperdistension and a rightward mediastinal shift. When preterm labor developed at 32 weeks, concern about inability to secure the neonatal airway led to the indication for an EXIT procedure. Fetal bronchoscopy performed under uteroplacental support showed that the trachea was completely occluded from an intraluminal mass. Venoarterial ECMO was initiated prior to cessation of placental support. The neonate was then taken for a chest CT scan which was immediately followed by a thoracotomy, mass resection, and tracheal reconstruction, also shown here.

This video illustrates the basic technique for performing an EXIT-to-ECMO procedure. The clinical case demonstrates the procedure's crucial value in ensuring a smooth, controlled transition from placental support to ECMO in a fetus with a prenatal diagnosis of severe airway obstruction.

Notes:

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V8 LAPAROSCOPIC CYSTOGASTROSTOMY FOR DRAINAGE OF PANCREATIC PSEUDOCYST

Shawn D. St. Peter, M.D., Daniel J. Ostlie, M.D.
Children's Mercy Hospital, Kansas City, MO, USA.

Purpose:
This video will show the laparoscopic approach for drainage of a pancreatic pseudocyst via cystogastrostomy.

Methods:
A 5 mm cannula was placed into the peritoneal cavity via the umbilicus. The abdomen was assessed and a second 5 mm cannula was inserted in the right mid abdomen. Two 10 mm cannulas were placed into the gastric lumen under direct vision after insufflating the stomach with air through a nasogastric tube. The pancreatic pseudocyst was identified and a spinal needle was used to aspirate some of the fluid to ensure its location. Electrocautery was used to open the common wall between the pseudocyst and the posterior gastric wall. A large cystogastrostomy was then created using multiple firings of the Endo GIA linear stapler. The necrotic pancreas was debrided. The cannulas were removed and the gastrotomy sites on the anterior gastric wall were closed using the Endo GIA linear stapler.

Results:
The patient recovered uneventfully and was discharged on POD 5. Follow up ultrasound at three months showed no residual pancreatic pseudocyst.

Notes:

P1 ATV RELATED INJURIES IN CHILDREN: HELMETS ARE NOT ENOUGH

Ashley Humphries, M.D.[1], Mike Honigberg[2], Jeff Izant[2], Martin Eichelberger, M.D.[2], Cynthia A. Gingalewski, M.D.[2]

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Purpose:

All-terrain vehicle (ATV) related injury and mortality continue to rise in both the adult and pediatric populations. Despite an increasing awareness, there has yet to be legislation, including age restrictions and helmet laws, for ATV operation. We report ATV use as a significant hazard to young children in the United States and urge legislation to mandate helmet use and age restrictions for the operation of ATVs.

Methods:

A retrospective review of all admissions related to ATV crashes at a tertiary Children's Medical Center, serving both urban and suburban populations of DC, MD, and VA, from 1989-present.

Results:

A total of 97 patients were admitted following ATV related crashes over the 17 year period. Notably, there has been a marked rise in injuries in the past three years (two fold) with more admissions occurring between 2004 and 2006 than in the previous 14 years combined. Accidents were more common in males (77%) and the mean age at admission was 10.7 years. Greater than 93% of injuries occurred in children less than 15 years old (90), 33% of which were <9 years of age. Overall, helmet compliance was 38% and was most commonly used by those >15 years. Despite this, 46% of patients had head injuries. Orthopedic injuries were next most common (42% patients) and 25% of patients had chest and abdominal injuries. Twenty per cent of patients had an Injury Severity Score > 10. Overall mortality was 2%.

Conclusions:

All terrain vehicles remain a significant public health risk for children less than 15 years of age. The pattern of injury observed in children suggests that helmet use alone is not enough to prevent the majority of ATV-related injuries in the pediatric population and that more stringent guidelines to prevent use is necessary to have a salutary effect on the public health of children.

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P2 ALARMING TRENDS IN THE IMPROPER USE OF MOTOR-VEHICLE RESTRAINTS IN CHILDREN

Shawn J. Rangel, M.D., Colin Martin, Rebeccah L. Brown, M.D., Victor F. Garcia, M.D., Richard A. Falcone, Jr., M.D.
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Purpose:
Although it is well established that proper use of restraints reduces the risk of serious injury in motor vehicle collisions (MVC), little is known regarding the patterns of age-appropriate restraint use among injured children. The purpose of this study was to characterize patterns of restraint use among children hospitalized following MVC and to identify demographic factors associated with non-compliance.

Methods:
All children admitted to our level 1 trauma center over a 10 year period (1996-2006) were reviewed. Patterns of proper restraint use were examined as defined by National Highway Traffic Safety Association (NHTSA) guidelines.

Results:
1,272 patients were identified with an overall rate of restraint use of 41.2%. When assessed by NHTSA guidelines, only 25.7% of children were properly restrained (Table). Compared to whites, African-Americans were significantly less likely to be properly restrained (15.1% vs. 27.8%,OR 0.46,(95%CI:0.31-0.69,P<0.0001)), or to be restrained by any means (26.8% vs. 44.2%,OR 0.46,(95%CI:0.33-0.63,P<0.0001)). These differences were observed across all ages, with the greatest difference observed for the use of car seats (11.9 vs. 45.8%,OR 0.15,(95%CI:0.06-0.41,p<0.0001). Medicaid patients were less likely to be restrained compared to those with commercial insurance (23% vs. 29%,OR 0.72(0.53-0.98),p=0.03).

Conclusions:
These data demonstrate an alarming trend, as nearly three-quarters of all children were improperly restrained. Marked disparities in compliance were observed in the AA population. Although insurance status, as a surrogate of socioeconomic status, explains some of findings, the observed differences persist after this is controlled. Future strategies should be directed towards promoting proper restraint use in minority and booster-seat age children who remain disproportionately under-restrained.

Compliance with age-appropriate restraint use as defined by NHTSA guidelines				
Age (years)	NHTSA Recommended restraint type	All patients	White	African-American
0-4	Car seat	39.7%	45.8%	11.9%
4-8	Booster seat	1.7%	2.3%	0%
>8	3-point restraints	34.1%	35.8%	24.5%
All (0-18)		25.7%	27.8%	15.1%

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P3 DRUG AND ALCOHOL USE AMONG ADOLESCENT BLUNT TRAUMA VICTIMS

John M. Draus, Jr., M.D., Ariel P. Santos, M.D., MPH, Glen A. Franklin, M.D., David S. Foley, M.D.

Univ. of Louisville School of Medicine, Louisville, KY, USA.

Purpose:

The contribution of drugs and alcohol to blunt trauma-related morbidity and mortality in the adolescent population is not well characterized. The purpose of this study was to compare injury severity, hospital course, and outcomes between adolescent blunt trauma patients with and without a positive toxicology screen.

Methods:

The trauma registries of a Level I trauma center and a large urban pediatric hospital were used to identify adolescents (12-18 years) who sustained injuries following blunt trauma between January 2000 and December 2005. Demographic data, mechanism of injury, Glasgow Coma Scale (GCS), injury severity scores (ISS), hospital course, and outcomes were evaluated. Patients with positive and negative toxicology screens were compared to each other.

Results:

The trauma registries contained data on 2,030 adolescent blunt trauma patients. Nine-point-three percent of adolescents had positive toxicology results, indicating illicit drug and/or alcohol usage. Motor vehicle collisions were the most frequent mechanism of injury in both groups. The mean age of patients with a positive toxicology screen was 17.2 years. The youngest was 13.6 years. The most commonly detected drugs were cannabinoids (40%), alcohol (30%), and polysubstances (23%). Other data are summarized in the table.

	n	GCS	ISS	emergent operation	ICU patients	hospital days	FIM score	mortality
Tox (+)	188	11.8± 4.6*	16.7± 11.2*	20.7%*	46.3%*	7.3± 8.1*	10.5± 2.2*	6.4%*
Tox (-)	1842	13.7± 3.3	10.4± 9.1	12.8%	20.7%	4.8± 7.2	11.2± 1.7	2.6%

** $p < 0.05$*

Conclusions:

A significant number of adolescent blunt trauma victims are under the influence of alcohol or drugs at the time of their injuries. Patients with a positive drug screen are more severely injured, require more hospital care, and have worse outcomes/higher fatalities than other adolescent blunt trauma victims. Improved intervention strategies are needed to discourage drug and alcohol use among adolescents.

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P4 DO PEDIATRIC TRAUMA VICTIMS HAVE REDUCED MORTALITY RATES WHEN TREATED IN DESIGNATED TRAUMA CENTERS?

Joseph J. Tepas, III, M.D.[1], Etienne E. Pracht, Ph.D.[2], Barbara L. Orban, Ph.D.[2], Pamela Pieper, MSN, ARNP[3], Lisa Simpson, MB, BCh, MPH[4], Lewis M. Flint, M.D.[5]

[1]Univ. of Florida College of Medicine, Jacksonville, FL, USA, [2]Univ. of South Florida College of Public Health, Tampa, FL, USA, [3]Univ. of Florida College of Nursing, Jacksonville, FL, USA, [4]Univ. of South Florida College of Public Health, Tampa, FL, USA, [5]Univ. of South Florida College of Medicine, Tampa, FL, USA.

Purpose:
To compare the survival associated with treatment of seriously injured children at state designated trauma centers to non-trauma center acute care hospitals, and to assess differences between designated trauma centers with pediatric capability to those without this additional resource.

Methods:
State trauma related inpatient hospital discharge records from 1995 to 2004 were analyzed for children from birth to 19 years of age. Age, gender, ethnicity, injury mechanism, discharge diagnoses, and severity as defined by the International Classification Injury Severity Score (ICISS) were analyzed. The outcome measure was mortality during hospitalization. Instrumental variables analysis was used to control for triage bias, and the probability of mortality was compared using a full information maximum likelihood bivariate probit model.

Results:
For the 27,313 children between ages zero and 19 years treatment in designated trauma centers was associated with a 3.15% reduction in the probability of mortality (est. =-.446, p<.0001, bivariate probit). Treatment of 16,384 children in designated trauma centers with pediatric capability, as opposed to trauma centers without pediatric capability was associated with an additional 4.84% reduction in mortality (est. = -.455, p<.001 bivariate probit).

Conclusions:
A child's survival from severe injury is better at a designated trauma center and best at a trauma center with pediatric capability. These data validate the function of trauma systems in reducing mortality from injury. The additional commitment of specific resources for care of the injured child yields an even greater return on investment in terms of children's lives saved.

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P5 APOPTOSIS VIA THE P38 PATHWAY IS DIRECTED THROUGH THE P75 RECEPTOR IN THE NGF TRANSFECTED SK-N-SH CELL LINE

Mary Beth Madonna, M.D., Rashmi Kabre, M.D., Yi Yong Qiu, M.D.
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Purpose:
Neuroblastoma remains an aggressive tumor. Understanding the biology of this tumor may help us gain insights to determine better therapies. Nerve growth factor (NGF) is a unique growth factor for neuronal cells and tumors with both survival/growth and differentiation/apoptosis effects. Our laboratory has extensively studied the effects of NGF on the human neuroblastoma cell line SK-N-SH. We have shown that NGF-transfected cells undergo apoptosis through the p38 pathway when treated with exogenous NGF. We hypothesize this is due to activation of the p75 (low affinity) receptor. To prove this hypothesis, we blocked either the p75 or TrkA (high affinity) receptor and studied the effect on the p38 apoptosis pathway and the RAF survival pathway.

Methods:
SK-N-SH cell lines were used for all experiments. Wild type cells were obtained from ATCC. NGF-transfected cells were obtained by retroviral transfection of wild type cells. Cells were treated with or without NGF (100ng/ml) and immunopreciptation experiments were performed with either trkA or p75 antibodies. Western blots were then performed for p38, pp38, RAF, RAS, p42, pp42, c-jun and ATF-2. In addition, cells were treated with siRNA primers for trkA or p75 and western blots were performed for p38 and pp38 and pp42.

Results:
Cells immunopreciptated with p75 antibody showed increased signal for RAS, RAF, pp38, c-jun and ATF-2 by western blot. Cells immunopreciptated with trkA antibody showed increased signal for RAS, p42 and pp42. SiRNA for p75 amerliorated the pp38 signal while siRNA for trkA decreased the pp42 signal, further confirming the immunoprecipitation experiments.

Conclusions:
NGF-transfected SK-N-SH cells treated with exogenous NGF are more prone to apoptosis due to activation of the p75 receptor. NGF binding to this receptor increases p38 activation and its downstream effectors. Immunopreciptation confirms that pp38, c-jun and ATF-2 colocalizes with p75. Furthermore, siRNA for p75 eliminates this response.

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P6 OVARIAN SOMATIC STEM CELLS, OVARIAN CANCER, AND THE ROLE OF MULLERIAN INHIBITING SUBSTANCE

Paul P. Szotek, M.D.[1], Henry Chang, M.D.[1], Rafael Pieretti-Vanmarcke, M.D.[1], Kristen Brennand, Ph.D.[2], Xainlin Li[2], Matthew Wallenstein, BS[2], David Dombkowski[1], Frederic Preffer, M.D.[1], Douglas Melton, Ph.D.[1], David T. MacLaughlin, Ph.D.[1], Jose Teixeira, Ph.D.[1], Patricia K. Donahoe, M.D.[1]

[1]Massachusetts General Hospital/Harvard Medical School, Boston, MA, USA, [2]Harvard Univ., Boston, MA, USA.

Purpose:

The identification of "side population" (SP) cells in several human cancers, including ovarian cancer, and their normal tissue sources has renewed interest in the hypothesis that cancers may arise from somatic stem cells. Somatic stem cells are defined by indefinite self-renewal and multipotency. These properties are recapitulated in ovarian cancer stem cells. Asymmetric division and multidrug resistance transporters characterize indefinite self-renewal. We exploited this property using pulse-chase BrdU and doxycycline inducible H2Bj-GFP mouse models to identify slow cycling label retaining cells (LRCs). In addition, we isolated SP cells from normal mouse and human ovarian epithelial cells, mouse ovarian cancer cell lines, and human ascites cells for comparison.

Methods:

Rosa26-rtTA/H2Bj-GFP mice were pulsed with doxycycline from E0 to P42 and adult B6 mice were pulsed with BrdU for seven days and chased for up to three months to define LRCs. SP cells were isolated from primary mouse and human ovarian epithelial cells and compared to SP cells from mouse ovarian cancer cell lines and human recurrent ascites.

Results:

After three months chase GFP and BrdU LRCs were identified in the surface epithelium and subepithelium of the adult mouse ovary marking candidate stem cells and their potential niches (Fig 1 A,B,C,D,E,). Primary mouse and human epithelial cells, mouse ovarian cancer cells, and patient ascites cells demonstrate SPs by flow cytometry. Surface marker analysis demonstrated SP and the MIS type II receptor as markers in both normal and cancer cells.

Conclusions:

Mouse ovarian surface epithelial cells have a slow cycling LRC population and side population with characteristics of stem cells which sustain cell growth and repair after ovulatory damage. It will be necessary to identify normal and cancer stem cells in order to identify differences that will permit design of therapies directed at controlling aberrant growth and recurrence of cancer stem cells.

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P7 IMMUNOHISTOCHEMICAL SURVEY OF PEDIATRIC LIVER CANCER

Daniel N. Rutigliano, D.O., Hikmat Al-Ahmadie, M.D., Mark L. Kayton, M.D., William L. Gerald, M.D., Michael P. La Quaglia, M.D.

Memorial Sloan-Kettering Cancer Center, New York, NY, USA.

Purpose:

Hepatoblastoma patients (HB) have an overall survival of 70% compared to <20% for hepatocellular carcinoma (HCC). These tumors differ in their response to chemotherapy, risk of recurrence, degree of local invasiveness, and metastatic spread. This study compares tumor samples from both histologies to identify factors that may account for these differences.

Methods:

IRB waiver was obtained and clinical records of patients under 25 years of age diagnosed with liver cancer were reviewed. Histological diagnoses were confirmed by re-review of H&E slides. Subsequently, immunohistochemical staining for the presence of proteins related to angiogenesis (VEGFR-1 and V-CAM), genetic stability (Caspase-3, MLH-1, MSH-2), and invasiveness (β-catenin, E-cadherin, V-CAM) was performed. The extent of immunoreactivity was evaluated semi-quantitatively. The absence of nuclear expression of MLH1 and MSH2, absence of membranous staining for E-cadherin and the presence of nuclear/cytoplasmic expression of β-catenin were considered abnormal.

Results:

A cohort of 35 tumors was studied- 22 HB patients and 13 HCC patients. The overall results of the immunohistochemical expression are listed in Figure 1. β-catenin staining in HCC was exclusively seen in a focal membranous pattern. In contrast, HB samples demonstrated only cytoplasmic and/or nuclear staining. The expression of MLH1 and MSH2 was overall stronger in HB than HCC.

Conclusions:

HCC may share similar defects in DNA repair (MLH-1,MSH-2) with HNPCC patients and possess lower levels of V-CAM and E-cadherin that may play a role in its aggressive and invasive nature. By comparison, HB tumors have higher levels of VEGFR-1 receptors and may be more responsive to anti-angiogenic therapy. The extensive nuclear location of β-catenin HB highlights its function as a transcription factor and may play a role in maintaining these cells in an undifferentiated state. Further comparison of these tumors may lead to tailored therapies that improve survival rates in these patients.

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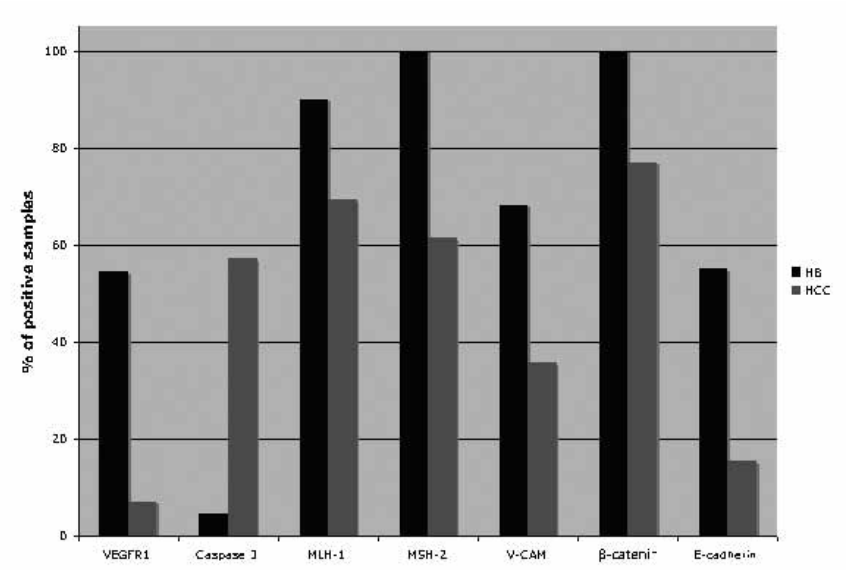
% of positive samples
100
80
60
40
20
0
VEGFR1
Caspase 3
MLH-1
MSH-2
V-CAM
β-catenin
E-cadherin
HB
HCC

Notes:

P8 COMBINED CYCLOOXYGENASE-2 AND VEGF INHIBITION DISRUPTS TUMOR VASCULAR ARCHITECTURE THROUGH DIFFERENTIAL EFFECTS ON VASCULAR MURAL CELLS

Jason C. Fisher, M.D., Jianzhong Huang, M.D., Rashida Jefferson, M.D., Darrell Yamashiro, M.D., Ph.D., Jessica J. Kandel, M.D.

Morgan Stanley Children's Hospital of New York Presbyterian, Columbia Univ. Medical Center, New York, NY, USA.

Purpose:

VEGF inhibition is a clinically validated therapy. Yet despite meaningful initial responses, virtually all patients ultimately develop tumor recurrence. Prior studies indicate that vascular recovery during VEGF blockade is strongly associated with enhanced recruitment of vascular mural cells (VMC). Conversely, we recently demonstrated that VMC recruitment is attenuated by inhibiting the proangiogenic cyclooxygenase-2 (COX-2) pathway. We hypothesized that combining VEGF and COX-2 blockade would more effectively perturb tumor vasculature than either approach alone.

Methods:

All studies were approved by the Institutional Animal Care Committee. Intrarenal xenografts were induced by injection of 106 cultured human Wilms' tumor cells (SK-NEP-1) in athymic mice (N=81). At Day 7, animals were divided into groups: (1)control, N=19; (2)COX-2 blockade, N=20; (3)VEGF blockade, N=22; and (4)COX-2+VEGF blockade, N=20, and received drinking water with either vehicle or COX-2 inhibitor (SC-236, 30 ug/mL). Animals received biweekly injections of (1)vehicle or (2)anti-VEGF antibody (bevazicumab, 250ug/dose) beginning at Day 21. Tumors were harvested at Day 42, weights compared by Kruskal-Wallis analysis, and analyzed immunohistochemically for alterations in vasculature (endothelium, basement membrane, VMC) and COX-2 target genes. Vessel architecture was mapped using 3D Boissonnat surface reconstruction.

Results:

Tumor growth was significantly suppressed in SC-236 (3.99 +/- 0.73g, $p<0.05$), bevazicumab (1.58 +/- 0.26g, $p<0.0001$), and SC-236+bevacizumab groups (1.72 +/- 0.34g, $p<0.0001$). Immunohistochemistry and image analysis demonstrated dilated, erratic vessels with decreased VMCs in SC-236-treated tumors. Conversely, bevacizumab-treated tumors displayed an increase in VMCs. Tumors treated with combined COX-2 and VEGF inhibition displayed a highly perturbed vascular architecture, with reductions in density and early VMC recruitment, hypertruncation, and defective branching hierarchy.

Conclusions:

The addition of COX-2 inhibition to bevacizumab prevents the acquisition of VMCs that is a feature of VEGF blockade, resulting in a strikingly disordered tumor vasculature. These results suggest that dual endothelial/VMC targeting may more effectively disrupt tumor angiogenesis, potentially providing more sustained therapeutic responses.

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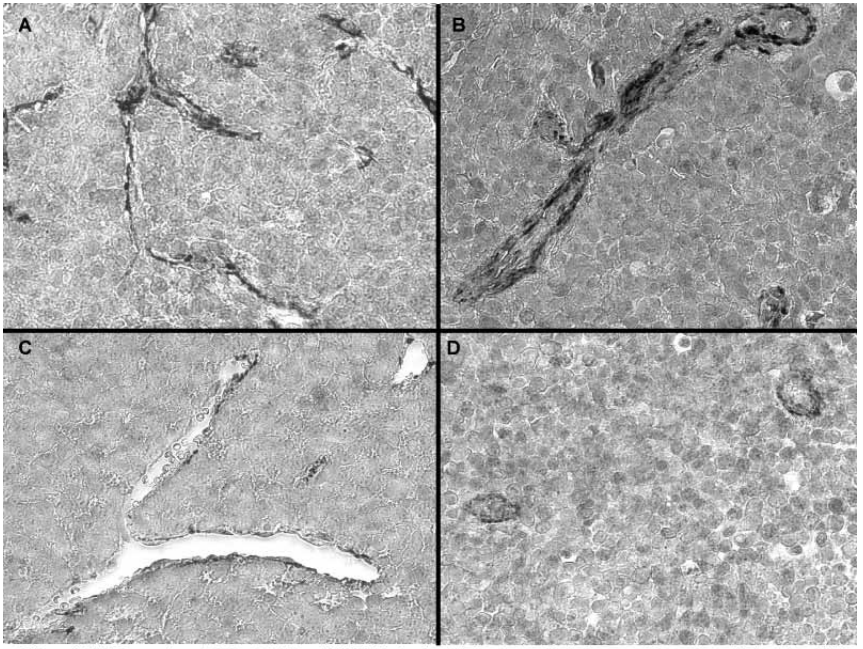

Differential VMC recruitment during COX2 and VEGF blockade. (A) Control; multiple fine vessel branches with baseline VMC recruitment. (B) VEGF-blockade; decreased vascular density, diminished branching, and increased VMC recruitment. (C) COX2-blockade; erratic and dilated vessels with only a thin layer of VMC present. (D) COX2 and VEGF blockade; decreased vascular density and truncated branching with decreased early VMC recruitment.

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P9 EXPERIENCE WITH 30 SENTINEL LYMPH NODE BIOPSIES FOR PEDIATRIC CARCINOMAS AND SARCOMAS

Mark L. Kayton, M.D., Ruby Delgado, M.D., Klaus Busam, M.D., Hiram S. Cody, III, M.D., Edward A. Athanasian, M.D., Daniel Coit, M.D., Michael P. La Quaglia, M.D.
Memorial Sloan-Kettering Cancer Center, New York, NY, USA.

Purpose:
Little data exist regarding techniques and indications for sentinel lymph node biopsy in pediatric carcinomas and sarcomas.

Methods:
After IRB waiver was obtained, pathology, lymphoscintigraphy, and operative records were reviewed for all pediatric sentinel lymph node biopsies performed for carcinomas and sarcomas at a single center over 10 years (1996-2006).

Results:
Thirty sentinel lymph node biopsies were performed in 29 patients (median age, 12; range, 2-21). A median of two sentinel nodes were biopsied per procedure (range, 1-6). Node localization was aided by preoperative lymphoscintigraphy, which successfully identified a sentinel node in 29/30 cases. The remaining case was localized intraoperatively using a handheld radioprobe and dye. Radiotracer alone was used in 12/30 cases, supplemented by blue dye in 18/30 cases. There were no complications. Three patients had positive sentinel nodes (table). Positive sentinel nodes were obtained in breast carcinoma and in rhabdomyosarcoma, but in no cases of non-rhabdomyosarcoma soft tissue sarcomas. The finding of a positive sentinel node in rhabdomyosarcoma prompted administration of node basin irradiation, and in breast cancer prompted completion lymph node dissection in one patient, the other having already opted for planned modified radical mastectomy with level I lymph node dissection.

(table on next page)

Conclusions:
Sentinel lymph node biopsy can yield positive results that may alter treatment for adolescent breast carcinoma and rhabdomyosarcoma. A better understanding of the utility of this procedure in rhabdomyosarcoma will require study of more patients. The applicability of sentinel node biopsy to nonrhabdomyosarcomatous soft tissue sarcomas appears questionable.

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Sentinel node biopsies for pediatric carcinomas and sarcomas		
Diagnosis	Cases with (+) Sentinel Nodes	Total Cases
Rhabdomyosarcoma	1	9
Adolescent Breast Carcinoma	2	5
Epithelioid Sarcoma	0	4
Synovial Sarcoma	0	2
Alveolar Soft Part Sarcoma	0	2
Fibrosarcoma	0	2
Other*	0	6

**n=1 each of Ewing's sarcoma, angiomatoid fibrous histiocytoma, clear cell sarcoma, malignant peripheral nerve sheath tumor, neurothekeoma, and malignant glomus tumor*

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P10 RET PROTO-ONCOGENE TESTING IN INFANTS PRESENTING WITH HIRSCHSPRUNG DISEASE IDENTIFIES 2 NEW MEN 2A KINDRED

Elizabeth A. Fialkowski, M.D.[1], Mary K. DeBenedetti, RN[1], Jeffrey F. Moley, M.D.[1], Bert E. Bachrach, M.D.[2]

[1]Washington Univ. School of Medicine, St. Louis, MO, USA, [2]Univ. of Missouri Children's Hospital, Columbia, MO, USA.

Introduction:

Multiple Endocrine Neoplasia 2A (MEN 2A) is a genetic syndrome manifesting as medullary thyroid carcinoma (MTC), hyperparathyroidism, and pheochromocytoma. MEN 2A results from mutations in the *RET* proto-oncogene. Hirschsprung disease (HSCR) is a rare manifestation of both MEN 2A and familial medullary thyroid carcinoma (FMTC). HSCR has been described as the presenting feature in seven known MEN 2A families. Here we describe two previously unrecognized MEN 2A families that were only identified after the diagnosis of HSCR in three infants.

Case Presentations:

1. WS presented in infancy with HSCR. Genetic screening revealed a C609Y gene mutation in exon 10 which is associated with MEN 2A. Subsequent evaluation of his sister, father and paternal grandmother revealed the same mutation. All three had thyroidectomies demonstrating C-cell hyperplasia, a precursor to MTC. In addition, the grandmother had a microscopic focus of MTC.

2. FC and his sister were diagnosed with HSCR as neonates. Both infants and their father had genetic testing, demonstrating a C620R gene mutation. This gene mutation is consistent with MEN 2A. All three had total thyroidectomies, with metastatic medullary thyroid carcinoma identified in the father. The children received their operations at 5 years of age, revealing C-cell hyperplasia.

Conclusions:

Hirschsprung disease can be the initial presentation of Multiple Endocrine Neoplasia 2A as demonstrated in the two described cases. We recommend that genetic screening be considered in patients presenting with Hirschsprung's disease, looking for the known *RET* proto-oncogene mutations associated with Multiple Endocrine Neoplasia 2A and familial medullary thyroid carcinoma. These involve the cysteine codons (C609, C611, C618 and C620) of exon 10 and (C630 and C634) exon 11. If a gene mutation consistent with Multiple Endocrine Neoplasia 2A or familial medullary thyroid carcinoma is detected, genetic screening of all kindred regardless of family history is strongly recommended.

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P11 ABNORMAL DISTRIBUTION AND MATURATION OF INTERSTITIAL CELLS OF CAJAL IN GASTROSCHISIS MICE LACKING AORTIC CARBOXYPEPTIDASE-LIKE PROTEIN MIMICS THE HUMAN CONDITION

Enrico Danzer, M.D.[1], Shincy Schegu[1], Matthew D. Layne, Ph.D.[2], Portia Kreiger, M.D.[1], Antoneta Radu[1], N. Scott Adzick, M.D.[1], Alan W. Flake, M.D.[1]

[1]The Children's Hospital of Philadelphia, Philadelphia, PA, USA, [2]Brigham and Women's Hospital, Boston, MA, USA.

Purpose:

We hypothesized that the gastrointestinal dysmotility (GD) seen in newborns with gastroschisis (GAS) is caused by an abnormal distribution and development of interstitial cells of Cajal (ICC). To test this hypothesis we investigated the immunolocalization and morphology of ICC in eviscerated intestine (EI) in GAS mice lacking aortic carboxypeptidase-like protein (ACLP) and human GAS specimens.

Methods:

ACLP(-/-) homozygous mice were created by genomic cloning and targeted disruption of ACLP. From 47 fetuses genotyped, 13 (27.7%) were wild type, 20 (42.5%) were heterozygous and 14 (29.8%) were ACLP(-/-) homozygous. Twelve (85.7%) of the ACLP(-/-) fetuses exhibited GAS. Human intestine was obtained from five newborns with GAS and four age-matched control patients. Specimens were processed for H&E and immunohistochemistry for ICC (c-kit-antibody). The expression of c-kit was blindly scored as follows: stage 0: no staining; stage 1: a few cells stained; stage 2: scattered staining; stage 3: continuous staining.

Results:

Abundant c-kit immunoreactivity, normal distribution and morphology of ICC were seen within non-EI of ACLP-GAS-mice, human GAS specimens and control tissue. Expression of c-kit was almost completely absent in EI in ACLP-GAS-mice. A faint scattered staining and abnormal morphology of ICC within EI in human GAS was found in less damaged loops and no ICC were seen in more damaged eviscerated human GAS intestine. Staging of the distribution of ICC within EI in human GAS confirmed that maturation of ICC was significantly impaired ($p < 0.001$).

Conclusions:

Distribution and maturation of ICC within EI in human GAS is severely impaired. These findings may help in understanding the delayed onset of peristalsis in newborns with GAS. As the defect observed in ACLP-GAS-mice closely resembles human GAS, further analysis of this model may provide new insights into the pathophysiology of GD observed in human GAS and may help define new clinical management strategies.

Notes:

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P12 THE CYTOPLASMIC DOMAIN OF VE CADHERIN REGULATES ENDOTHELIAL JUNCTIONAL MORPHOLOGY

Ian C. Mitchell, M.D., Dorit Nahari, Ph.D., Zijuan Liu, Ph.D., Christine Ingle, B.Sc., Laurie B. Task, B.Sc., Lance S. Terada, Ph.D., Fiemu Nwariaku, M.D., FACS.
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Vascular endothelial cadherin (VE cadherin) is a major component of endothelial adherens junctions and regulates intercellular gap formation. We previously demonstrated increased tyrosine phosphorylation of VE cadherin and intercellular gap formation during increased vascular permeability. However the regulators of VE cadherin tyrosine phosphorylation and tyrosine targets are still undetermined. We propose the hypothesis that the cytoplasmic domain of VE cadherin regulates endothelial permeability and that the (ii) tyrosine phosphatase, SHP-2 dephosphorylates VE cadherin during endothelial signaling.

Methods:
Human Umbilical Vein Endothelial Cells (HUVEC) were infected with adenovirus encoding full length VE cadherin or the cytoplasmic truncation, AdVEC-644 (both linked with green fluorescent protein), and then subjected to confocal microscopy or measurement of permeability (trans-endothelial resistance). SHP-2 deficient fibroblasts were transfected with similar plasmids, VE cadherin was immunoprecipitated and finally subjected to Western blot for phosphotyrosine.

In vitro phosphatase assays were performed by incubating HUVEC lysates in the presence or absence of SHP-2 protein prior to Western blots with anti-phosphotyrosine antibody

Results:
We found that infection with the truncated VE cadherin, (AdVEC-644), prevented the establishment of normal endothelial cell - cell junctions compared to the full length VE cadherin (AdFLVEC), Figure 1. AdVEC-644 also caused abnormal endothelial permeability. SHP-2 co-immunoprecipitated with VE cadherin and in-vitro phosphatase experiments revealed that SHP-2 was capable of dephosphorylating VE cadherin.

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Conclusion:
Together these data demonstrate that the cytoplasmic domain of VE cadherin is necessary for normal endothelial cell-cell contact and monolayer morphology. The tyrosine phosphatase, SHP-2 regulates VE cadherin phosphorylation.

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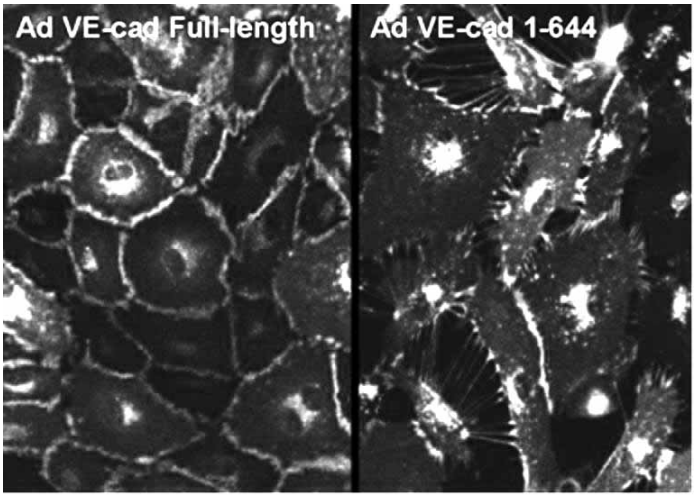

Figure 1. Confocal microscopy of HUVEC monolayers infected with full lengh VE cadherin (left panel) and the cytoplasmic truncation, AdVEC-644 (right panel). Junctional morphology is abnormal and major intercellular gaps are apparent in monolayers with the truncation.

Notes:

P13 TOLL-LIKE RECEPTOR 4 ACTIVATION REGULATES PHOSPHORYLATION OF FOCAL ADHESION KINASE AND BARRIER INTEGRITY CONTRIBUTING TO THE PATHOGENESIS OF NEC

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Background:
Necrotizing enterocolitis (NEC) is characterized by increased circulating endotoxin (LPS) and intestinal barrier disruption, which involves focal adhesion kinase phosphorylation. We have shown that barrier integrity is restored through intestinal restitution and is reduced in experimental NEC, and mice with mutations in the LPS receptor, Toll-like Receptor 4 (TLR4) are protected from the development of experimental NEC, although the mechanisms remain incompletely understood. We hypothesize that TLR4 activation leads to mucosal barrier disruption, and sought to assess the effects of TLR4 on FAK phosphorylation (pFAK) and intestinal restitution.

Methods:
NEC was induced in 3 week-old mutant (C3H/HeJ) mice and wild-type counterparts (C3H/HeOUJ) by formula gavage and hypoxia, and graded pathologically from 0 (mild) – 4 (severe) by a blinded observer. Fecal endotoxin levels were assessed by limulus assay. In CaCO2 or IEC-6 enterocytes±LPS (0-50ug/ml), barrier integrity was assessed by transepithelial resistance (TER), and pFAK by SDS-PAGE. Intestinal restitution was measured *in vivo* by BRDU. Focal adhesions were measured by confocal microscopy.

Results:
The severity of experimental NEC was significantly reduced in mutant (MUT) compared with wild-type (WT) mice (Grade:WTvsMUT:3±1vs0.5±.5,p<0.05, n=5 experiments,5 animals/expt) as were levels of fecal endotoxin (EU:WT:16,000vs.MUT:9,000). TLR4 activation by LPS measured in experimental NEC reduced enterocyte barrier integrity (ΔTER:ctrl:3.2±1.8vsLPS:39±14.9,ohms-cm2) and increased pFAK by SDS-PAGE compared with untreated cells, suggesting a role for TLR4 in the breakdown of focal adhesions. To support this, induction of NEC in WT animals led to an increase in mucosal pFAK, a loss of focal adhesions and a reduction in intestinal restitution. Strikingly, induction of NEC in MUT mice led to a reduction in the pFAK, intact focal adhesions and the restoration of intestinal restitution compared with wild-type littermates, indicating the role of TLR4 in this process.

Conclusions:
TLR4 regulates focal adhesion formation and barrier integrity within the intestinal monolayer, suggesting its possible role as a novel therapeutic target in the management of NEC.

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P14 FGF10/FGFR2B SIGNALING PROMOTES GOBLET CELL DIFFERENTIATION IN ADULT MURINE ILEAL EPITHELIUM

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Purpose:

While Fibroblast Growth Factor 10 (FGF10) is a key regulator of colonic epithelial survival and proliferation during gut organogenesis, *Fgf10* is not constitutively expressed in the ileum of either the newborn or adult mouse. We have previously shown that *Fgf10* is expressed in the ileum after massive small bowel resection, suggesting that FGF10 may be a positive regulator of gut adaptation. Thus, we hypothesize that over-expression of FGF10 in adult ileum leads to increased proliferation of epithelial progenitor cells and increased differentiation of goblet cells and that inactivation of FGFR2b (main receptor for FGF10) decreases proliferation and differentiation of goblet cells.

Methods:

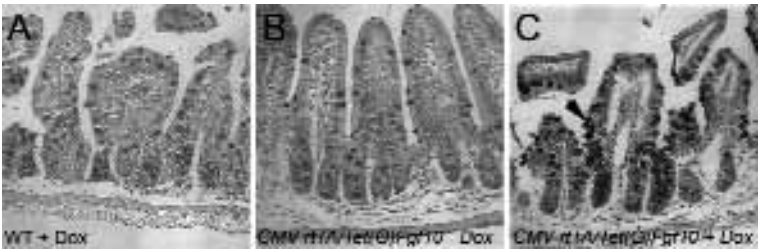
CMV-Cre;rtTA^{flox} driver mice were crossed with *Tet(O)Fgf10 or Tet(O)sFgfr2b* responder mice to generate mice capable of inducible pan-somatic expression of *Fgf10* or the dominant negative soluble *Fgfr2b*. Expression of *Fgf10* or soluble *Fgfr2b* was induced by doxycycline. Controls were age-matched wild type (WT) also placed on doxycycline. Immunohistochemical analysis of relative proliferation was performed using proliferating cell nuclear antigen. Identification of goblet cells was performed using alcian blue staining for mucin.

Results:

Over-expression of *Fgf10* leads to an increase in goblet cell differentiation compared to controls. Conversely, expression of the dominant negative soluble *Fgfr2b* is associated with a decrease in goblet cells. Over-expression of *Fgf10* also leads to an increase in proliferation of ileal epithelial progenitor cells at the base of the crypt, whereas there is no demonstrable change in progenitor cell proliferation in mice over-expressing soluble *Fgfr2b*.

Conclusions:

Thus, we conclude that FGF10/FGFR2b signaling activation promotes goblet cell differentiation in adult mice. This pathway is likely to be critical in gut adaptation. We speculate that since goblet cells are an integral part of the intestinal mucosal barrier, disruption of this barrier may play a pivotal role in diseases such as inflammatory bowel syndrome or necrotizing enterocolitis.



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P15 MOLECULAR MECHANISMS CONTRIBUTING TO GLUTAMINE-INDUCED INTESTINAL CELL SURVIVAL

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Intestinal failure, which can lead to mucosal atrophy and inflammatory complications, is a major source of morbidity and mortality in premature infants. Glutamine (Gln) is the principal fuel source for the small bowel and has been used to maintain gut growth during periods of disuse or disease; however, the molecular mechanisms regulating its effects are not known. Recently, we showed that Gln stimulates ERK phosphorylation in rat intestinal epithelial (RIE) cells. The purpose of this study was to further delineate the effects of Gln on MEK/ERK using a novel RIE cell line containing an inducible Ras (upstream ERK activator).

Methods:
(i) Parental RIE-1 cells were treated with Gln or vehicle with or without MEK/ERK inhibitors (UO126 or PD98059). DNA fragmentation (a measure of apoptosis) was quantified; protein was analyzed by Western blot. (ii) RIE-iRas cells with IPTG-inducible form of Ha-Ras were cultured in the presence or absence of Gln for 24h. Cells were stimulated with IPTG and treated with MEK/ERK inhibitors or vehicle; DNA fragmentation was quantified and protein was analyzed by Western blot.

Results:
(i) Inhibition of MEK/ERK significantly increased RIE-1 cell apoptosis in the presence of Gln. ERK inhibition was confirmed by Western blot. (ii) IPTG-stimulated RIE-iRas cells, grown in the presence of Gln, had significantly decreased levels of apoptosis when compared to Gln-deprived IPTG-stimulated cells. Inhibition of ERK significantly increased levels of apoptosis despite Gln treatment. Again, ERK inhibition was confirmed by Western blot.

Conclusions:
Our results are the first to show a critical role for ERK in Gln-mediated intestinal survival. Furthermore, we have utilized a novel cell model to delineate Gln-mediated ERK induction. Importantly, understanding the molecular mechanisms by which Gln promotes cell survival and attenuates apoptosis may provide therapeutic strategies to protect mucosal integrity during periods of gut injury in premature infants and children.

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P16 INTEGRIN ALPHA-V, BETA-6 EXPRESSION IS UPREGULATED IN THE PROLIFERATING BILE DUCTS OF CHILDREN WITH BILIARY ATRESIA

Danielle Patterson[1], Shelia Violette, Ph.D.[2], Paul Weinreb, Ph.D.[2], Michael Lewis, M.D.[3], Margaret S. Magid, M.D.[3], M. Alba Greco, M.D.[1], Evan P. Nadler, M.D.[1]

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Introduction:

Biliary atresia (BA) is a progressive fibrosis of the extrahepatic biliary tree. Expression of transforming growth factor beta (TGF-β), a mediator of fibrosis, is upregulated in the liver of BA patients. TGF-β function is in part governed by integrin $\alpha_v\beta_6$ -mediated activation. Therefore, we hypothesized that expression of integrin $\alpha_v\beta_6$ would be increased in liver tissue from patients with BA.

Methods:

Tissue samples were obtained from patients with BA at Kasai procedure (n=5) and liver explant (n=5). Liver explant tissue from age-matched patients with non-fibrosing diseases was used as a control (n=5). Immunohistochemical analysis was performed to evaluate protein expression of integrin $\alpha_v\beta_6$ and reviewed by a pediatric pathologist who was blinded to the groups. Intensity of staining was graded as either mild, moderate, or strong.

Results:

All control tissue samples were negative for integrin $\alpha_v\beta_6$ staining. Tissue samples from patients with BA were positive for integrin $\alpha_v\beta_6$ staining at the time of Kasai (5/5) as well as liver explant (5/5). Staining was membranous with a cytoplasmic component in pattern and was specific to proliferating bile ducts and ductules in both Kasai and explant tissues. No staining was noted in hepatocytes, fibroblasts, or blood vessels. Among Kasai biopsy samples, staining ranged from mild to moderate with no correlation to age or severity of disease. In liver explant samples staining ranged from moderate to strong. Staining intensity was strongest in the oldest patients among the liver explant group.

Conclusions:

Our data suggest that integrin $\alpha_v\beta_6$ expression is increased in the livers of patients with BA. Furthermore, expression was confined to the portal triads suggesting an origin other than the hepatocytes. Further studies are warranted to characterize the role and the cells of origin of integrin $\alpha_v\beta_6$ in human BA and whether it may be an attractive target for future therapy.

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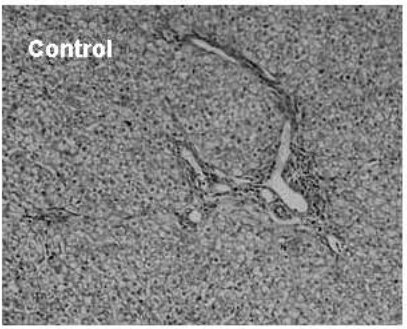

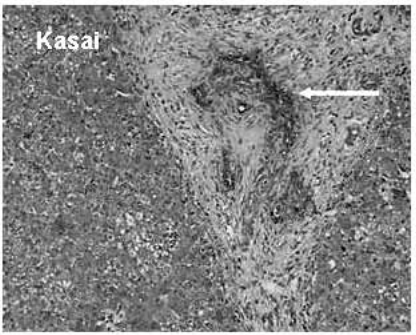

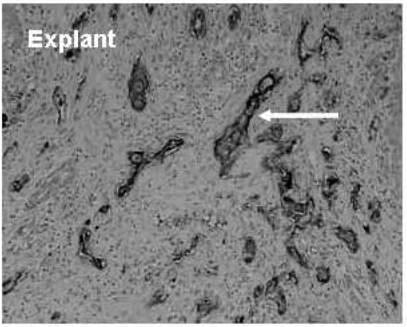

Representative liver sections from patients with biliary atresia and age-matched controls. Arrows indicate areas of integrin alpha-v, beta-6 reactivity.

Notes:

P17 HB-EGF KNOCKOUT MICE HAVE DELAYED ANGIOGENESIS AFTER INTESTINAL ISCHEMIA/REPERFUSION INJURY

Osama N. El-Assal, M.D., Ph.D., Andrei Radulescu, M.D., Ph.D., Heather N. Paddock, M.D., Gail E. Besner, M.D.

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Purpose:

We have previously demonstrated that deletion of the HB-EGF gene reduces early healing by restitution and increases mortality after intestinal ischemia in mice. Complete intestinal recovery, however, requires cell proliferation and reconstitution of villus structure, a process that requires active angiogenesis. The current study was designed to evaluate whether deletion of HB-EGF affects microvascular changes after intestinal ischemia/reperfusion in mice.

Methods:

The experimental protocol was approved by the Institutional Animal Care and Use Committee. HB-EGF knockout (KO) and wild type (WT) mice were subjected to 45 min of intestinal ischemia, resulting in deep intestinal damage. Evaluation of microvascular changes was achieved by immunohistochemistry using three different antibodies [anti-CD34, anti-Von-Willebrand factor (VWF) or anti-alpha smooth muscle actin (SMA)]. Stained sections were scanned microscopically and evaluation of the immunoreactive area % was achieved using MetaMoprh computer software. All values were expressed as mean ± SE with statistical analyses performed using Student t test.

Results:

Under basal conditions, the immunoreactive endothelial cell area % in HB-EGF KO mice was slightly lower compared to WT mice. Seventy-two hours after intestinal ischemia, the immunoreactive endothelial cell area % in HB-EGF KO mice was significantly lower compared to WT mice (0.59±0.07, n=13 vs. 1.34 ±0.14, n=11; $p<0.05$; anti-VWF staining). Comparable results were obtained by staining with anti-CD34 and anti-alpha SMA antibodies. Seven days after ischemia, the microvascular density returned to basal preoperative levels in KO and WT mice.

Conclusions:

These results indicate that HB-EGF KO mice have delayed onset of angiogenesis after ischemic injury and that endogenous HB-EGF promotes angiogenesis during intestinal healing. Thus, HB-EGF is essential not only for early intestinal healing by restitution, but also for late healing via angiogenesis. These findings lend further support for the therapeutic use of HB-EGF in patients with intestinal injuries including necrotizing enterocolitis.

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P18 BODY COMPOSITION AND METABOLIC CHANGES ASSOCIATED WITH MASSIVE INTESTINAL RESECTION

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Purpose:
Following massive small bowel resection (SBR), patients suffer from malnutrition and other metabolic alterations which have yet to be fully characterized. Further, the effect of resection-induced adaptation on reversal of these abnormalities is presently unknown. We sought to determine the effect of massive SBR and postoperative adaptation on alterations in energy turnover and body composition in our murine model.

Methods:
Male C57/Bl6 mice underwent 50% SBR or Sham operation and were pair-fed throughout the study. On post-operative days 1, 3, 7, 14, 21 and 28, 24-hour indirect calorimetry was used to serially determine O_2 consumption, CO_2 production, and Total Energy Expenditure (TEE). At the same time points, Nuclear Magnetic Resonance (NMR) was employed to determine body composition to include % lean body mass (LBM) and % total body fat (BF). A repeated-measures linear regression was used to determine statistical differences between groups.

Results:
Both groups of mice were gaining weight throughout the study period. When compared with sham-operated mice, SBR was associated with significantly lower ($p<0.001$) O_2 consumption, CO_2 production, and TEE. These differences persisted during the entire 28-day postoperative adaptation phase. Following SBR, the %BF was significantly lower in the early postoperative time (days 1-3) but increased significantly during the later adaptation time points. LBM was lower after SBR but no differences existed in rate of change over time between the sham and the SBR groups.

Conclusion:
Massive SBR results in significantly lower energy expenditure, but rapidly depletes both body fat and lean body mass. During the adaptation phase, a unique response has been identified consisting of preferential restoration of body fat stores over lean body mass. The impact of growth factor and/or pharmacologic therapy designed to enhance resection-induced adaptation responses warrant further evaluation in the context of this perturbed metabolic response to massive intestinal loss.

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P19 URIC ACID PREDICTS LIVER INFLAMMATION IN OBESE ADOLESCENTS

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Purpose:

Morbid obesity is associated with non-alcoholic steatohepatitis (NASH) but no biomarker has been demonstrated to reliably predict NASH. The purpose of this study was to investigate the association between uric acid levels and steatohepatitis in obese adolescent patients undergoing gastric bypass surgery (GBS).

Methods:

Clinical and laboratory data were prospectively collected for 11 consecutive patients undergoing GBS. All patients underwent liver biopsy at the time of GBS for histologic evaluation and RNA extraction for gene expression microarray analysis. A pathologist independently scored all histologic sections utilizing a modified Brunt's criteria. Patients were stratified into groups based upon histological inflammation scores. Follow-up liver biopsies were performed six or more months after GBS to determine resolution or progression of disease.

Results:

Multivariate linear regression analysis, accounting for differences in age, sex, and body mass index (BMI), revealed a significant association between uric acid levels and liver inflammation at the time of surgery (see Table). No other measure of liver function or plasma lipid was significantly associated with steatohepatitis in this patient sample. Microarray analysis identified several differentially expressed genes between individuals with and without inflammation, including monocyte chemoattractant protein-1, which is associated with both increased inflammation and uric acid mediated arteriole damage.

Conclusions:

Morbidly obese adolescent patients undergoing gastric bypass surgery have an increased risk of liver inflammation. Uric acid levels significantly predict inflammation whereas other known markers did not. Uric acid levels may be an important marker of liver inflammation.

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Inflammation	None (n=2)	Mild (n=6)	Moderate (n=2)	High (n=1)	Multivariate Regression P-value
Female/Male	1/1	5/1	0/2	0/1	0.390
BMI (kg/m2)	56(45-67)	72(55-95)	86(85-87)	59	0.832
Age (y)	16 (15-17)	16.8 (16-19)	16 (15-17)	17	0.747
Uric Acid (g/dL)	5.6(5.4-5.8)	7.1(5.6-8.8)	7.7(7.6-7.7)	9.5	0.021
ALT (U/L)	29(19-38)	31(18-43)	39(36-42)	90	0.091
AST (U/L)	21(21)	22(17-26)	26(26)	56	0.072
GGT (U/L)	91(18-164)	30(18-49)	33(32-34)	50	0.364
Triglycerides (mg/dL)	114(85-143)	106(79-152)	106(90-121)	117	0.862
Insulin (µU/mL)	9.9(9.8-10)	29(2.9-75)	62.5(36-89)	26(26)	0.333

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P20 A RATIONAL DEFINITION OF SUPEROBESITY FOR ADOLESCENT BARIATRIC PATIENTS: A BMI> 45 kg/m^2?

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Purpose:
The concept of "superobesity" initially evolved to describe a subset of adult bariatric patients whose preoperative weight far exceeded the minimum requirement for surgical intervention and in whom weight loss after gastric restrictive operations was suboptimal and problematic. Since its inception, however, various reports in the adult bariatric literature have dissimilarly defined "superobesity" based on arbitrarily assigned cutoff points for either weight or BMI. We test the hypothesis that the incidence and severity of obesity related comorbidities by BMI can provide a rational basis for defining superobesity in adolescent bariatric patients.

Methods:
To elucidate how obesity-related comorbidities stratify according to BMI in 20 morbidly obese adolescents (aged 14-17) who have undergone laparoscopic adjustable gastric banding (LAGB) at our institution, we compared preoperative data at multiple cutoff points for BMI. Statistical analyses of continuous and discrete variables were performed using student's t-test and Chi-squared test, respectively. Differences were considered significant at $p< 0.05$.

Results:
In this series, incidences of several obesity-related comorbidities and means of several metabolic parameters were observed to stratify disparately at a BMI cutoff point of 45 kg/m^2 (BMI range 38.3 - 78.5) (table 1). Furthermore, early postoperative results show a trend towards slower weight loss in patients with BMI >45 kg/m^2 after LAGB (p=not significant) *(Figure 1 on next page)*.

Conclusions:
Adolescent bariatric patients with a BMI>45 kg/m^2 have a higher incidence and severity of several obesity-related comorbidities than those with a BMI < 45 kg/m^2, suggesting that BMI >45 kg/m^2 can rationally define superobesity in adolescent bariatric patients. This definition needs further validation with a larger patient sample and long term follow up.

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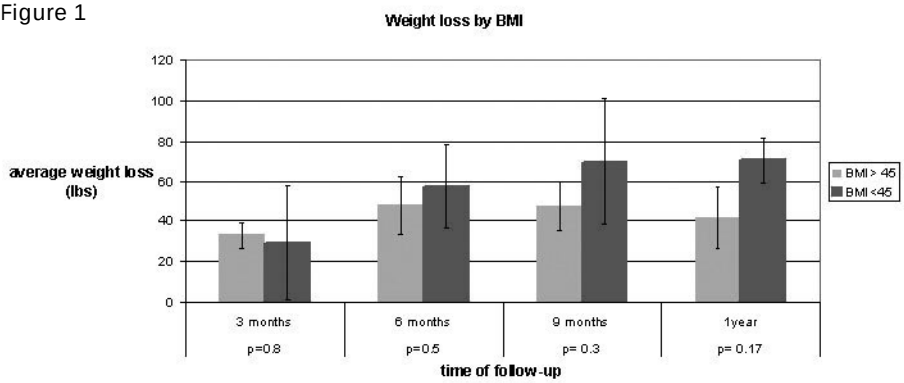
Figure 1



Severity and incidences of comorbidities by BMI of 45 kg/m^2			
Measure (reference range)	BMI>45 kg/m^2 (14 patients)	BMI<45 kg/m^2 (6 patients)	p-value
HOMA-IR (insulin resistance, <3.16)	13.5 ± 12.1	4.1 ± 1.8	0.01
Fasting Insulin (<17uU/mL)	43.9 ± 35.3	17.8 ± 9.9	0.02
Fasting glucose (<110 g/dL)	121.1 ± 74.7	78.7 ± 6.7	0.05
Vitamin D (20-60 ng/ml)	21.1 ± 9.6	32.3 ± 8.1	0.02
Triglycerides (30-150 mg/dL)	130.8 ± 59.9	66 ± 12.8	0.002
Incidence of Vitamin D insufficiency	7 (54%)	0	0.03
Incidence of Metabolic syndrome	14 (100%)	3 (50%)	0.004
Incidence of hyperlipidemia	7 (50%)	0	0.03
Incidence of Obstructive Sleep Apnea	8 (57%)	0	0.02

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P21 AN UPDATE ON 66 U.S. OBESE PEDIATRIC PATIENTS TREATED WITH LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING

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Background:

Evidence suggests that bariatric surgery may be the only reliable method for substantial and sustainable weight loss for morbidly obese adolescents, however debate continues over the optimal surgical procedure. Our institution has demonstrated excellent weight loss with little morbidity using laparoscopic adjustable gastric banding (LAGB), including in adolescents. This analysis is an update of our results in our first 66 patients.

Methods:

All children aged 13-17 who have undergone LAGB at our institution have been entered into our prospectively collected database since 2001 were reviewed. Data collected preoperatively included age, gender, race, and body-mass index (BMI). Post-operatively recorded data included length of stay, operative morbidity, need for re-operation, as well as percent excess weight loss (%EWL) and BMI at three month intervals.

Results:

Sixty-six children aged 13-17 (mean 16.0) underwent LAGB at our institution since September 2001. Of these, 49 were female and 17 were male. The mean pre-operative weight was 296 lbs. with a BMI of 47. The %EWL and BMI at six months, one year, and two years post-operatively are shown below (Table). There were no intra-operative complications. Five patients required laparoscopic repositioning for band slippage and one required band removal for intolerance. Two patients developed symptomatic hiatal hernias that required laparoscopic repair.

Conclusions:

LAGB is a safe operation for morbidly obese pediatric patients and represents an effective treatment strategy with a %EWL greater than 50% at both one and two year follow-up. Due to the minimal morbidity compared to the gastric bypass, it is the optimal surgical option for pediatric patients with morbid obesity.

BMI and %EWL in 66 Obese U.S. Adolescents

Time	Number	Mean Weight	BMI	%EWL
Pre-op	66	296 ± 51	47 ± 6.3	NA
6 months	44	242 ± 54	37 ± 10	38.5 ± 18
1-year	34	210 ± 56	34 ± 8	57.3 ± 20
2-years	5	229 ± 23	36 ± 5	52.4 ± 6

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P22 OUTCOME AFTER CAUSTIC INGESTION IN CHILDREN

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[1]Univ. of Miami Miller School of Medicine, Miami, FL, USA, [2]Baylor College of Medicine, Dept of Pediatrics, Houston, TX, USA, [3]Baylor College of Medicine, Houston, TX, USA.

Purpose:

To review outcome in children with caustic ingestions over a 20 year period (1985-2006).

Method:

Retrospective chart review.

Results:

Fourty-four patients with caustic ingestion were identified. Nineteen (43%) were boys. There was one death three days after ingestion from a caustic tracheoesophageal fistula. She was excluded from statistical analysis. The average age was four years (range 9 mo -17y). In 7/43 patients (16%) the ingestion was observed. Twenty-eight of 43 (65%) of patients had an oropharyngeal burn. All patients underwent endoscopy and 34/43 (79%) had an esophageal burn (Grade 1, n= 9, Grade 2, n=19, Grade 3, n=6). Thirty-two of 40 pts with alkaline ingestion had esophageal burns and two had injury to the gastric mucosa. There were three patients with acid ingestion; all had esophageal burns, and none had injury to the gastric mucosa. Twenty-three of43 patients received antibiotics and 21/43 patients received steroids. There were fewer patients who received steroids in the last 10 years (68% vs 41%, p =0.47). The average LOS was six days (range 1-31). Patients were able to tolerate solid oral intake an average of 14 days after ingestion. The average time to tolerating solid food for two days for Grade 1 (range 0-5), nine days for Grade 2 (range 2-29), and 40 days for Grade 3 (range 3-183). Four of 43 pts developed strictures an average of 26 days from ingestion (range 12-36), three with Grade 2 injuries, and one with Grade 3. These four patients required 1, 2, 12, and 18 dilations before two went on to esophagectomy and esophageal replacement.

Conclusion:

In a large, single hospital series, caustic ingestion resulted in oropharyngeal burns in 65% of patients and esophageal injury in 79% of patients. Approximately 7% of patients required surgery and approximately 10% require dilations for stricture formation. Caustic ingestion remains a serious and morbid condition in children.

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P23 GLOBAL IMPACT OF ANTENATAL DIAGNOSIS OF ANOMALIES ON OUTCOMES AND HEALTH CARE SYSTEM: ANALYSIS OF PROSPECTIVE POPULATION-BASED FETAL ALERT NETWORK (FAN) DATABASE

The Fetal Alert Network, Peter Kim, M.D.
Hospital for Sick Children, Toronto, ON, Canada.

Purpose:
Antenatal care and interventions are fundamentally changing the nature and natural history of congenital anomalies. The global impact of antenatal care on postnatal outcomes of pregnancies complicated by anomalies however is not known.

Method:
The FAN comprises of all perinatal centers providing antenatal care for all pregnancies complicated by antenatal detection of anomalies for a geographically defined population of approximately 12 million inhabitants in a centralized, single payer health care system. A prospective, precise and accurate antenatal health care and health systems utilization information are collected by the care providers in real-time. The cohort of (n = 931) was registered between April 2005 and March 2006. The provincial perinatal database which collects all delivery information (n = 120,611) was used as comparison. The data were analyzed by SAS (v 9.1) and SPSS (v 11.5).

Results:
Maternal demographics including genetics and environmental risk factors were comparable between the cohorts and low risk general population. Antenatal diagnosis of anomalies is associated with significantly higher incidence of prematurity (<28 wk, 28-36 wk GA) and low birth weight (<1500 gm, 1500-2499 gm) ($p<0.001$). Types of anomalies significantly influenced the time of first assessment, birth gestational age and birth weight ($p<001$). The overall outcomes of immediate neonatal survival was 624.5 per 1000 live births while 30.4 % of cohorts were admitted to NICU ($p<0.001$). The presence of congenital anomalies has significantly longer length of NICU stay ($p<0.0007$).

Conclusion:
To our knowledge, this is the first report, linking antenatal care and intervention with the postnatal outcome. It reveals important insights into both antenatal health care and health systems utilization information, critical for future health policy formulation and resource allocation. The FAN database provides the basis for fundamental changes in the paradigm of birth defect care and surveillance.

Notes:

P24 IMPROVED SURVIVAL IN A MULTIDISCIPLINARY SHORT BOWEL SYNDROME PROGRAM

Biren P. Modi, M.D.[1], Monica Langer, M.D.[1], Stephen D. Waterford, MS[1], Julie Iglesias, PNP[1], Debora Duro, M.D.[2], Christopher Duggan, M.D., MPH[2], Tom Jaksic, M.D., Ph.D.[1]

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Purpose:
Pediatric short bowel syndrome (SBS) remains a management challenge with significant mortality. In 1999, we initiated a multidisciplinary pediatric intestinal rehabilitation program to consolidate the care of these complex patients. The purpose of this study was to determine if the multidisciplinary approach was associated with improved survival in this patient population when compared to our prior institutional experience.

Methods:
The program includes dedicated staff in surgery, gastroenterology, nutrition, pharmacy, nursing and social work who guide management for inpatients and outpatients with intestinal failure. After IRB approval, we reviewed the medical records of all severe SBS patients (dependence on parenteral nutrition > 90 days) treated in our program from 1999 to 2006. These patients were compared to a historical control group of consecutive severe SBS patients (n=30) identified using the same criteria who were treated between 1986 and 1998. Statistical analysis was performed using Fisher's exact and t-tests, with significance set at $p<.05$.

Results:
Fifty-four patients with severe SBS managed by the multidisciplinary program were identified. Mean (±SD) follow-up was 2.2 (±2.1) years. The mean residual small intestinal length was 70±36cm, compared to 83±67cm in the historical controls (p=NS). Mean peak direct bilirubin was 8.1±7.9 mg/dL compared to 9.0±7.4 mg/dL in the historical controls (p=NS). Full enteral nutrition was achieved in 67% (36/54) of patients, compared to 67% (20/30) of patients in the historical group (p=NS). The overall survival rate, however, was 88.9% (48/54), significantly higher than in the historical controls (70%, 21/30; $p<.05$).

Conclusions:
A multidisciplinary center for advanced intestinal rehabilitation allows for fully integrated care of inpatients and outpatients with SBS by fostering coordination of surgical, medical and nutritional management. Our experience with two comparable cohorts demonstrates that this multidisciplinary approach is associated with improved survival.

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P25 RISK FACTORS FOR NEGATIVE APPENDECTOMY IN CHILDREN: BASIS FOR THE ESTABLISHMENT OF A CLINICAL PATHWAY IN THE DIAGNOSIS OF PEDIATRIC APPENDICITIS

Pascal Rheaume[1], Pascale Prasil[1], Guillaume Boiteau[1], Ghislain Brousseau[1], Ari-Nareg Meguerditchian.[2]

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Purpose:

Acute appendicitis (AA) remains the most common surgical emergency in children. Despite technical advances, the appropriate and cost-effective diagnostic algorithm for pediatric appendicitis is yet to be refined. Consequently, the acceptable threshold for negative appendectomy (NA) remains unknown. The aim of this study is to determine risk factors for undergoing a NA using a large, single institution database.

Methods:

With IRB approval, pediatric NA and AA performed between January 2000 and 2006 were compared regarding age, sex, clinical presentation, laboratory investigation and imaging. All ultrasound studies were reviewed by a single radiologist. Chi Square and Fisher's t test were used for statistical analysis and a $p<0.05$ was considered significant.

Results:

Eight hundred eighty-one appendectomies were performed over the study period. One hundred six children (12%) underwent negative appendectomies. The mean age was the same in both groups (10.2 vs 10.9 years). Children aged between 2-6 years old carried the highest risk of unnecessary appendectomy (17.8%). Females underwent more frequently NA (15.6% vs 9.8%, $p=0.009$). McBurney's sign was less frequent in the NA group (57.6% vs 84.9%, $p<0.0001$). Mean rectal temperatures were similar in the two groups, but leukocytosis was significantly lower in the NA group (11.2 vs 15.1x109/mm, $p<0.0001$). The proportion of children undergoing preoperative ultrasound was similar in both groups (68.7% vs 69.8%). Ultimately, 35 children (33%) underwent unnecessary surgery based on misleading ultrasound results. The major confounding criteria was appendicular diameter.

Conclusions:

Factors leading to a negative appendectomy in children include female sex, young age (2-6 years), absence of McBurney's sign and absence of leukocytosis. A clinical decision pathway integrating more advanced investigation when patients present with a combination of these risk factors would result in optimal resource allocation. Finally, ultrasound criteria for diagnosis of pediatric appendicitis might have to be refined.

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P26 RESIDENCY TRAINING IN PYLOROMYOTOMY:
A SURVEY OF 331 PEDIATRIC SURGEONS

Graham H. Cosper, M.D., Rema Menon, Ph.D., Mary Sue Hamann, Ph.D., Don K. Nakayama, M.D., M.B.A.
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Purpose:
Both pediatric and general surgeons perform pyloromyotomy. Developments in laparoscopic pyloromyotomy (lap) and changes in referral patterns have affected the training of pediatric surgery fellows and general surgery residents. We surveyed pediatric surgeons regarding these issues.

Methods:
We mailed an IRB-approved survey to 701 U.S. members of APSA: preferred technique (lap vs. open), practice setting, involvement with fellows and residents, and opinions regarding pyloromyotomy training. Chi-square analyses determined significance.

Results:
Three hundred thirty-one surgeons (47%) responded: 197 (60%) performing most or all open, 85 (26%) most or all lap. Lap was more likely in academic centers and children's hospitals ($p<0.05$). Compared to residents under surgeons performing open, residents under surgeons performing lap were less likely to participate (58% vs. 91%, $p<.01$) or gain competence (22% vs. 42%, $p<.01$). Only 34% of surgeons performing lap believed that general surgery residents should learn pyloromyotomy, while 67% of surgeons performing open believed that residents should learn the procedure ($p<.01$). Three hundred seven surgeons (93%) believed at least four open were necessary to become competent, but 126 (44%) reported that their residents performed fewer than four. Only 104 surgeons (31%) believed that their residents were competent in pyloromyotomy. Three hundred three surgeons (92%) believed that pyloromyotomy should be performed only by pediatric surgeons when possible.

Conclusions:
Most general surgical residents are not learning pyloromyotomy, in part due to the adoption of laparoscopic technique, limited operative experience, and the opinion of most pediatric surgeons that the procedure should be performed only by pediatric surgeons.

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P27 LIVER TRANSPLANTATION FOR PULMONARY COMPLICATIONS OF PEDIATRIC END-STAGE LIVER DISEASE

Corey W. Iqbal, M.D., Tuan H. Pham, M.D., Ph.D., Angela M. Hanna, M.D., Michael J. Krowka, Michael B. Ishitani, M.D.

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Purpose:

Hepatopulmonary syndrome (HPS) and portopulmonary hypertension (PPH) are poorly understood pulmonary complications of end-stage liver disease (ESLD). We present a case series of children with HPS and PPH evaluated for orthotopic liver transplantation (OLT).

Methods:

After IRB approval, query of our medical database identified children 0-18yrs with ESLD evaluated for HPS or PPH. Data was collected via chart review.

Results:

Five children had HPS (n=4) or PPH (n=1). ESLD was due to biliary atresia (n=3), hepatoportal sclerosis, and alpha-1antitrypsin deficiency. Patients with HPS presented with dyspnea at a mean age of 12 yrs (range 5-17 yrs) and experienced progressive hypoxia over a mean 8mos (range 6-12 mos). Pulmonary shunting by lung perfusion scan averaged 34% (range 20-63%) with a mean PaO_2 of 54mmHg (range 44-66mmHg). Three patients required supplemental oxygen and, upon UNOS appeal, received MELD score exceptions enabling them to undergo OLT within 1-2 mos. The fourth patient was initially rejected by UNOS regional review board, but 12 mos of worsening hypoxia led to OLT 2 mos after successful UNOS appeal. All patients with HPS undergoing OLT experienced complete resolution of hypoxia within 1-4 mos. The child with PPH was treated with intravenous epoprostenol to lower mean pulmonary artery pressure (PAP) after her initial mean PAP of 35 mmHg rose to 53 mmHg. Seven mos after listing she underwent OLT. At recirculation PAP transiently rose to systemic levels but was controlled by increasing epoprostenol infusion. Post-operatively, mean PAP normalized to 16mmHg over 15 mos and epoprostenol was weaned to discontinuation. There were no peri-operative deaths nor pulmonary complications and all patients are alive at a mean follow-up of 43 mos (range 15-111 mos).

Conclusions:

HPS and PPH are uncommon complications of ESLD in children. Epoprostenol can bridge PPH patients to OLT. OLT leads to rapid resolution of pulmonary disease and currently represents the only successful treatment for these children.

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P28 INTERMEDIATE TERM PATENCY OF UPPER ARM ARTERIOVENOUS FISTULAE FOR HEMODIALYSIS ACCESS IN CHILDREN

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Purpose:
Despite abundant literature about upper arm arteriovenous fistulae in adults, pediatric data are scarce. The goal of this study was to estimate thrombosis free survival of basilic vein transposition (BVT) and brachiocephalic fistulae in children.

Methods:
After IRB approval, all children who underwent BVT or brachiocephalic fistula construction at a tertiary children's hospital from June 2001-July 2006 were reviewed. Kaplan-Meier analysis, log-rank test and proportional hazards regression were done, with $p<0.05$ considered significant.

Results:
Sixteen children (7 girls) with inadequate forearm veins by venography underwent creation of 18 upper arm fistulae (12 BVT, 6 brachiocephalic). Median age was 14 (9 to19) years. Thirteen patients (81%) had undergone prior renal transplantation. Mean (±SE) operative times for BVT and brachiocephalic fistulae were 3.4 (± 0.6) hours and 1.9 (±0.4) hours, respectively. All patients were systemically heparinized during the operation and received aspirin in the immediate postoperative period. Early thrombosis (prior to fistula use) occurred in one patient. A Kaplan-Meier curve for overall patency is shown in Figure 1. This reflects four thromboses (one brachiocephalic, three BVT) and nine patients who were censored prior to the date of study completion (four renal transplants, two unrelated deaths, one elective conversion to peritoneal dialysis, one surgical ligation of fistula due to arm edema associated with innominate vein occlusion, and one lost to follow-up). Six of 18 fistulae underwent interventions (four percutaneous angioplasty; two surgical thrombectomy). There were no significant differences in survival curves based on fistula type, prior transplant status, age, or operative time. All failures and 83% interventions occurred within one year of fistula creation.

Conclusions:
Brachiocephalic and basilic vein transposition fistulae create reliable hemodialysis access for children who have inadequate forearm veins to allow construction of more distal fistulae. Intermediate term patency is comparable to that reported in adults.

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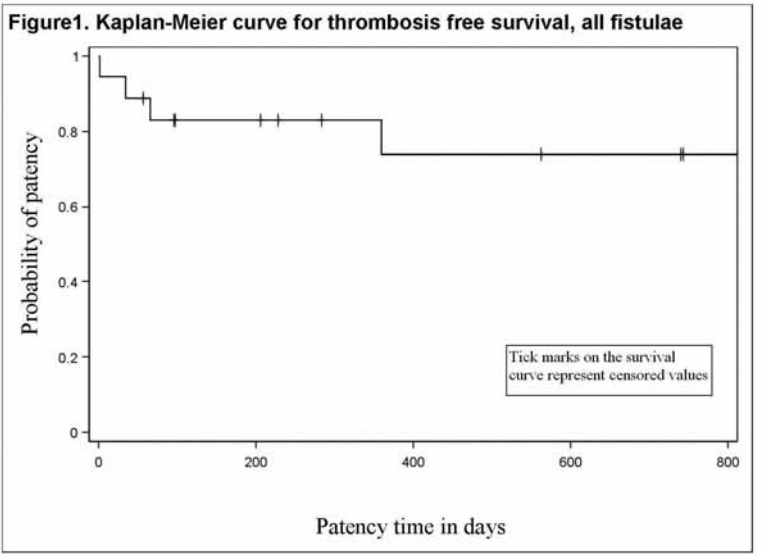
Figure1. Kaplan-Meier curve for thrombosis free survival, all fistulae



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P29 PROTEOMIC APPROACH TO FETAL DISEASES

Raul A. Cortes, M.D., Olga Miroshnychenko, Ph.D., Alan Jew, Susan Fisher, Ph.D., Hanmin Lee, M.D.

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Purpose:

Proteomic analysis of diseased tissues has led to the discovery of novel diagnostic and therapeutic targets. Our goal was to establish a proteomic workflow for analysis of amniotic fluid from fetuses with varied diagnoses seen at a fetal treatment center.

Methods:

Between 2003-2006, we started a fetal tissue bank comprised of amniotic fluid from 51 patients undergoing fetal intervention and 25 controls undergoing screening amniocentesis. All amniotic fluid was centrifuged at 3000g x 15 minutes to remove cellular debris and stored at -80 C. Samples from three patients with a fetal diagnosis of posterior urethral valves (PUV) and a gestational age matched control were immuno-depleted of albumin and immunoglobulins. In order to remove salts and other interfering substances, samples were precipitated using 10% Trichloroacetic-Acid in 2% Sodium-Deoxycholate followed by 95% acetone washings. Samples were analyzed using two approaches. In the first, protein precipitates underwent liquid isoelectric fractionation (IEF) into five different pH fractions followed by SDS PAGE analysis. In the second, samples were compared using 2-D gel electrophoresis. All gels were fixed, stained with colloidal Coomassie blue and silver dyes and compared.

Results:

Average gestational age at the time of intervention was 21 2/7 for the PUV patients and 19 5/7 for the control patient. Two PUV patients underwent fetal cystoscopy and valve ablation and the third underwent bladder drainage. SDS-PAGE analysis of liquid IEF fractions showed striking differences in the protein profiles at all pH ranges consistent amongst the PUV patients (figure). Traditional proteomic approach using 2-D gel electrophoresis also showed major differences in the amniotic fluid of patients with PUV compared to a gestational matched control (figure).

Conclusions:

Amniotic fluid from PUV patients is remarkably different from that of an age-matched control. Further analysis of these fractions with MALD-TOF mass spectroscopy may reveal new proteins integral to PUV pathophysiological mechanisms.

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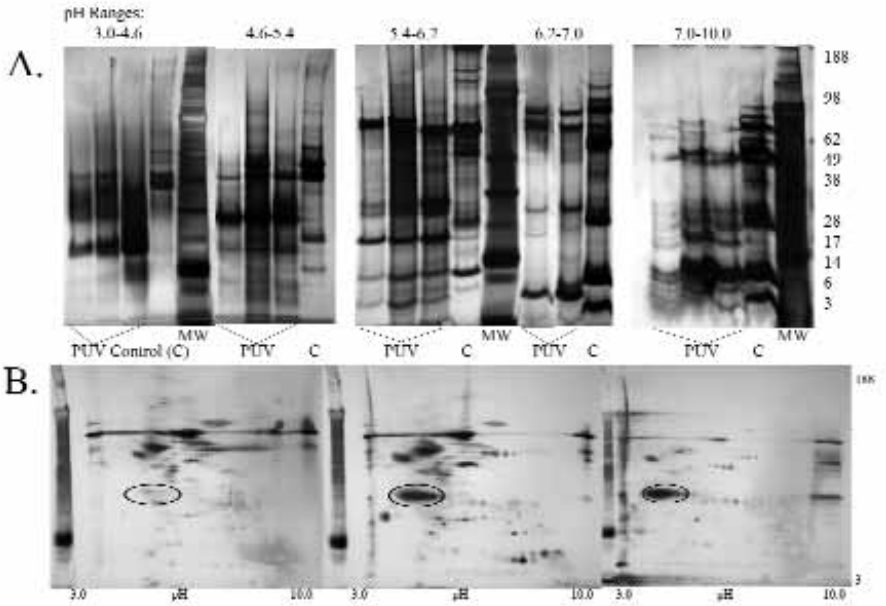

Figure A. 1-D SDS-PAGE of different IEF fractions (prefractionated by pH using ZOOM IEF Fractionator, Silver stained). PUV-posterior urethral valve, MW-molecular weight marker (values on side).
Figure B. 2-D ZOOM Electrophoresis of Normal (left panel) and PUV amniotic fluid from two patients (Silver stained). pH ranges are noted, MW marker values on side. Areas of large obvious differences are circled.

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P30 C-MET IS UP-REGULATED IN A RABBIT MODEL OF GASTROSCHISIS

Matthew S. Clifton, M.D., Jacob T. Stephenson, Prema S. Idumalla, MS, Edgar Sy, M.D., Shinsuke Ohashi, M.D., Susmita Chatterjee, SRA-III, Erich J. Grethel, M.D., Raul A. Cortes, M.D., Denise Ventura, M.D., Amy J. Wagner, Kerilyn K. Nobuhara, M.D.
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Purpose:
Following repair of gastroschisis, many children suffer from lifelong disturbances in intestinal motility. Intestinal peristalsis is a complex process regulated by both the interstitial cells of Cajal (ICC's) and the neuronal network of the intestine. Coordination of enteric neuron growth and maturation is mediated by a number of factors. c-Met, a tyrosine kinase membrane receptor, regulates axonal growth and differentiation. We hypothesized that intestinal dysmotility in gastroschisis is due to failure of development of a normal network of ICC's as well as an overgrowth of immature neuronal forms.

Methods:
Timed pregnant New Zealand white rabbits (n=20) underwent laparotomy on gestational day 21 (term, 31 days). Hysterotomy was performed to expose the fetal abdomen and hindquarters, and a full thickness abdominal wall defect was created to the right of the umbilicus. The fetus was replaced into the uterus and harvested at gestational day 28. The surgical defect was created in a total of 30 fetuses, with a 53% survival rate. Non-operated fetuses from the same uterus served as controls. Small intestine, colon, stomach, and liver were removed for histology, protein and RNA.

Results:
Histology with hematoxylin/eosin staining revealed a thickened circular muscle layer in small bowel and blunting of the intestinal villi. Immunohistochemistry for c-kit showed an absence of staining in gastroschisis small bowel, however no qualitative difference was appreciated between control and experimental groups with c-met immunohistochemistry. PCR and Western blot for c-met revealed an increased expression in the small bowel of gastroschisis animals.

Conclusion:
C-met, a neurotrophic factor involved in neuronal growth and migration, is overexpressed in the setting of gastroschisis. Along with damage to ICC's, this may contribute to the disordered overgrowth of enteric neurons, and ultimately result in intestinal dysmotility.

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P31 POSTOPERATIVE FOLLOW-UP: IS A PHONE CALL ENOUGH?

Marcene R. McVay, M.D., Karen R. Kelley, RN, Donna L. Mathews, RN, Evan R. Kokoska, M.D., Richard J. Jackson, M.D., Samuel D. Smith, M.D.

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Background/Purpose:

Telephone follow-up after pediatric surgical procedures has not been widely reported to date. At our institution, patients undergoing selected procedures are referred to a protocol for telephone follow-up by surgical specialty nurses. This system was developed to meet the needs of families who travel up to three hours for their child's surgical care. Our objective is to review our experience with this protocol to determine if telephone follow-up is a safe and preferred alternative to the traditional postoperative clinic visit.

Methods:

With IRB approval, records of postoperative patients followed-up by telephone over six months were reviewed. Procedures selected for telephone follow-up include routine herniorrhaphy, appendectomy, pyloromyotomy, circumcision, soft-tissue mass excision, gastrocutaneous fistula closure, ingrown toenail excision, laparoscopic cholecystectomy and other procedures referred by the attending surgeon. Telephone follow-up forms, clinic notes and emergency department (ED) records were all evaluated for information regarding the postoperative course of each patient.

Results:

We reviewed the charts of 563 patients who underwent a total of 601 procedures including 250 herniorrhaphies, 137 circumcisions, 59 pyloromyotomies, 47 soft-tissue excisions, 35 appendectomies, 21 toenail excisions, 14 cholecystectomies, 14 gastrocutaneous fistula closures and 24 other procedures. Seventy-six percent (n=427) were contacted postoperatively; 24% (n=136) did not respond to two phone calls or letter. Forty-five requests for clinic follow-up resulted in 27 actual visits, 10 from families not satisfied with phone contact alone. Most families contacted (382 of 427, 90%) were satisfied and did not request an appointment. A total of 43 postoperative clinic or ED evaluations resulted in nine interventions for complications (1.6% complication rate). The four complications requiring surgery or admission were from ED visits by non-contacts.

Conclusions:

Postoperative follow-up by telephone using a structured protocol is a safe alternative to routine clinic follow-up for patients undergoing selected procedures and is preferred by patients' families.

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P32 NITROFEN INDUCES A POTENT CYTOXICITY INDEPENDENT OF RETINOIC ACID SIGNALING

David E. Kling, Ph.D., Amanda J. Cavicchio, B.S., Christina A. Sollinger, B.S., Thomas Bernard Kinane, M.D., Patricia K. Donahoe, M.D., Jay J. Schnitzer, M.D., Ph.D.
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Purpose:
Nitrofen is a diphenylether that induces pulmonary hypoplasia associated with congenital diaphragmatic hernia (CDH) in rats and mice. A longstanding hypothesis has been that nitrofen (at a concentration of 17.6 µM) interferes with retinoic acid signaling. To definitively test this hypothesis, we developed a quantitative assay to measure the impact of nitrofen on retinoic acid signal transduction.

Methods:
Plasmid constructs consisting of a retinoic acid response element (RARE) upstream of a Luciferase reporter gene were co-transfected into HEK293 cells with a pGL3 normalizing plasmid containing Renilla Luciferase. Using retinaldehyde as a ligand, a dose-response curve was used to generate an EC_{50} (the midpoint between maximal and minimal responses). Nitrofen's impact on the oxidation of retinaldehyde to retinoic acid was assessed by simultaneous treatment of the transfected cells with the EC_{80} value of retinaldehyde and multiple nitrofen concentrations. Retinoic acid signaling levels were characterized by measuring luciferase as a function of Renilla. Cytoxicity was assessed in HEK cells using LDH release and TUNEL assays and in whole embryos using Live/Dead staining.

Results:
Nitrofen potently interferes with both Luciferase and Renilla Luciferase responses, suggesting that nitrofen is cytoxic for these cells. This cytoxicity was confirmed both in HEK cells as well as in whole embryos at concentrations comparable to those used in previous studies.

Conclusions:
The mechanism of nitrofen induced pulmonary hypoplasia has been hypothesized to involve interference with retinoic acid signaling. We now show that that nitrofen does not directly interfere with retinoic acid signaling but induces cytoxicity in both HEK293 cells and in whole embryos. These results support our previous observations that nitrofen-induced teratogenesis involves increases in apoptosis, suggesting that embryonic cell death may play a role in the observed pulmonary hypoplasia associated with CDH.

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P33 LAPAROSCOPIC PYLOROMYOTOMY: EFFECT OF RESIDENT TRAINING ON COMPLICATIONS

Ramanath N. Haricharan, MBBS, MPH, Charles J. Aprahamian, M.D., Ahmet Celik, M.D., Carroll M. Harmon, M.D., Ph.D., Keith E. Georgeson, M.D., Douglas C. Barnhart, M.D., MSPH.

Univ. of Alabama at Birmingham, Birmingham, AL, USA.

Purpose:

The purpose of this study was to characterize the safety of laparoscopic pyloromyotomy and examine the effect of resident training on the occurrence of complications.

Methods:

After IRB approval, 500 consecutive infants who underwent laparoscopic pyloromyotomy between January 1997 and December 2005 were reviewed. Analyses were performed using Fisher's exact test and logistic regression.

Results:

Laparoscopic pyloromyotomy was successfully completed in 489 patients (97.8%). Mean operative time was 26 minutes (SD 11 minutes). Four hundred seventeen patients were boys (83%). Mucosal perforation occurred in seven patients (1.4%). Another patient suffered a serosal injury to the duodenum. All were immediately recognized and uneventfully repaired. Six patients (1.2%) required revision pyloromyotomy for persistent or recurrent gastric outlet obstruction; all but one occurred in the first half of the series. There were seven wound complications (1.4%) and no deaths.

Pediatric surgery residents performed 83% of the operations while 16.7% were done by general surgery residents (PGY 3-4). There was a 5.4 fold increased risk of mucosal perforation or incomplete pyloromyotomy when a general surgery resident rather than a pediatric surgery resident performed the operation (95% CI 1.8-15.8, p=0.003). This effect remained even when the initial 15 operations (n=179) performed by each pediatric surgery resident were compared to all operations (n=81) by general surgery residents (OR 4.1, 95% CI 1.2-14.6, p=0.02). These training effects persisted even after the effects of weight, age, and attending experience were controlled. No increased risk was associated with the initial 15 operations performed by each pediatric surgery resident compared to subsequent cases performed by pediatric surgery residents (OR 1.7, p=0.37).

Conclusions:

Laparoscopic pyloromyotomy has a low complication rate and compares favorably to the open operation. The occurrence of complications is increased when the operation is performed by a general surgery resident even when directly supervised by pediatric surgical faculty.

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P34 THORACOSCOPIC VERSUS OPEN RESECTION OF CONGENITAL CYSTIC ADENOMATOID MALFORMATIONS OF THE LUNG

Lan T. Vu, M.D., Diana Farmer, M.D., Michael Harrison, M.D., Kerilyn Nobuhara, M.D., Doug Miniati, M.D., Hanmin Lee, M.D.

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Purpose:

This study evaluated the advantages and disadvantages of thoracoscopy compared to thoracotomy for resection of congenital cystic adenomatoid malformations of the lung (CCAM).

Methods:

We conducted a retrospective chart review of all cases of CCAM resection in our practice during the time period of January 1996 to July 2006. Data analysis was performed using STATA software.

Results:

Thirty-four cases of postnatal CCAM resections were done over the past 10 years; nine patients had thoracoscopic resections, while 25 patients had open resections. Even though there was no significant difference in the average age of the patients between the two groups, thoracoscopic resection was performed successfully only on patients greater than four months of age and at least six kilograms. Patients who had thoracoscopic resection had shorter postoperative hospital stay and chest tube duration. The operative time for thoracoscopy was significantly longer than that for thoracotomy (169.1 ± 15.6 days and 105.7 ± 10.9 days, respectively, $p = 0.003$). The thoracotomy group had a higher proportion of patients with postoperative complications (respiratory and non-respiratory) than the thoracoscopic group (60% and 22%, respectively, $p = 0.05$). Of the 16 attempted cases of thoracoscopic lobectomy, seven cases had to be converted to open procedures. Patients with a history of pneumonia had a significantly higher percentage of conversion than those who were asymptomatic preoperatively (100% versus 25%, $p = 0.009$).

Conclusion:

Thoracoscopic resection of CCAM resulted in shorter hospital stay and decreased incidence of postoperative complications. Based on the 44% conversion rate in our practice, thoracoscopy should be reserved for patients with no prior history of pneumonia. More advanced thoracoscopic instruments may eliminate the current limitations of age and weight.

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P35 LAPAROSCOPIC NISSEN FUNDOPLICATION MAINTAINS PULMONARY FUNCTION IN PATIENTS WITH CYSTIC FIBROSIS

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Purpose:
We have previously shown that operations on patients with cystic fibrosis (CF) can be performed with few complications and no unexpected changes in their pulmonary function. We set out to examine the effect on pulmonary function after laparoscopic Nissen fundoplication on patients diagnosed with CF.

Methods:
A retrospective review was conducted of 75 patients who underwent laparoscopic Nissen fundoplication from 2/1/2001 to 10/1/2006. Pulmonary function tests (PFT) where evaluated for those patients with a documented diagnosis of CF (n=14) pre-op and post-op at one month, one, two, three and four years when available. Statistical analysis utilizing Fisher's analysis and Student t-test was performed with $p < 0.05$ designated as significant.

Results:
Fourteen patients with CF underwent laparoscopic Nissen fundoplication. Average age of the patients was 10.7 years (range 5-16 years old). There were no deaths or complications. The mean follow-up was 48 months. Eleven of 14 patients had at least one year of follow-up. The mean forced vital capacity (FVC) at pre-op, one month, one, two, three and four years was 2.27, 2.23, 2.59, 2.90, 3.20, and 3.18 liters respectively. The mean forced expired volume in one sec (FEV1) was 1.75, 1.72, 1.89, 2.36, 2.57, and 2.69 liters and FEV1/FVC was 77.9, 77.4, 75.1, 81.6, 81.5, and 85.7 % respectively. Although there was a trend towards improvement, there was no statistically significant change in FEV1/FVC (Figure 1).

Conclusions:
While it is generally expected that the cystic fibrosis patient will decrease 1% per year in each pulmonary function parameter, pulmonary function in our patient population was either stable or improved over the post-operative period. Laparoscopic Nissen fundoplication is safe and can either maintain or improve pulmonary function tests in CF patients with severe gastroesophageal reflux disease.

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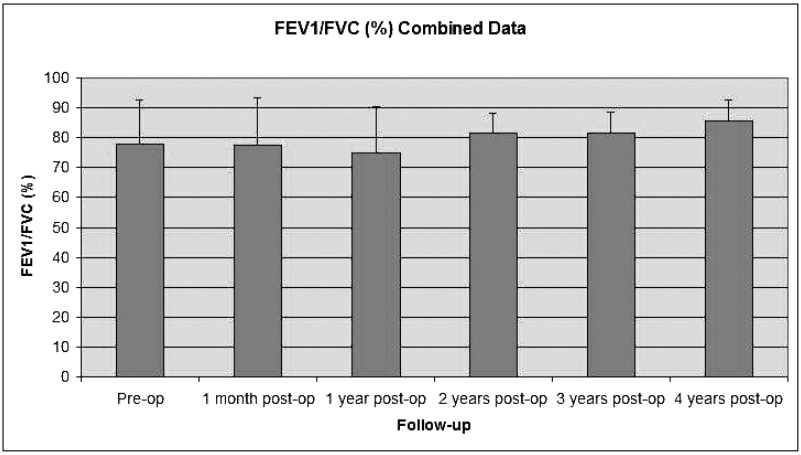

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P36 FURTHER EXPERIENCE WITH INJECTION OF MUSCLE PRECURSORS IN THE GASTROESOPHAGEAL JUNCTION

Francesco Fascetti Leon, M.D.[1], Alberto Malerba, Ph.D.[1], Luisa Boldrin, Ph.D.[1], Libero Vitiello, Ph.D.[2], Enrico Talenti, M.D.[3], Giovanni Franco Zanon, M.D.,Prof[4], Pier Giorgio Gamba, M.D.[4], Agostino Pierro, Prof[1], Paolo De Coppi, M.D., Ph.D.[1]

[1]Institute of Child Health-Surgery Unit, Great Ormond Street Hospital for Children, London, United Kingdom, [2]Gene Transfer Laboratory, Department of Biology, Padova, Italy, [3]Institute of Radiology Az. Ospedaliera, Padova, Italy, 4Pediatric Surgery Department, Padova, Italy.

Purpose:

Endoscopic injection of bulking agents has emerged as a viable option to threat Gastroesophageal reflux. However long term results are usually unsatisfactory because the use of non-functional agents. Muscle precursors cells (MPCs) expanded *in vitro* maintain their phenotype and generate both *in vitro* and *in vivo* contractile muscle tissue. It has previously demonstrated that MPCs could survive when injected in the Gastroesophageal Junction (GJ). In this study we investigate the capability of the injected cells to integrate, differentiated and persisted at longer time point in the GJ.

Methods:

Two cellular compounds, MPCs and minced muscle cultured cells, were obtained from skeletal muscle biopsies of green fluoreshent (GFP+ve) mice. After expansion *in vitro* the cells were injected in the GJ of GFP-ve mice after cryo-injury, as previously described. Esophageal gross distortion was assessed *in vivo* by upper gastrointestinal contrast (UGI). Histological and immuno-histochemical analyses were performed at one, three and five months after injection. In parallel in order to prove the possibility of generating smooth muscle cells from skeletal myoblasts, satellite cells were cultured in presence of TGFβ1.

Results:

No feeding problems and no signs of stenosis were present at the UGI contrast in both control and studied animals. On histological examination no signs of inflammation were present. Immunoistochemical analysis showed that injected cells survived in the muscle layer were they fused and form muscle fibres still persisting at the last time point. Different expression of smooth muscle proteins was observed when MPCs were cultured in conditioned media.

Conclusion:

Muscle precursors could be used in the future as biological injectable agent to functionally correct sphincterial defects.

Notes:

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P37 MINIMALLY INVASIVE CLOSURE OF PEDIATRIC UMBILICAL HERNIAS

Alexander Dzakovic, M.D., Neil R. Feins, M.D.
Children's Hospital Boston, Boston, MA, USA.

Purpose:
Pediatric umbilical hernias may close spontaneously by concentric fibrous and scar tissue formation. Some hernias do not close. This study was developed to assess a novel minimally invasive closure (MIC), using injectable material to close the umbilical defect.

Methods:
Fourteen children with umbilical hernias were included in this IRB approved pilot study after written informed consent was obtained. Five patients had general anesthesia for a non-related surgical procedure. Nine of the patients, all greater than four years old, had an isolated umbilical hernia. Hyaluronic acid dextranomer was injected percutaneously in the preperitoneal space in four quadrants around the hernia defect, occluding the lumen. Follow-up was obtained one week, three, six and twelve months

Results:
Mean age at the time of the MIC was 5.6 years and ranging from four months to 13 years. The average defect was 6.9mm ranging from four to 14mm and the average injection measured 3.5cc of compound. All hernias appeared closed immediately after the injection. Ten defects were closed at and remained closed after the first follow up. Three to 13 months after surgery 12 of the 14 umbilical hernias are closed. The remaining defects are 2 mm and 1 mm in patients nine and four months following the procedure. There were no complications.

Conclusions:
Minimally invasive closure (MIC) procedure with injection of hyaluronic acid dextranomer can safely be used to close umbilical hernias. The procedure closed or reduced the size of hernias early after surgery and within months 12 of the 14 were closed (86%). The two remaining defects are smaller and may go on to close as the others did by ongoing fibroblast ingrowth and collagen deposit. The MIC procedure may be an alternative to open repair of umbilical hernias. Increased experience and long-term follow-up will determine the true efficacy of this new technique.

Notes:

P38 INTRASPHINCTERIC INJECTION OF BOTULINUM TOXIN FOR THE TREATMENT OF REFRACTORY CONSTIPATION IN CHILDREN WITH ANAL ACHALASIA

Allan M. Goldstein, M.D., Katayun Irani, M.D., Daniel P. Doody, M.D., Leonel Rodriguez, M.D.
Massachusetts General Hospital, Boston, MA, USA.

Purpose:
Severe constipation can be a devastating problem in the pediatric population, leading to severe straining, bloating, soiling, and social withdrawal. A potential cause of refractory constipation is internal anal sphincter achalasia, a disorder in which the anal sphincter fails to relax. The purpose of this study was to evaluate the effectiveness of intrasphincteric injection of botulinum toxin in the treatment of anal achalasia.

Methods:
After obtaining institutional review board approval, we conducted a retrospective review of patients less than 18 years of age who had undergone botulinum toxin injection for the treatment of anal achalasia. The study group consisted of 20 patients (11 male) with a mean age of nine years (range 2-17 years). Of the 20 patients, 14 (70%) had soiling preoperatively and five (25%) reported pencil-like caliber stools. All patients were diagnosed with anal achalasia based on anorectal manometry. Patients with Hirschsprung's disease were excluded. Treatment response was assessed by patient and/or parental report of improvement in stool consistency and frequency.

Results:
Of the 20 patients studied, 17 (85%) experienced significant improvement in their stooling pattern, with markedly increased frequency in 17 patients and improved stool consistency reported in 11. The duration of response ranged from two weeks to nine months, with an average duration of 11 weeks. The only complication encountered was transient incontinence following the procedure in eight (40%) patients, lasting a maximum of seven days.

Conclusions:
We conclude that intrasphincteric injection of botulinum toxin is a safe and effective therapy for children with anal achalasia.

Notes:

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P39 COMPRESSIVE ORTHOTIC BRACING IN PECTUS CARINATUM: THE USE OF RADIOGRAPHIC MARKERS TO PREDICT SUCCESS

Jacob T. Stephenson, M.D., Jeffrey J. Du Bois, M.D.
David Grant Medical Center, Travis AFB and Kaiser Permanente Health System, Sacramento, CA, USA.

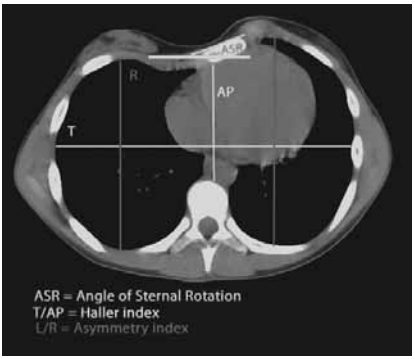
Purpose:
The treatment of pectus carinatum (PC) has classically been operative, though compressive orthotic braces have been employed with good success in recent years. The purpose of this paper is to evaluate the use of radiologic measurements in a successful bracing protocol.

Methods:
Thirty-two patients with PC have been treated over an eight year span. There are five females (16%) and 27 males (84%), with an average age of 13.4 ±1.7. Baseline chest computed tomography (CT) was obtained, and custom fitted orthotic braces were constructed for each patient. Radiographic markers were evaluated to include angle of sternal rotation, and asymmetry index. Upon completion of treatment, follow-up CT was obtained in six of the 32 patients.

Results:
Sixteen of 32 patients have successfully completed the protocol with excellent subjective improvement, and nine are currently undergoing treatment. Three patients have been lost to follow-up and four were noncompliant with treatment. Four of the 32 patients (13%) required surgical intervention, two for noncompliance and two for failure of bracing.

On initial CT, angle of sternal rotation was 12.5 ± 5.6, Haller index was 2.05 ± 0.37, and asymmetry index was 1.08 ± 0.09. In those who completed treatment, there was no significant difference in the Haller or asymmetry indices, but the average improvement in sternal rotation was 47%. In the two patients who failed bracing, the pretreatment asymmetry index was measured at 1.33 and 1.26.

Conclusion:
Compressive orthotic bracing is a successful method of treatment for pectus carinatum. The asymmetry related to sternal rotation can be significantly improved with appropriate bracing. Asymmetry of chest diameter is related to concomitant excavatum-type deformity and is less likely to respond to bracing attempts. In this way, initial chest CT can be of value in treatment planning.



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P40 CXR AS PRIMARY MODALITY FOR PRE-OPERATIVE IMAGING OF PECTUS EXCAVATUM

Claudia Mueller, M.D., Ph.D., Sarah Bouchard, Dickens Saint-Vil, M.D., Ph.D.
St. Justine Hospital, Montreal, PQ, Canada.

Purpose:
Adolescents with a pectus excavatum deformity mostly present with cosmetic complaints and rarely have significant functional limitations. The pre-operative evaluation includes pulmonary functions tests, echocardiography, and CT scan of the chest to measure the Haller index. In most patients, the chest CT is performed only to measure the Haller index. The purpose of this study was to evaluate whether indexes measured on CXR and CT are comparable.

Methods:
Cases of pectus excavatum treated with the minimally invasive approach in the last year were prospectively collected. In patients for whom a pre-op CXR (AP and lat) and CT scan were available, an index was measured using both imaging modalities and compared.

Results:
Both pre-op imaging studies were available in 12 patients. The mean Haller indexes on CT scan and CXR were 3.97 and 4.08 respectively. The pearson's correlation score between the two groups was 0.984.

Conclusions:
We propose that the Haller index measured on CT scan be replaced by CXR measurement in patients without functional limitations in whom a chest CT is otherwise not necessary. This will limit radiation exposure to children. When in doubt, a CT scan of the chest can be used for the pre-operative evaluation.

Notes:

P41 REAL TIME DIAGNOSIS OF NEUROBLASTOMA AND GANGLIONEUROMA USING RAMAN SPECTROSCOPY

Raja Rabah, M.D.[1], Gulay K. Serhatkulu[2], Rachel Weber[2], Alex Cao[2], Abhilash Pandya[2], Ratna Naik[2], Gregory Auner[2], Janet Poulik[1], Michael Klein, M.D.[1]

[1]Wayne State Univ. and Children's Hospital of Michigan, Detroit, MI, USA, [2]Wayne State Univ., Detroit, MI, USA.

Purpose:

Raman spectroscopy has been demonstrated to distinguish between premalignant and malignant lesions in adults. It is potentially useful as a real time non-invasive diagnostic tool to help surgeons identify malignant tissue from uninvolved tissue and guide the surgical excision. Here we apply this technique to a pediatric tumor, neuroblastoma.

Methods:

Our institutional review board approved this study. Fresh tissue samples from adrenal glands, neuroblastomas and ganglioneuromas biopsied and resected at our hospital were equally divided between routine histology and Raman spectroscopic studies. Several spectra were collected from different regions of each sample using a Renishaw Raman microscope, and the tissue was subsequently processed for histologic examination. Raw spectra were processed for noise reduction and removal of tissue florescence, and then analyzed using principal component analysis and discriminant function analysis. We collected 319 spectra from nine neuroblastomas (six pretreatment and three post treatment), four ganglioneuromas and one normal adrenal gland.

Results:

Raman spectroscopy was able to differentiate neuroblastoma from ganglioneuroma with 100% sensitivity and specificity. It was also able to differentiate between normal adrenal gland and neuroblastoma with 100% sensitivity and specificity and correlated well with the Shimada histological classification of neuroblastoma with sensitivity and specificity of 90% and 94.6%.

Conclusions:

Raman spectroscopy can differentiate neuroblastoma from ganglioneuroma and normal adrenal gland. It can also assign the Shimada classification. It has a great potential as a non-invasive real time diagnostic tool in classifying pediatric tumors.

Notes:

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P42 MURINE BONE MARROW STROMAL PROGENITOR CELLS ELICIT AN *IN VIVO* CELLULAR AND HUMORAL ALLOIMMUNE RESPONSE

Andrea Badillo, M.D., Kirstin Beggs, BS, Elisabeth Javazon, Ph.D., Alan Flake, M.D.
Children's Hospital of Philadelphia, Philadelphia, PA, USA.

Background/Purpose:
Stromal progenitor cells (SPC) hold much promise as a therapeutic cell population for tissue repair and diseases of mesenchymal defect such as Osteogenesis Imperfecta. Interest in SPC is based on their capacity for multipotent differentiation, expansion, and growth factor production. More recent observations of the immunosuppressive effects of SPC *in vitro* have led to speculation about their ability to evade host immune recognition and their suitability for "off-the-shelf" use without the need for histocompatability matching. However, there is little *in vivo* experimental data to support these immunologic claims. The question of SPC immune recognition has significant implications in the development and clinical use of all allogeneic SPC based therapeutic strategies. To assess immune recognition of SPC *in vivo*, we evaluated and compared the immune response of animals transplanted with syngeneic and allogeneic SPC.

Methods:
C57BL/6 or Balb/c murine, bone marrow derived SPC were administered by intraperitoneal injection into C57BL/6 recipients. T cell proliferation and alloantibody response was assessed from spleens and peripheral blood harvested from transplanted animals and analyzed by cell proliferation assay and flow cytometry. To assess tolerance induction, transplanted animals also received allogeneic skin grafts.

Results:
Four of five injected animals mounted a CD4 and CD8 response to alloantigen and all animals demonstrated high titers (≥1:1000) of SPC specific antibody. Furthermore, injection of allogeneic SPC failed to induce tolerance with all animals exhibiting rejection of allogeneic skin grafts ($n = 7$, $p<0.0001$).

Conclusions:
In contrast to their immunosuppressive behavior *in vitro*, our data demonstrate that SPC are recognized by the host immune system *in vivo* and elicit an alloantigen specific cellular and humoral immune response. These findings have significant implications for the persistence of SPC *in vivo* and the therapeutic effectiveness of allogeneic SPC based strategies for tissue repair and congenital diseases of mesenchymal defect.

Notes:

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1 THE ROLE OF PERIOPERATIVE ANTIBIOTICS IN NEONATAL SURGICAL SITE INFECTIONS (3 MINUTE)

Lan T. Vu, M.D., Diana Farmer, M.D., Michael Harrison, M.D., Kerilyn Nobuhara, M.D., Douglas Miniati, M.D., Hanmin Lee, M.D.
Univ. of California, San Francisco, San Francisco, CA, USA.

Purpose:
The purpose of this study was to determine the role of perioperative antibiotics in the prevention of surgical site infections in neonates.

Methods:
We conducted a retrospective chart review of a random sample of neonates who underwent thoracic or abdominal operations from the study period of January 1996 to July 2006 at our institution. Specific information, including patient- and operation-related variables, the use of antibiotic prophylaxis, and the development of surgical site infection within 30 days of the operation, was abstracted from the medical records. Data analysis was performed using STATA software.

Results:
The incidence of surgical site infections (SSI) after 289 thoracic and abdominal operations in 278 neonates was 9.34%. The duration of perioperative antibiotics was categorized into four groups: no antibiotics, only preoperative antibiotics, postoperative 24-hour course, and longer than 24-hour course. There was no significant difference in the odds ratio of developing SSI for the given antibiotic categories after adjustment for wound contamination, gestational age, the presence of cardiac anomalies, weight at time of operation, Apgar score at one and five minutes, and ASA score. Multivariate analysis did not demonstrate any variable as a predictor of SSI. However, there was a pattern for a higher incidence of SSI in patients who underwent re-operation within 30 days, had higher levels of wound contamination, delivered vaginally, and whose mother had chorioamnionitis.

Conclusion:
Prolonged antibiotic prophylaxis for neonatal thoracic and abdominal operations did not influence the incidence of surgical site infections in this group of patients. However, the incidence of SSI in our study population was higher than previously reported, with potential risk factors being re-operation, maternal chorioamnionitis, vaginal delivery and higher wound contamination classification. The exact optimal duration of perioperative antibiotics remains unclear and warrants further study.

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2 FORMULA FORTIFIED WITH LIVE PROBIOTIC CULTURE REDUCES PULMONARY AND GASTROINTESTINAL BACTERIAL COLONIZATION AND TRANSLOCATION IN A NEWBORN ANIMAL MODEL (3 MINUTE)

Marcene R. McVay, M.D., Cristiano Boneti, M.D., Christine M. Habib, M.D., Jennifer E. Keller, M.D., Evan R. Kokoska, M.D., Richard J. Jackson, M.D., Samuel D. Smith, M.D.
Univ. of Arkansas for Medical Sciences, Arkansas Children's Hospital, Little Rock, AR, USA.

Background/Purpose:
We have previously reported that an acidified diet is protective against intestinal bacterial colonization and translocation; a biologically acidified formula is more effective than citric acid for this purpose. Probiotic enhanced diets are designed to modulate the intestinal flora to enhance mucosal immunity. We hypothesize that formula acidified with live probiotic will be equally tolerated as diets acidified by other means and further decrease bacterial gut colonization and translocation.

Methods:
With IACUC approval, 128 rabbit pups delivered one day preterm via cesarean section were randomly assigned to four feeding groups: NAN® Nestle, a control diet (pH 7.0); NAN® Nestle acidified in the lab with citric acid (pH 4.55); biologically acidified Pelargon® Nestle (pH 4.55); and NAN® Nestle with live *Lactococcis lactis* culture (pH 4.2). Pups were gavage fed every 12 hrs with *Enterobacter cloacae* challenges of 10 cfu/mL of diet per feed and sacrificed on day of life three. Lungs, liver, spleen, mesenteric lymph nodes (MLN), stomach and cecum were cultured and quantitatively analyzed for target organism growth and statistically analyzed using the Chi-square test.

Results:
NAN® with live probiotic culture, when compared to Pelargon®, acidified NAN® and NAN®, significantly reduced the incidence of *Enterobacter* pulmonary colonization ($p<0.01$), bacterial translocation (Liver: $p<0.025$, Spleen: $p<0.05$, MLN: $p<0.05$), gastric colonization ($p<0.001$) and intestinal colonization ($p<0.001$); see Table 1 where * denotes statistical significance compared to other groups.

Conclusion:
Formula fortified with live probiotic culture provides superior protection against bacterial gastrointestinal colonization and translocation compared to formulas with normal pH and those acidified by other methods. In addition, probiotic enhanced formula is protective against pulmonary colonization.

(table on next page)

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Table 1. Enterobacter Colonization with Various Diets					
Organ	NAN®	Acidified NAN®	Pelargon®	NAN® with probiotic	p value
Lungs	27/35 (77%)	19/27 (70%)	10/33 (30%)	3/33 (9%)*	<0.001
Liver	11/35 (31%)	6/27 (22%)	10/33 (30%)	1/33 (3%)*	<0.025
Spleen	8/35 (23%)	7/27 (26%)	10/33 (30%)	1/33 (3%)*	<0.05
MLN	9/35 (26%)	11/27 (41%)	10/33 (30%)	3/33 (9%)*	<0.05
Stomach	28/35 (80%)	21/27 (78%)	15/33 (45%)	5/33 (15%)*	<0.001
Cecum	35/35 (100%)	27/27 (100%)	33/33 (100%)	21/33 (64%)*	<0.001

Notes:

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3 PARENTERAL NUTRITION-ASSOCIATED LIVER DISEASE AND OMEGA-3 LIPID EMULSIONS: PRELIMINARY FINDINGS ON SAFETY AND EFFICACY (6 MINUTE)

Sang Lee, M.D., Kathleen M. Gura, Pharm.D., Danielle A. Arsenault, B.S., Sendia Kim, M.D., Robbert A. M. Strijbosch, Drs., Biren P. Modi, M.D., Suzanne Lopes, R.N., Clarissa Valim, M.D., Sc.D., Christopher P. Duggan, M.D., Mark Puder, M.D., Ph.D.
Children's Hospital Boston, Boston, MA, USA.

Purpose:
The purpose of this study was to evaluate the safety and initial efficacy of parenteral fish oil-based omega-3 lipid emulsion in the treatment of parenteral nutrition (PN)-associated liver disease.

Methods:
The setting was a tertiary pediatric hospital. Patient ages ranged from 1-7 months (mean 3.4 ± 1.7). Primary diagnoses included necrotizing enterocolitis, gastroschisis, malrotation/midgut volvulus, intestinal atresia, and perforated small bowel obstruction. Inclusion criteria were PN dependence and cholestasis, confirmed by liver biopsy and/or direct bilirubin (DB) greater than 2 mg/dL. Patients were administered fish oil-based omega-3 emulsions instead of standard soybean-based omega-6 emulsions (n = 18). Dosage began between 0.2-0.5 g/kg/day and advanced to 1 g/kg/day. Treatment duration ranged from 1-25 months (mean 5.1 ± 5.8). Additional non-protein calories were provided via carbohydrates per standard of care and no other parenteral form of fat was administered. Enteral feeds were advanced per standard of care. Monitoring included serum fatty acid profiles and liver function tests. Compassionate use was approved by the IRB and FDA.

Results:
Initial DB levels ranged from 2.5-10 mg/dL (mean 5.5 ± 2.5). All patients tolerated the intravenous infusion of omega-3 lipid emulsions without any associated complications. There was no evidence of bleeding or essential fatty acid deficiency. All patients experienced normalization of bilirubin (DB < 2), in the setting of varying degrees of enteral nutrition, with elapsed time ranging from 14.5-91.5 days (mean 56.5 ± 23.4). There were two deaths, secondary to aspiration pneumonia and withdrawal of care.

Conclusions:
We conclude that parenteral omega-3 lipid emulsions may be a safe alternative to standard omega-6 lipid emulsions in the nutritional support of pediatric patients with PN-associated liver disease. Initial results demonstrate resolution of cholestasis, indicating potential reversal of this disease.

Notes:

4 ADHESIONS FOLLOWING LOWER ABDOMINAL SURGERY IN CHILDREN (6 MINUTE)

H. W. Grant[1], M. C. Parker[2], M. S. Wilson[2], D. Menzies[2], G. Sunderland[2], J. N. Thompson[2], D. N. Clark[3], A. D. Knight[2], A. M. Crowe[2], H. Ellis.[2]

[1]John Radcliffe Hospital, Oxford, United Kingdom, [2]SCAR Panel, London, United Kingdom, [3]NHS Information Services, Scotland, Glasgow, United Kingdom.

Purpose:

This is the first and only population-based study that quantifies the burden caused by adhesions following specific types of lower abdominal surgery in children.

Methods:

Patient data was obtained from the Scottish NHS Medical Record Linkage Database. This database was used to identify all children under 16 years who underwent abdominal surgery (duodenum to rectum) in the year 1996/7. All subsequent adhesion-related re-admissions in this cohort of 1581 patients were followed up for five years using OPCS-4 and ICD-10 codes.

Results:

Re-admission episodes were reported as 'directly due to adhesions' if the OPCS or ICD codes corresponded to adhesiolysis or adhesion-related symptoms.

Cumulative 5-year follow-up:% patient re-admissions directly due to adhesions			
Original procedure	Number of operations	Patient readmissions	%
General laparotomy	92	6	6.5
Duodenal surgery	21	1	4.7
Jejunal surgery	18	0	0
Open reduce intuss	10	0	0
Meckel's resection	8	0	0
Ileostomy	12	3	25.0
Ileal resection	24	2	8.3
Colonic surgery	48	1	2.1
Appendectomy	1336	4	0.3

The number of re-admissions was highest in the first year after surgery but continued over the subsequent 5 years: 10 had a readmission for adhesions in the first year, 10 in the second, one in the third, three in the fourth and none in the fifth. The risk of directly-related readmissions varied according to site of surgery: the re-admission rate following ileal surgery was highest at 9.2%, 6.5% after general laparotomy, 4.7% after duodenal surgery, 2.1% after colonic surgery, and 0.3% after appendectomy.

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Conclusion:
This population-based study has shown that, following abdominal surgery, children have a high incidence of readmissions, and re-laparotomy due to adhesions. The risks are related to the site of the original surgery and the type of surgery. The data enable surgeons to target anti-adhesion strategies at the high-risk groups. The risk of further re-admissions continues with time.

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5 RECENT TRENDS IN THE EXPERIENCE OF PEDIATRIC SURGEONS WITH INFANT INDEX CASES (3 MINUTE)

Xiaonan Sun, BA, Thomas V. Whalen, M.D., Randall S. Burd, M.D., Ph.D.
UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ, USA.

Purpose:
Performance of 'index cases' in infants is a key area of interest for pediatric surgeons. Previous studies have suggested that pediatric surgeons have variable experience with index procedures but have been limited by reliance on self-reporting and incomplete survey response. The purpose of this study was to examine the recent experience of pediatric surgeons with infant index cases using a nationally representative database.

Methods:
The number of pediatric surgeons in the U.S. was estimated using data from APSA and the American Board of Medical Specialists (ABMS). The number of pediatric surgeons/live births was calculated using data from the National Center for Health Statistics. Records of infants (less than one year old) undergoing selected index cases were identified in the Nationwide Inpatient Sample (NIS) from 1994-2003. The rate of procedures/surgeon over the study period was estimated using survey methods that accounted for the sampling design of the database.

Results:
The number of pediatric surgeons/live births significantly increased between 1994 and 1997 ($p<0.01$), but remained unchanged after 1997. The number of annual tracheoesophageal fistula repairs per surgeon significantly decreased over the study period, while rates remained unchanged for other procedures. The average experience was highest for gastroschisis repair (2-3 procedures/surgeon/year) and lowest for the Kasai procedure (<0.6 procedures/surgeon/year).

	# of procedures/surgeon				
	1994	1997	2000	2003	p-value for trend
# of surgeons/100,000 live births	8.9	11.0	10.8	11.6	0.13
Gastroschisis repair	2.5	2.1	2.9	3.1	0.32
CDH repair	1.7	1.6	1.2	1.4	0.23
TEF repair	1.9	1.6	1.2	1.1	0.02
Pull-through for Hirschsprung disease	1.2	1.2	1.3	1.2	0.25
Kasai procedure	0.6	0.4	0.3	0.4	0.28

Similar results were observed using estimates of the number of surgeons obtained from the ABMS.

Conclusions:
The average number of most infant index cases performed by pediatric surgeons remained constant over the study period. While the practice of individual surgeons varies, the low number of cases per surgeon mandates an appraisal of the relationship between volume and outcome for these procedures.

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6 CLOSURE OF GIANT OMPHALOCELES BY THE ABDOMINAL WALL COMPONENTS SEPARATION TECHNIQUE (3 MINUTE)

Ivo de Blaauw, M.D., Ph.D., Floortje C. van Eijck, M.D., Paul N. Rieu, M.D., Ph.D., Marc H. Wijnen, M.D., Ph.D., Frans H. van der Staak, M.D., Ph.D., Rene S. V. M. Severijnen, M.D., Ph.D., Rene M. H. Wijnen, M.D., Ph.D.

Univ. Medical Centre St. Radboud, Nijmegen, The Netherlands.

Purpose:

At present several techniques for closure of giant omphaloceles are being used. Most techniques have the disadvantage of using prosthetic material (temporarily), of needing multiple operations and of having a high risk of leaving a large ventral hernia. Aim of the present study was to analyze the outcome of reconstruction of giant omphaloceles by using the components separation technique (GST).

Methods:

Six patients with giant omphaloceles (>6 cm) were treated using GST. Initially, the omphalocele was fully epithelialized by the ability of the amnion to support epithelial proliferation and migration from the skin edges. Reconstruction of the abdominal wall was secondary performed and is described as followed: the skin was separated from the underlying fascia, leaving the blood supply and innervation intact. The external aponeurosis of the external oblique muscle was incised over the full length of the abdominal and thoracic wall. The external oblique muscle was separated from the internal oblique in the avascular plane. Then the abdominal wall was closed with a non- or slowly-absorbable suture. Follow up was 3-12 months

Results:

GST was performed at age 3-16 months. The size of the hernia varied from 6-10 cm. There was no mortality. No wound infections or other postoperative complications were seen. Mean hospital stay in this group was six days. Reherniation didn't occur during follow-up. There was a good cosmetic result with good function of the abdominal muscles.

Conclusions:

The components separation technique is a safe and effective procedure for secondary and definitive closure in children with a giant omphalocele. This technique provides an excellent functional and esthetic outcome without the need for prosthetic material.

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7 CAPSNET: A POPULATION-BASED PEDIATRIC SURGICAL NETWORK AND DATABASE FOR ANALYZING INCIDENCE, TREATMENT AND OUTCOME OF SURGICAL BIRTH DEFECTS: THE FIRST 90 CASES OF GASTROSCHISIS (3 MINUTE)

Erik D. Skarsgard, M.D.[1], Sarah Bouchard, M.D.[2], Peter Kim, M.D.[3], Jean-Martin Laberge, M.D.[7], Shoo K. Lee, M.D.[4], Douglas McMillan, M.D.[5], Peter von Dadelszen, M.D.[6], Natalie Yanchar, M.D.[5]

[1]BC Children's Hospital, Vancouver, BC, Canada, [2]St. Justine Hospital, Montreal, PQ, Canada, [3]Hospital For Sick Children, Toronto, ON, Canada, [4]Univ. of Alberta, Vancouver, AB, Canada, [5]IWK Children's Health Centre, Halifax, NS, Canada, 6BC Women's Hospital, Vancouver, BC, Canada, [7]Montreal Children's Hospital, Montreal, QC, Canada.

Single institution studies of outcome for birth defects like gastroschisis (GS) are constrained by small numbers, prolonged accrual and non-standardized data collection.

Purpose:
To create a national pediatric surgical network and database for birth defects that tracks cases of GS from diagnosis to postnatal hospital discharge.

Methods:
The network consists of 16 perinatal centres and serves a population of 32 million. Gastroschisis cases are ascertained at prenatal diagnosis (if made), and all pregnancy outcomes are recorded. Prenatal data includes maternal risk and fetal ultrasound variables (growth, amniotic fluid volume, fetal bowel dilation/thickening), while postnatal fields include a validated neonatal illness severity score, a bowel injury score, intended and actual surgical treatment, and outcomes including ventilation, nutrition, length of stay (LOS), treatment intensity, survival and complications. Federally-funded until 2009, data collection at each centre is IRB-approved, conforms to regional privacy legislation and is conducted by trained abstractors. Collected data is de-identified, uploaded to a central repository and accessible through the network steering committee.

Results:
Since data collection commenced in mid-2005, 94 cases of pre and/or postnatal gastroschisis have been uploaded. Of 89 liveborn infants, 33 (37%) were by C-section (planned in 7; 8%). In 56 (63%) the intended treatment was urgent closure (silo required in 4; 7%); in the remainder, a preformed silo was used to facilitate "elective" closure. Overall survival to discharge was 95%, with a mean survivor LOS of 36 days. Fetal bowel dilation ≥15 mm did not predict a difference in outcome. Infants treated with urgent closure had significantly fewer TPN days (25 vs. 38 d; p=0.03), but comparable LOS.

Conclusions:
Population-based databases allow rapid case accrual and enable epidemiologic studies of birth defect incidence. The application of multiple logistic regression analyses and outcomes modeling to large, standardized datasets should contribute to identification of optimal perinatal treatment strategies.

Notes:

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8 PREVIOUS PORTAL HYPERTENSION SURGERY NEGATIVELY AFFECTS RESULTS OF MESENTERIC TO LEFT PORTAL VEIN BYPASS (3 MINUTE)

Anthony Chin, M.D., Fiona Thow, Riccardo Superina, M.D.
Children's Memorial Hospital, Chicago, IL, USA.

Purpose:
Extrahepatic portal vein obstruction (EHPVO) is a reversible cause of portal hypertension in children. Mesenteric to left portal vein bypass (MLPVB) has been utilized to treat children with EHPVO. We examined outcome following MLPVB and the effect of prior surgery aimed at treating symptomatic portal hypertension.

Methods:
Sixty-three patients with EHPVO underwent MLPVB between 1997 and 2005. Children were divided into three groups: those with no prior surgery related to portal hypertension, prior porto-systemic shunts and those with either splenectomy or splenic embolization. MLPVB patency rates among the three groups were compared using contingency table analysis. Other numerical variables were compared using Student's t test.

Results:
Patients with previous surgery were significantly older and larger than those with no surgery (See Table). Twelve of 63 (14.5%) children had previous portal hypertension surgery: seven had a porto-systemic shunt, three a splenectomy and two splenic embolization. Even though patients with no previous surgery were smaller than the others, they had a significantly higher MLPVB patency rate: 85.5 % in comparison to 62.5 % in previous shunt patients. Splenectomy patients fared best with a 100% patency rate and those with splenic embolization did poorly with a 0% patency rate. These differences were found to be statistically different (p value=0.005).

Conclusions:
The results demonstrate that prior porto-systemic shunt or splenic embolization may have a deleterious effect on outcome after MLPVB. Decreased available mesenteric blood for the bypass may account for this difference. This study suggests that patients with symptomatic EHPVO should undergo MLPVB as a primary intervention rather than as a rescue procedure after a failed prior intervention.

Patency Rates and Paient Variables				
	No Surgery	Shunt	Splenectomy	Other
Age at Surgery	6.9+/-4.1	13.0+/- 5.7	10.4+/- 2.4	12.3
Weight (kg)	24.3 +/- 14.3	43.8+/- 23.4	44.6 +/- 14.3	35.9
Bypass Patency	47/58 (85.5%)	5/8 (62.5%)	3/3 (100%)	0/2 (0%)

Notes:

Underlining denotes the author scheduled to present at the meeting.

9 LAPAROSCOPIC INGUINAL HERNIA REPAIR DOES NOT IMPAIR TESTICULAR PERFUSION (3 MINUTE)

Felix Schier, Salmai Turial, Thomas Hückstädt, Ullrich Klein.
Univ. Medical Center, Mainz, Germany.

Purpose:
In pediatric laparoscopic inguinal hernia repair the internal ring is closed with a suture. Concern has been raised whether or not the testicular vessels are compromised with this technique. This study was undertaken to evaluate pre- and postoperative testicular perfusion and to compare it with normal controls.

Methods:
Sixty-five boys with unilateral (n= 52) or bilateral (n= 13) inguinal hernias (aged six weeks to 11 years, median 1.4 years) were treated laparoscopically. Testicular perfusion was measured using a recently developed neuromonitoring device, which combines light spectroscopy and laser Doppler technique. An optical probe was placed on the surface of each scrotal pouch for measurements at two depths (two and eight mm). A linear model was fitted to test changes in O_2 saturation of hemoglobin, hemoglobin volume and blood flow. Measurements were conducted before and after anesthesia, and before and after surgery, six weeks and six months later. Children with previous incarceration, inflammatory changes or other testicular abnormalities that could influence O_2 perfusion were excluded. Testicular perfusion of 21 healthy boys of similar ages served as additional controls.

Results:
Measurements at two mm depth were unreliable. At eight mm depth the oxygen saturation of hemoglobin was between 80 and 95%. The relative blood flow was between 150 to 325 AU. This is better than in healthy awake controls. Values were directly and promptly influenced by the administered FiO_2. The relative hemoglobin volume of the testes remained unchanged and the capillaries did not change their size after surgery. Blood flow and oxygenation were also normal when measured during early and long-term follow-up.

Conclusions:
Laparoscopic inguinal hernia repair using suture closure of the internal inguinal ring does not impair testicular perfusion.

Notes:

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10 LONGTERM PSYCHOLOGICAL OUTCOMES OF FEMALE CONGENITAL ADRENAL HYPERPLASIA PATIENTS (3 MINUTE)

Daniel H. Teitelbaum, M.D., Shelly Scheier, Ph.D., Jennifer Maschin, BS, Ariel U. Spencer, M.D., Robert A. Drongowski, MS, Arnold G. Coran, M.D.
Univ. of Michigan, Ann Arbor, MI, USA.

Purpose:
Congenital adrenal hyperplasia (CAH) patients with ambiguous genitalia typically need surgeons to make early gender assignment, and surgical modification of external genitalia. While short term outcomes are well described, little data is available regarding patients as adults. This study contacted adults who underwent surgery as infants and determined their overall psychosocial satisfaction.

Methods:
Patients (>18 yo, 46XX), who underwent surgical correction in infancy to create a female phenotype, were contacted. Patients underwent either in-person psychological interview (6) or completed a mailed questionnaire (5). Patients also completed several psychosocial tests. Scores (mean±SD) are compared using t-test.

Results:
Mean age was 28±8 (range 18-42 yrs). The Table gives key results (*P<0.05). Most were satisfied with external genitalia 9/11, and 10/11 were happy being female. Interestingly, over half were bisexual (3) or homosexual (3). Additionally, there was a high incidence of depression (4/11). The majority had a satisfactory quality of life (QOL, Table); however, one had a low QOL and two had a very low QOL.

Major Outcome Measures				
Test/Outcome		CAH patients	Normative Means	Test Description
Bem (BSRI Hybrid)	Masculine Feminine Androgynous Undifferentiated	2 (18%) 1 (9%)* 3 (27%) 5 (45%)*	16.2% 29.4% 27.4% 27.1%	Defines patient's tendency toward male or female roles
Beck BDI-II score		11.3±10.0 4/11 scored >17	12.6±9.9 Depression = scores >17	Depression inventory
Achenbach	Internalizing problems Externalizing problems	7/11 (59±11.5) 4/11 (56.6±11.7)	. 50.0±9.8 . 50.0±9.9	Defines level of adaptive functioning
QOLI		44.3	50.0	Quality of life
GRISS	Anorgasmic Vaginismus	4/9 (44%) 7/9 (78%)	Not Available	Measures of sexual function

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Conclusions:
This study represents one of the most comprehensive examinations of adult outcomes of CAH patients undergoing gender assigning surgery as infants. The findings suggest that female assignment to 46XX patients with CAH may be appropriate; and most are non-depressed with an average quality of life. However, it highlights a large number who have a homo/bisexual bias, and a significantly lower feminine sexual role. Such patients also have a high rate of anorgasm and vaginismus, and this occurred in those undergoing clitorrhectomy or clitorrhal recession. Such information is essential for family and patient education, and suggests a critical need for long-term monitoring of such patients.

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11 MULTI-MODAL MANAGEMENT OF MASSIVE HEPATIC HEMANGIOMA — IMPACT ON TRANSPLANT AVOIDANCE (3 MINUTE)

Ivan R. Diamond, M.D., Haley Draper, Michael Temple, M.D., Sanjay Mahant, M.D., Philip John, M.D., Vicky Ng, M.D., Annie Fecteau, M.D.
Hospital for Sick Children, Toronto, ON, Canada.

Purpose:
While hepatic replacement may be life-saving and effective as a last resort, intervention for patients with massive hepatic hemangioma causing systemic compromise, an effective multi-modal approach to obviate the need for liver transplantation, is highly desirable in an era where deceased donor organ demand clearly exceeds availability. We aimed to examine the results of such an approach implemented over the past 10 years.

Methods:
Retrospective descriptive study of children with massive hepatic hemangioma managed at our institution between January 1996 and June 2006.

Results:
Five children (all female) presented with massive hepatic hemangioma during the index time period, with presenting symptoms inclusive of cardiac failure in four, respiratory distress in one, and an acute abdomen in one. Mean age at presentation was 2.2 (range: 0-4) months. All patients received medical treatment (four steroids, three vincristine, three interferon) for their hemangioma, and all also underwent a median of two (range 1-6) hepatic embolization procedures. Peri-procedural complications included a non-occlusive clot in the vena cava in one, and partial occlusion of the left hepatic artery in one patient, neither resulting in adverse sequalae. One patient died from progressive liver failure secondary to undiagnosed neonatal hemochromatosis. The remaining four patients all recovered and were discharged. With mean post procedure follow-up of 2.11 years (range 0-6.2), all remain well, off medications, and none have undergone a liver transplant. During the course of this series, no liver transplants were performed at our institution for hepatic hemangioma.

Conclusions:
Multi-modal management of hepatic hemangioma combining medical, surgical, and interventional radiology expertise is a strategy that deserves consideration in these patients. While the strategy requires further evaluation as to its safety and efficacy, such an approach with directed therapy has the potential to decrease the need for liver transplantation in this patient population.

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12 DEFINITIVE PERCUTANEOUS TREATMENT OF LYMPHATIC MALFORMATIONS OF THE TRUNK AND EXTREMITIES (3 MINUTE)

William E. Shiels, II, D.O., Donna A. Caniano, M.D., Brian D. Kenney, M.D., Gail E. Besner, M.D.

Children's Hospital, Columbus, OH, USA.

Purpose:

Resection of lymphatic malformations (LM) often represents a significant technical challenge for the surgeon. We report a new treatment regimen for macrocystic and microcystic LM of the trunk and extremities.

Methods:

Eleven patients (11 m-17 y, mean age $8^1/_2$ y) underwent percutaneous treatment for LM of the trunk and extremities between 2002-2006, with a follow-up period of 1-48 months. Locations of LM included the arm, leg, axilla, chest wall, abdomen, scrotum and penis. Seven patients underwent primary treatment of LM and four were treated for recurrence following surgery. Macrocysts (>1 cm diameter) and microcysts (<1 cm diameter) were treated after complete cyst aspiration under sonographic guidance. Macrocyst access was obtained using a coaxial 5F catheter system and dual-drug chemoablation performed with sequential intracystic sodium tetradecyl sulfate and ethanol. Macrocyst containment was confirmed with fluoroscopic cystography. Catheter drainage for macrocystic treatment was maintained for three days following treatment. Microcysts were treated by direct needle installation of doxycycline. Macrocysts and microcysts were usually treated in separate sessions. In total, 19 macrocysts and 40 microcysts were treated with the goal of treatment being complete cyst ablation documented by sonography, CT, or MR imaging.

Results:

The mean number of treatments required for LM obliteration was 1.8 per patient (1.0 for macrocysts, 1.09 for microcysts). Ablation efficacy was 100% in the 59 cysts treated. Proximity of the LM to functionally important structures (massive intraperitoneal cysts and cysts surrounding the adventitia of the brachial artery and nerve) did not preclude sclerotherapy. Complications included infection in 2/11 patients ablated without perioperative antibiotic treatment. There was no post-procedural pain, skin necrosis, neuropathy, vascular thrombosis, bowel obstruction, skin retraction, scarring or myoglobinuria.

Conclusions:

An improved percutaneous interventional radiological regimen provides effective treatment of macrocystic and microcystic LM. Sclerotherapy results in rapid resolution of LM with few complications and excellent cosmetic results.

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13 TECHNIQUES AND FINDINGS IN 47 PEDIATRIC SENTINEL LYMPH NODE BIOPSIES FOR MELANOMA AND ATYPICAL MELANOCYTIC/SPITZ LESIONS (3 MINUTE)

Mark L. Kayton, M.D.[1], Ruby Delgado, M.D.[1], Klaus Busam, M.D.[1], Shuang Wang, Ph.D.[2], Mary Sue Brady, M.D.[1], Dennis Kraus, M.D.[1], Daniel Coit, M.D.[1], Michael P. La Quaglia, M.D.[1]

[1]Memorial Sloan-Kettering Cancer Center, New York, NY, USA, [2]Mailman School of Public Health, Columbia Univ., New York, NY, USA.

Purpose:

Sentinel lymph node biopsy (SLNBx) can detect regional metastasis of melanocytes in patients with atypical melanocytic or Spitz lesions, as it can for melanoma. We reviewed our experience to determine the incidence of positive sentinel nodes for these lesions. Pathologic findings, technical issues, and complications are described.

Methods:

Pediatric SLNBx's for melanoma or for atypical melanocytic/Spitz lesions, performed at our institution from 1996 to 2006, were examined by retrospective review conducted with IRB waiver. Positive nodes comprised melanoma or any melanocytic deposit not definitively classified as a benign nodal nevus by two dermatopathologists. Analysis was by odds ratios and Fisher's exact test (significance at $p<0.05$).

Results:

Forty-seven patients (median age=14) underwent SLNBx for either melanoma (n=25) or atypical melanocytic/Spitz lesions (n=22). Sentinel nodes were located in 46/47 cases. Positive nodes were seen in in 6/21 patients with atypical melanocytic/Spitz lesions (29%) and 6/25 melanoma patients (24%). The odds ratio for a positive SLNBx was equivalent for the two groups (odds ratio 1.3; 95% confidence interval, 0.3-4.7). All 47 patients had preoperative lymphoscintigraphy, which positively identified the sentinel node in 45/47; identification on preoperative lymphoscintigraphy was strongly associated with successful localization of the node at surgery ($p<0.05$). The success rate using radiotracer alone (13/14 cases) was statistically indistinguishable from that for radiotracer plus dye (33/33 cases). Complications were laryngospasm in one patient who had received dye, and axillary seroma in another.

Conclusions:

Positive sentinel nodes were found in 24% of melanoma patients and 29% of patients with atypical melanocytic/Spitz lesions. Some of these nodes exhibited melanocytes that could not be readily classified as benign or malignant by light microscopy. Technically, we found preoperative lymphoscintigraphy and intraoperative detection of radiotracer to be essential for finding pediatric sentinel nodes, but could not show a benefit from supplemental use of dye.

Notes:

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14 RETROPERITONEAL TERATOMAS — POTENTIAL FOR SURGICAL MISADVENTURE (6 MINUTE)

Niall M. Jones, Edward M. Kiely.

Great Ormond Street Hospital for Children, London, United Kingdom.

Purpose:

Retroperitoneal teratomas are uncommon in infants and children. The literature provides little guidance in regard to surgical management. As few surgeons will encounter significant numbers of such tumors we wish to report our experience in dealing with this condition. The aim of this report is to highlight the unusual vascular anatomy encountered at operation.

Methods:

A retrospective review of the operative findings in six patients who underwent resection of retroperitoneal teratomas since 1999.

Results:

Four of the six were female. Age ranged between three weeks and 10 years (median four months). Surgery was undertaken in early infancy because of relentless tumour growth. Striking distortion of the usual anatomy was encountered in all six. The commonest pattern seen was of anterior displacement of the inferior vena cava and renal veins with posterolateral compression of aorta and renal arteries. Coeliac and superior mesenteric arteries often traversed the tumour. Only the arteries were visualised on pre-operative imaging in most. None of the lesions were malignant. Histology was considered immature in the three youngest infants. Substantial intra-operative bleeding occurred in the majority.

Conclusions:

1. Generally in oncological surgery the anatomy is distorted in a manner which is predictable. However with these tumours the distortion is unpredictable and often bizarre thereby increasing operative risk.
2. Preoperative imaging is of limited use in demonstrating the position of the major vessels. In particular the veins may be effaced.
3. Despite planned systematic display of the major vessels excision of retroperitoneal teratomas is a significant challenge.

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15 PHOSPHATIDLYSERINE EXPRESSION BY NEUROBLASTOMA PROMOTES TUMOR GROWTH *IN VIVO* (6 MINUTE)

Kara Doffek, B.S., Xiaocia Yan, Ph.D., Michael Phillips, B.S., Bryon Johnson, Ph.D., Sonia Sugg, M.D., Joel Shilyansky, M.D.

Medical College of Wisconsin, Milwaukee, WI, USA.

Purpose:

Examine phosphatidylserine (PS) expression as a mechanism by which neuroblastoma (NB) induce immune tolerance. PS is a phospholipid that is restricted to the inner surface of cell membrane in living cells, but translocates to the surface early in apoptosis. PS expressed by apoptotic cells inhibits immune responses in mice. PS may be also expressed on the surface of live tumor cells.

Methods:

A/J mice (n=5) injected with 10^4 NB cells subcutaneously were monitored for tumor growth. PS expression was determined using Annexin-V (AnV) binding and flow cytometry. To block PS *in vivo*, NB cells were engineered to secrete AnV protein, which specifically binds PS. AnV was cloned in front of protrypsin leader sequence as a FLAG fusion protein to allow protein secretion. Western blot was used to determine AnV expression.

Results:

Analysis demonstrated that live NB cells express PS on the surface. NB cells were transfected with AnV-FLAG (AnV-NB). Analysis of supernatants demonstrated AnV secretion. *In vitro* supernatants from AnV-NB cells blocked PS on the surface of wt NB. AnV-NB proliferated *in vitro* at the same rate as wild type (wt) NB cells. The control and AnV-NB cells were injected subcutaneously into A/J mice. Western analysis showed continuous AnV expression *in vivo*. In immunocompetent mice, AnV-NB cells grew significantly slower than control tumors. In mice depleted of T cells with anti-Thy1.2, control and AnV-NB tumors grew equally.

Conclusions:

The study demonstrated that mouse NB cells express PS on the cell surface. Blocking PS *in vivo* slowed tumor growth in immunocompetent but not T cell depleted mice. The findings suggest that PS inhibited anti-tumor T cell immunity. The studies support the hypothesis that PS expression is a potential mechanism for tumor immune evasion.

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16 THE COMBINATION OF INTERFERON-BETA AND TRICHOSTATIN A INHIBIT NEUROBLASTOMA GROWTH *IN VITRO* AND IN A MURINE MODEL OF NEUROBLASTOMA (3 MINUTE)

John B. Hamner, M.D., Aaron Cutshaw, MS, Thomas Sims, M.D., Cathy Ng, Andrew M. Davidoff, M.D.

St. Jude Children's Research Hospital, Memphis, TN, USA.

Purpose:

Trichoatatin A (TSA) is a potent histone deacetylase inhibitor and has demonstrated significant anti-tumor activity against a variety of cancer cell lines. In addition, Type-I interferons have shown significant anti-tumor and anti-angiogenic activity. In this study, we examine the effectiveness of combination therapy including TSA and Interferon-Beta (IFN-β) on human neuroblastoma cells *in vitro* and *in vivo* using a murine model of retroperitoneal neuroblastoma.

Methods:

For *in vitro* experiments plated human neuroblastoma cells (NB-1643 and NB-1691) were treated as controls or with IFN-β, TSA, or both for 24 hours and cytotoxicity was assessed by cell counts expressed as percent controls. Expression of the tumor suppressor $p21^{Waf1}$ was assessed by Western blot. For *in vivo* experiments, retroperitoneal neuroblastomas were established in SCID mice. IFN-β was given using a gene therapy approach, administering $1.5x10^{10}$ gene copies of human IFN-β via tail vein in a single dose. TSA was given at a dose of 5mg/kg every 48 hours subcutaneously. Treatment groups included controls, IFN-β alone, TSA alone, and IFN-β followed by TSA. Tumor volume was assessed two weeks after treatment began.

Results:

After 24 hours of treatment NB-1643 cells treated with IFN-β, TSA, or combination had the following cell counts (as percent controls): 75.2%(+/-13,p=0.008), 41.9%(+/-8.9,p=<0.001), and 37.7%(+/-5.4,p=<0.001). NB-1691 cell counts were: 54.7%(+/-1.36,p=<0.001), 21.9%(+/-3.6,p=<0.001), and 23.8%(+/-1.6,p=<0.001). In addition, NB-1691 cells treated with TSA showed increased expression of $p21^{Waf1}$ on Western blot. For *in vivo* experiments, control, IFN-β, TSA, and combination treated tumors had the following final volumes: $1577.7mm^3$(+/-264.2,n=3), $128.5mm^3$(+/-74.4,n=4,p=0.0001), $1248.7mm^3$(+/-673.9,n=4,p=0.48), and 127.5(+/-36.8,n=4,p=0.0007).

Conclusions:

Neuroblastoma, because of its unique biology, continues to be a difficult tumor to treat and many times these tumors are refractory to standard chemotherapeutic regimens. These data show that both TSA and IFN-β both inhibit neuroblastoma growth and that the combination may potentially provide a unique way to treat this difficult disease.

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17 EFFICACY OF LAPAROSCOPIC CHOLECYSTECTOMY FOR BILIARY DYSKINESIA IN THE PEDIATRIC POPULATION (3 MINUTE)

Sabina Saddiqui, M.D.[1], Daniel Alterman, M.D.[1], Scott Newbrough, M.D.[1], Alan Anderson, M.D.[2], Alfred P. Kennedy, Jr., M.D.[2]

[1]Univ. of Tennessee, Knoxville, TN, USA, [2]East Tennessee Children's Hospital, Knoxville, TN, USA.

Purpose:

Gallbladder disease is increasingly affecting the pediatric population. The advent of new technology in the 1980s, specificially hepatobiliary scintagraphy and laparoscopic cholecystectomy, has given rise to a dramatic rise in both the diagnosis and treatment of gallbladder disease in this population. The purpose of the this study is to determine whether or not laparoscopic cholecystectomy for biliary dyskinesia is efficatious in the treatment of children with biliary colic and the ability of cholescintagraphy to predict which patient may benefit from operative intervention.

Methods:

Retrospective review was performed of all patients (n=185) from 2003 to 2006 who underwent laparoscopic cholecystectomy, correlating postoperative results with degree of dyskinesia, histopathology, associated gastrointestional diagnoses, age and sex. Biliary dyskinesia was defined by ultrasonography without evidence of cholelithiasis with clinical symptoms of biliary colic.

Results:

One hundred thirty-four patients underwent laparoscopic cholecystectomy for a diagnosis of biliary dyskinesia. Mean age was 13 years. 156 (92.5%) of patients reported resolution or improvement of pre-operative symptoms (65% with complete resolution and 27.5% with improvement in symptoms). Mean follow up was nine months. No corellation was seen for degree of dyskinesia, histopathology, age or sex. Patients with a pre-operative diagnosis of gastroesophageal reflux were less likely to report resolution of symptoms. The most common histopathological finding was mild chronic cholecystitis. There were no major complications; one patient suffered prolonged ileus, one patient suffered wound infection and one patient required incisional hernia repair.

Conclusions:

Laparoscopic cholecystectomy is safe, efficacious and durable in children suffering from biliary dyskinesia.

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18 SMALLER SCARS — WHAT'S THE BIG DEAL: A SURVEY OF THE PERCEIVED VALUE OF LAPAROSCOPIC PYLOROMYOTOMY (3 MINUTE)

Ramanath N. Haricharan, MBBS, MPH, Charles J. Aprahamian, M.D., Traci L. Morgan, RN, BSN, Carroll M. Harmon, M.D., Ph.D., Keith E. Georgeson, M.D., Douglas C. Barnhart, M.D., MSPH.

Univ. of Alabama Birmingham, Birmingham, AL, USA.

Purpose:

Laparoscopic and open pyloromyotomy are equally safe and effective with the principal benefit of laparoscopy being better cosmesis. The goal of this study was to measure the perceived value of laparoscopic pyloromyotomy.

Methods:

After IRB approval, representative photographs of mature surgical scars were shown to 416 subjects (177 college freshmen, 126 first-year medical students, and 101 parents). They were asked to indicate preference of scar appearance and relative importance of the difference in appearance. To measure the perceived value of the cosmetic benefit, subjects were presented hypothetical situations of additional out of pocket expenses for their preferred operation and were asked to indicate an acceptable cost. Data were analyzed using Cochran-Mantel-Haenszel test, t-test and multivariable regression.

Results:

Four hundred and four of 416 surveys were complete. Overall, 74% preferred the appearance after laparoscopy, and among them 58% felt that the difference in appearance was important. The perceived value of the cosmetic benefit of the laparoscopic approach is summarized in Figure 1; overall 88% would pay an additional out of pocket amount for their daughter and 85% for their son. Respondents were willing to pay significantly more for their daughters ($p<0.0001$) and sons ($p<0.0001$) than themselves, but 74% would pay an additional amount for the appearance after laparoscopy if they were patients. As expected, income level ($p<0.0001$) influenced the range of acceptable additional out of pocket expenditure, while ethnicity, education, number of children, and gender did not influence the perceived cosmetic value. Older respondents tended to spend less for themselves, but age did not influence the acceptable out of pocket expenditure for their children.

Conclusions:

The cosmetic benefit of laparoscopic pyloromyotomy was valued by a wide demographic with 85% being willing to hypothetically pay additional out of pocket expenses for their children to have smaller scars.

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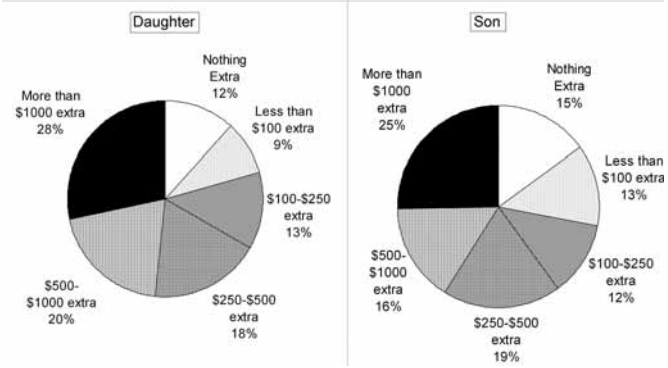
Figure 1. How much would you be willing to additionally pay for the appearance after a laparoscopic pyloromyotomy?



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19 ULTRASOUND AS A DIAGNOSTIC TOOL USED BY SURGEONS IN PYLORIC STENOSIS (3 MINUTE)

Cristiano Boneti, M.D., Marcene R. McVay, M.D., Evan R. Kokoska, M.D., Richard J. Jackson, M.D., Samuel D. Smith, M.D.
Arkansas Children's Hospital, Little Rock, AR, USA.

Background/Purpose:
The accuracy of ultrasonography in diagnosing hypertrophic pyloric stenosis (HPS) is well documented. Enabling surgeons to perform an abdominal ultrasound at initial evaluation would expedite diagnosis and management and improve overall cost-effectiveness. Our objective is to validate surgeon-performed abdominal ultrasound in the diagnosis of pyloric stenosis.

Methods:
After obtaining IRB approval, a surgery resident, after completing the basic and abdominal ultrasound courses offered by the American College of Surgeons, examined 30 consecutive patients referred to pediatric surgery with the suspected diagnosis of HPS. The resident was blinded regarding the clinical and radiographic findings. The pylorus was scanned in the longitudinal and transverse axis. Positive ultrasonographic evidence of HPS was defined as muscle thickness of greater than or equal to 4mm and/or channel length of greater than or equal to 16mm. The resident's measurements were compared to radiology results. Descriptive analyses and t-Test were used for statistical analysis.

Results:
Our study population was comprised of 30 infants (25 boys, five girls). Twenty-eight of 30 patients were found to have HPS on both radiology and surgeon ultrasound examination. The remaining two patients had a negative ultrasound and were subsequently diagnosed with reflux. When ultrasound performed by the surgeon was compared to that of radiology, no false-negative or false-positive results were noted. The surgeon was diagnostically accurate in all 30 cases. More specifically, there was no statistically significant difference between surgeon and radiology measurements with regards to pyloric muscle thickness ($p=0.825$, average deviation=0.4mm) or channel length ($p=0.74$, average deviation=2.2mm).

Conclusions:
Surgeons with appropriate training in abdominal ultrasound can diagnose HPS with the same degree of accuracy as radiologists. Based on these results, we are now using ultrasound by surgeons as a primary diagnostic modality and employing radiology only for problematic or equivocal cases.

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20 PERITONEAL DRAINAGE OR LAPAROTOMY IN NEONATAL BOWEL PERFORATION? A RANDOMISED CONTROLLED TRIAL (6 MINUTE)

Clare M. Rees, MBChB, MRCS[1], Simon Eaton, Ph.D.[1], A. Kate Khoo, BSc, MBBS, MRCS[1], Edward M. Kiely, FRCSI, FRCS, FRCPCH (Hon)[2], Agostino Pierro, M.D., FRCS (Engl), FRCS (Edin), FAAP (Hon).[3]

[1]Institute of Child Health, London, United Kingdom, [2]Great Ormond Street Hospital for Children NHS Trust, London, United Kingdom, [3]Institute of Child Health & Great Ormond Street Hospital for Children NHS Trust, London, United Kingdom.

Purpose:
To determine whether primary peritoneal drainage compared to primary laparotomy reduces mortality in extremely low birth weight infants with perforated necrotizing enterocolitis or isolated perforation.

Methods:
A multi-centre randomised controlled trial was performed in neonates from 31 pediatric surgical centers in 13 countries between October 2002 and March 2006. Inclusion criteria were birth weight ≤1000g and pneumoperitoneum on x-ray. Patients were randomly allocated to primary peritoneal drain or primary laparotomy on-line, minimizing for weight, gestational age, ventilatory support, inotropes or platelet transfusion, country of origin and presence of on-site surgical facilities. Patients randomised to drain were allowed to have a "rescue" laparotomy after at least 12 hours of no clinical improvement. Patients were followed up for six months to calculate mortality.

Results:
Sixty-nine patients were randomised (35 drain, 34 laparotomy), and a further 44 were eligible but not enrolled. There were no differences between the groups in minimization criteria. Overall survival was 18/35 (51%) in the drain group and 22/34 (65%) in the laparotomy group (p=0.3, Fisher's exact test). Cox regression analysis showed a trend towards improved survival with primary laparotomy (relative risk of mortality 0.5, p=0.2, 95%CI 0.2-1.5). "Rescue" laparotomy was performed in 26/35 (74%) patients after 119±24.4 hours (mean±SEM) and did not increase survival compared to primary laparotomy (relative risk of mortality 1.4, p=0.4, 95%CI 0.6-3.4). Drain was effective as a definitive treatment (no laparotomy) in only 4/35 (11%) surviving neonates. Adjusted survival curves are shown for laparotomy, drain with "rescue" laparotomy and drain alone. [Figure].

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Conclusions:
This trial provides no evidence to support the benefit of a primary peritoneal drain in extremely low birth weight infants with intestinal perforation, either as a definitive treatment, or to achieve clinical stability before performing a laparotomy.

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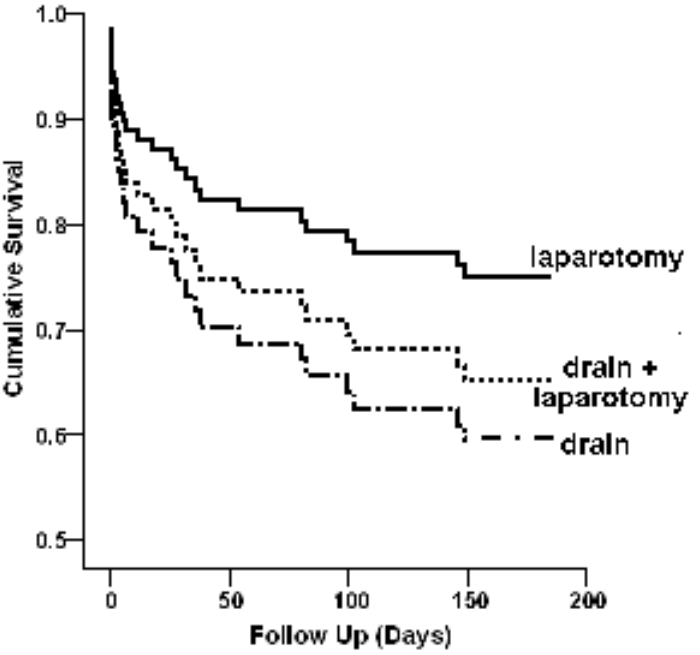
1.0
0.9
0.8
0.7
0.6
0.5
Cumulative Survival
0
50
100
150
200
Follow Up (Days)
laparotomy
drain +
laparotomy
drain

Notes:

21 ORALLY APPLIED POLYETHYLENE GLYCOL CO-POLYMER (PEG 15-20) AS A SURROGATE MUCIN: THE EVOLUTION OF A MUCOSAL PROTECTIVE STRATEGY AGAINST NECROTIZING ENTEROCOLITIS (3 MINUTE)

Donald C. Liu, M.D., Ph.D.[1], Loretto Glynn, M.D.[1], Adam Suchar, B.S.[1], Jonathan Kohler, M.D.[1], Richard Wu, M.D.[1], Hongjin Lee, M.D.[2], Kelly Snider[1], John Alverdy, M.D.[1]

[1]Univ. of Chicago, Chicago, IL, USA, [2]Hanyang Univ., Seoul, Republic of Korea.

Purpose:

In neonatal necrotizing enterocolitis (NEC), bacterial invasion into the gut epithelium with subsequent inflammation and necrosis are key pathophysiologic events that characterize this disease. Here we tested whether application of a novel membrane active polymer PEG 15-20 acting as a surrogate mucin into the intestinal tract could protect against early pathologic events in NEC and its development.

Methods:

A standardized hypoxic model of NEC was used in which rat pups were randomized to receive standard infant formula reconstituted in either H_2O or a 5% solution of PEG 15-20. Pups were fed by gavage for 96 hours and followed for the development of NEC. To determine the biological effect of the polymer on epithelial barrier function and bacterial invasion, intestinal segments were examined by Atomic Force Microscopy (AFM). Physicochemical properties of the polymer were evaluated by applying PEG 15-20 onto ordered bilipid membranes using Small Angle Scatter X-ray beam analysis (SAXS)

Results:

NEC incidence based on mortality, clinical grading, and gross bowel appearance was overall significantly reduced in animals fed PEG15-20 (44% reduction n=29/group; $P<0.05$). AFM demonstrated that PEG15-20 formed a topographically tight covering on the epithelium and protected against bacterial invasion and epithelial apoptosis. SAXS analysis demonstrated the intercalation of PEG 15-20 into bilipid membranes with the formation of repellant polymer brushes. In safety studies, mice fed PEG15-20 for one month displayed normal growth patterns and appeared healthy.

Conclusion:

PEG 15-20 appears to be a novel surface active protectant acting as a surrogate mucin within the intestinal epithelium without any biological or clinical toxicity that may have a potential role in a gut-protective strategy against necrotizing enterocolitis.

Notes:

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22 MID-TERM POSTOPERATIVE CLINICO-RADIOLOGICAL ANALYSIS OF SURGERY FOR HIGH TYPE IMPERFORATE ANUS: PROSPECTIVE COMPARATIVE STUDY BETWEEN GEORGESON AND PEÑA PROCEDURES (6 MINUTE)

Chizue Ichijo, Kazuhiro Kaneyama, Tadaharu Okazaki, Yoshifumi Kato, Hiroyuki Kobayashi, Yoshihisa Kurosaki, Atsuyuki Yamataka.

Juntendo Univ. School of Medicine, Tokyo, Japan.

Purpose:

To analyze outcome of surgery for high type imperforate anus (HTIA) using anal endosonography (AES), magnetic resonance imaging (MRI), and a fecal continence evaluation questionnaire (FCEQ).

Methods:

In this study, 24 HTIA were studied. Fifteen of 24 had laparoscopy-assisted Georgeson pull-through procedure (G-group) and 9/24 had Peña procedure (P-group). All subjects had postoperative AES and MRI. On AES, differences in muscle-thickening (M-T) of the external sphincter (ES) and puborectalis (PR) at three and nine o'clock were measured and compared between groups. If pull-through colon was central, the difference in M-T was nearly zero. On MRI, M-T was classified as good, fair, and poor, and semi-quantitatively analyzed for symmetry. If M-T was symmetric, the MRI score was zero. Slight differences in M-T scored one point, and marked differences in M-T scored two points. Sixteen of 24 (nine in G-group, seven in P-group) followed for over three years were given a structured FCEQ assessing frequency of motions, severity of staining, severity of perianal erosions, anal shape, and requirement for medications (max score 10). Surgical stress was assessed using mean febrile period, peak white blood cell count, and peak C-reactive protein and compared.

Results:

Mean age at surgery and mean postoperative period for both groups were not statistically different. There were no differences in mean M-T for ES or PR between groups (ES: G-group: 0.19±0.15mm, P-group: 0.16±0.09mm, p=0.59; PR: G-group: 0.19±0.19mm, P-group: 0.22±0.15mm, p=0.69). MRI scoring also showed no significant difference in M-T (G-group: 0.77±0.83, P-group: 0.75±0.50, p=0.97). When FCEQ were analyzed annually, G-group scores were generally higher throughout the study, but only statistically significant at three and four years ($p<0.05$). Differences in parameters of surgical stress were not significant.

Conclusions:

Although there was no difference in the distribution of ES and PR between the two groups, our study suggests that the G-group has better continence.

Notes:

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23 OUTCOMES IN PEDIATRIC PATIENTS UNDERGOING STRAIGHT VERSUS J-POUCH ILEOANAL ANASTOMOSIS: A MULTICENTER ANALYSIS (6 MINUTE)

Rupa Seetharamaiah, M.D.[1], Risto Rintala, M.D.[2], Mikko Pakarinen, M.D., Ph.D.[2], Antti Koivusalo, M.D., Ph.D.[2], Donald C. Liu, M.D., Ph.D.[3], Ariel Spencer, M.D.[3], James D. Geiger, M.D.[1], Ronald B. Hirschl, M.D.[1], Arnold G. Coran, M.D.[1], Daniel H. Teitelbaum, M.D.[1]

[1]C S Motts Children's Hospital, Univ. of Michigan, Ann Arbor, MI, USA, [2]Hospital for Children and Adolescents, Univ. of Helsinki, Helsinki, Finland, [3]Univ. of Chicago Comer Children's Hospital, Chicago, IL, USA.

Purpose:

Outcomes remain controversial for patients undergoing straight (SIAA) versus J-pouch (JPAA) ileoanal anastomosis, particularly in children where fewer such cases are performed. Our three centers have had extensive experience with both techniques. Thus, we had the unique opportunity to compare outcomes within the same centers.

Methods:

We retrospectively analyzed 250 children after proctocolectomy with either SIAA or JPAA. Data abstracted included demographics, surgical complications, stooling frequency and pouchitis. A functional stooling score was developed to further assess outcomes. Data was analyzed with chi-square and generalized linear mixed models for repeated measures; $p<0.05$ was considered significant. Stool frequency was treated as a continuous and pouchitis as a binary outcome measure.

Results:

Two hundred three patients had sufficient data for complete analysis (41% males; mean surgery age 15±7years). Indication for surgery was ulcerative colitis in 168 and familial polyposis in 35. One hundred twelve had a SIAA, and 91 had a JPAA. Day-time and night-time stooling frequency was significantly higher ($p<0.013$) for SIAA patients at one, three, six, 12 and 24 months; however, stooling frequencies approximated each other by 24 months (Figure). Symptomatic pouchitis (compared to enteritis after SIAA) was significantly higher in JPAA patients (Odds ratio 10.9, C.I. 2.66 - 44.17). Frequency of pouchitis declined with time (Table). Post surgically, JPAA had significant anastomotic stenosis ($p=0.046$), where as SIAA had a significantly higher rate of fistula formation ($p=0.05$).

(graphic and table on next page)

Conclusions:

SIAA and JPAA are associated with initial morbidity; SIAA with higher stool frequency and JPAA with increased pouchitis. Over time problems improved, yielding similar functional outcomes by three years; however JPAA had lower stool frequency and better early continence rates.

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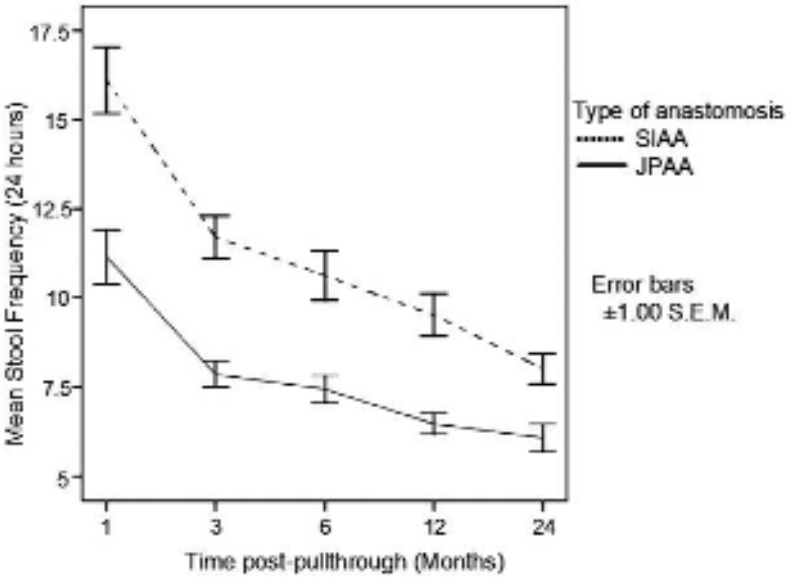

Stooling Functional Results			
	SIAA	JPAA	P value
Stool frequency at 24 months	8.4±3.9/day	6.2±2.8/day	0.003
Pouchitis /Enteritis: 12 months	8%	39%	0.0001
Pouchitis /Enteritis: 24 months	8%	24%	0.013
Pouchitis /Enteritis: 36 months	5.3%	20%	0.005
Stooling scores at 24 months: Good	52%	62%	0.161
Stooling scores at 24 months: Fair	39%	28%	0.161
Initial Incontinence rate: Day-time	10%	2%	0.025
Initial Incontinence rate:Night-time	29%	20%	0.074
On stool control medications at 24 months	83%	61%	0.001

Notes:

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24 EXPERIENCE WITH 12 CONSECUTIVE INTESTINAL TRANSPLANTS FOR TOTAL INTESTINAL AGANGLIONOSIS (TIA) (6 MINUTE)

Frederique Sauvat, M.D.[1], Fabio Fusaro, M.D.[1], Florence Lacaille, M.D.[1], Laurent Dupic, M.D.[1], Nathalie Bourdaud, M.D.[1], Virginie Colomb, M.D.[1], Dominique Jan, M.D.[1], Jean-Pierre Cezard, M.D.[2], Yves Aigrain, M.D.[2], Olivier Goulet, M.D.[1], Yann Revillon, M.D.[1]

[1]URF Necker-Enfants Malades, Univ. Rene Descartes Paris V, Paris, France, [2]Hopital Robert Debre, Univ. Paris VII, Paris, France.

Purpose:

TIA, the absence of ganglion cells throughout almost the entire gastrointestinal tract represents a very rare form of Hirschsprung disease. Management of such patients represents a medical and surgical challenge because of the parenteral nutrition (TPN) dependency and its long-term sequelae. Small bowel transplantation (ITx) represents the only cure.

Methods:

Among 62 patients who underwent ITX, 12 had TIA. They received an isolated (n=4) or liver-ITx (LITX) after 10 to 144 months of TPN started at birth. All patients had several operations prior to the transplant with a mean frequency of laparotomy of 6.3. Transplantation was either isolated ITX, with inferior vena cava anastomosis, or a combined LITx using the Omaha procedure, but including the right colon in all the cases. Immunosuppression included steroids, tacrolimus and azathioprine or IL2-blockers. TP weaning was slowly achieved through a combination of oral and enteral feeding.

Results:

At a median follow-up of 47 months, the survival rate was 62.5% in the LITx group and 100% in the ITx patients. Graft survival was 62.5% in the LITx group and 75% in the ITx patients, one death in the latter group being related to graft removal for a acute exfoliative rejection. All the surviving patients are completely weaned off of TPN after a median time of 57 days. Pull-through of the allograft colon was carried out in all patients using a Swenson procedure in five and a Duhamel in three. Fecal continence is normal in all children except one.

Conclusions:

ITx should be considered as the preferred therapeutic option in TIA. Early referral to a transplantation center when the diagnosis of TIA is made is critical to prevent the development of TPN-related cirrhosis and thus allow an ITx, which carries a 100% survival, to be performed rather than an LITx with a 62.5% survival.

Notes:

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25 EXSTROPHY-PULL-THROUGH OR PERMANENT STOMA?
A REVIEW OF 53 PATIENTS (6 MINUTE)

Grace Z. Mak, M.D., Marc A. Levitt, M.D., Richard A. Falcone, M.D., Alberto Peña, M.D.
Cincinnati Children's Hospital, Cincinnati, OH, USA.

Purpose:
Exstrophy patients have complex anomalies of the genitourinary and gastrointestinal tract with a spectrum of colonic length. Often colon is lost during the initial management by use of ileostomies and for urologic and genital reconstruction. We reviewed our experience with exstrophy focusing specifically on the potential to undergo a colonic pull-through.

Methods:
All patients with exstrophy or exstrophy variant treated by the authors were retrospectively reviewed. Their ability to form solid stool was assessed via bowel management involving a constipating diet, anti-diarrheals, and a daily enema via the stoma. Patients who underwent successful bowel management were offered a pull-through.

Results:
Fifty-three patients were treated over a 25 year period, including cloacal exstrophy (27), covered exstrophy (16), and complex anorectal malformations with short colon (10). Newborn operations (48 from other institutions, five by us) involved ileostomy in 11 or end colostomy in 42. Eight with ileostomies suffered acidosis and failure to thrive, and underwent "rescue" operations to incorporate all defunctionalized colon in the fecal stream. Four had colon used for their urologic reconstruction, six for their genital reconstruction, leaving them borderline or unable to form solid stool. Twenty-three are undergoing bowel management or being observed for growth of the colonic pouch to determine if they are pull-through candidates. Of the others, 27/30 (90%) underwent colonic pull-through. Of 20 available for follow-up after pull-through, 17 are clean, two have occasional soiling, and one is incontinent but noncompliant. Three of 30 (10%) have a permanent stoma.

Conclusions:
Pull-through depends on successful bowel management, which depends on the ability to form solid stool. To maximize this potential it is crucial to use all available hindgut for the initial colostomy and avoid use of colon for urologic or genital reconstruction. Utilizing these criteria, most exstrophy patients, contrary to popular belief, are candidates for a pull-through.

Notes:

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26 LAPAROSCOPIC NEAR TOTAL PANCREATECTOMY FOR DIFFUSE CONGENITAL HYPERINSULINISM OF INFANCY (3 MINUTE)

Agostino Pierro, M.D., FRCS, FAAP, Virpi Smith, Ph.D., Michael Ashworth, M.D., Khalid Hussain, M.D.

Institute of Child Health and Great Ormond Street Hospital, London, United Kingdom.

Purpose:

The treatment of some forms of "diffuse" congenital hyperinsulinism of infancy (CHI) is near total (~95%) pancreatectomy. The aim of this study is to report our recent experience with the use of laparoscopic pancreatectomy.

Methods:

During the last three years we treated 41 patients with CHI of whom 21 did not respond to medications and required surgery. Eleven patients underwent near total pancreatectomy for "diffuse" CHI: two had standard open near total pancreatectomy and more recently nine had laparoscopic operation. This study reports the clinical course of these nine patients. Results are reported as median and range. Differences were analysed by Mann-Whitney test.

Results:

In four patients (16.3 Kg [9.3-33.2]; 39.6 months [3.3-107.0]) the laparoscopic procedure was converted to open for bleeding. In five most recent patients the near total pancreatectomy was completed laparoscopically, the patients were smaller and younger compared to converted cases (5.4 Kg [4.9-5.8]; 1.4 months [1.2-2.1]; $p<0.016$) and in these patients there were no significant intra-operative complications. Histology and genetic analysis confirmed the presence of "diffuse" CHI. Following surgery completed laparoscopically, analgesia was required for 24-48 hours. Enteral feeding was started on the first postoperative day and delayed in patients who required conversion. There were no postoperative complications. At a follow-up of nine months (3-27) all patients have bolus feeding with normal glucose levels and none are diabetic. Six patients have no medications and three (one conversion, two laparoscopic) require small doses of octreotide (5-10 mcg/kg/day).

Conclusions:

We report laparoscopic near total pancreatectomy associated with no post-operative complications and prompt recovery. In the older patients there is a higher chance of conversion to open. Our results show no diabetes mellitus early after laparoscopic surgery.

Notes:

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27 HOSPITAL ADMISSIONS FOR RESPIRATORY SYMPTOMS AND FAILURE TO THRIVE BEFORE AND AFTER NISSEN FUNDOPLICATION (3 MINUTE)

Steven L. Lee, M.D., Hooman Shabatian, M.D., Jin-Wen Y. Hsu, Harry Applebaum, M.D., Philip I. Haigh, M.D.
Kaiser Permanente, Los Angeles Medical Center, Los Angeles, CA, USA.

Purpose:
To determine whether Nissen fundoplication decreases hospital admissions for respiratory symptoms and failure to thrive.

Methods:
A retrospective study using discharge abstract data from Southern California Kaiser Permanente hospitals during the last decade. Three hundred forty-two pediatric patients had at least one Nissen fundoplication. Hospital admissions for aspiration pneumonia, other pneumonia, respiratory distress/apnea, and failure to thrive (FTT) were determined before and after Nissen fundoplication. Age and associated neurologic disorders were also studied. Statistical analysis was determined by Poisson Regression analysis and relative risk.

Results:
Admissions for aspiration pneumonia was similar before and after Nissen fundoplication. Twenty-four patients were admitted with aspiration pneumonia prior to Nissen fundoplication and three required readmission after surgery. Twenty additional patients with no history of aspiration pneumonia were admitted after Nissen fundoplication. The number of patients admitted for other pneumonia, respiratory distress/apnea, and failure to thrive were similar before and after Nissen fundoplication. The proportion of readmission within one year after Nissen for aspiration pneumonia was 0.1250 (95% CI: 0.0266-0.3236), other pneumonia 0.5465 (95% CI: 0.4355-0.6542), respiratory distress/apnea 0.5039 (95% CI: 0.4145-0.5931), and FTT 0.5669 (95% CI: 0.4761-0.6545). Associated neurologic disorders independently increased hospital admissions for aspiration pneumonia, other pneumonia, respiratory distress/apnea, and failure to thrive. Age was inversely related to hospital admissions for respiratory distress and FTT.

Conclusions:
Hospital admissions for aspiration pneumonia, other pneumonia, respiratory distress/apnea, and FTT in patients with severe GERD were not decreased following Nissen fundoplication. Patients with aspiration pneumonia clearly related to GERD may show some benefit following Nissen fundoplication. Associated neurologic disorders increased readmissions for aspiration pneumonia, other pneumonia, respiratory distress/apnea, and FTT whereas increasing age decreased readmission for respiratory distress and FTT.

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28 MECHANISM OF BAR DISPLACEMENT AND CORRESPONDING BAR FIXATION TECHNIQUES IN NUSS REPAIR OF PECTUS EXCAVATUM (3 MINUTE)

Hyung Joo Park, Won-Jae Chung, Won-Min Jo, Jae Seung Shin, In Sung Lee, Kwang Taik Kim.

Korea Univ. Ansan Hospital, Ansan, Republic of Korea.

Purpose:

Bar dislocation has been a major obstacle in the repair of pectus excavatum with the Nuss technique. Mechanisms of bar displacement have been elucidated by case by case analysis and specific bar fixation techniques have been developed to deal with each mechanism. The efficacy of our bar fixation techniques is appraised.

Methods:

Data of 725 consecutive pectus excavatum patients repaired with our modification of Nuss procedure between 1999 and 2006 were retrospectively analyzed.

Results:

Mechanism of bar displacement fell into one or a combination of the following three types. Type 1 displacement is "bar flipping" - rotation of the bar along the axis of hinge. Type 2 displacement is "lateral sliding" - horizontal slipping of the bar to one side in asymmetric pectus excavatum. Type 3 displacement is "hinge-point disruption"- a backward shift of the bar due to tearing of supporting intercostal musculature. Specific bar fixation techniques have been tailored individually to compensate for potential mechanism of bar displacement according to morphology: multi-point pericostal bar fixation (n=496) for type 1 displacement; incorporation of a stabilizer on the depressed side (n=169) for type 2 displacement; and hinge point reinforcement and the crane technique (n=122) for type 3 displacement. Bar dislocation rate was decreased with our mechanism-based approach (before 4.7% vs. after 1.6%, p=0.033). Also, overall complication rate (before 6.1% vs. after 1.8%, p=0.002) and reoperation rate (before 5.6% vs. after 2.1%, p=0.017) were decreased.

Conclusions:

Mechanism-based bar fixation technique, especially the multi-point pericostal wire fixation, facilitates prevention of bar dislocation in pectus excavatum repair.

Notes:

29 QUALITY OF LIFE AFTER BAR REMOVAL IN PATIENTS WHO HAD UNDERGONE THE NUSS PROCEDURE FOR PECTUS EXCAVATUM (3 MINUTE)

Hyun Koo Kim, Sr., M.D., Ph.D., Young Ho Choi, Sr., M.D., Ph.D., Jae Hoon Shim, Sr., M.D., Man Jong Baek, Sr., M.D., Ph.D., Young Sang Sohn, Sr., M.D., Ph.D., Hark Jei Kim, Sr., M.D., Ph.D.
Guro Hospital, Korea Univ. Medical Center, Seoul, Republic of Korea.

Purpose:
This study examines the perspectives of both the parents and patients who had undergone the Nuss procedure and explores the changes in quality of life and overall satisfaction after the corrective procedure and after bar removal.

Methods:
From August 2001 to July 2006, 61 patients of 132 (46.2%) who had undergone the Nuss procedure had removal of the bar. Interviews based on the Keith and Schlalock's quality of life model were completed in 39 patients (male 26, female 13) of 61 (63.9%) and their parents. Ten questions that focused on satisfaction, social belonging, empowerment, well-being, and operation-related factors were scored from one (negative) to five (positive).

Results:
Patients' ages were 6.8±3.23 years at the Nuss procedure, 9.1±3.54 at bar removal, and 12.0±3.28 at interview. Satisfaction score increased after the Nuss procedure in parents ($p<0.05$) and patients ($p<0.05$). Social belonging score increased after the Nuss procedure (parents: $p<0.05$, patients: $p<0.05$) and after bar removal (parents: $p<0.05$, patients: $p<0.05$). Empowerment score increased after the Nuss procedure (parents: $p<0.05$, patients: $p<0.05$) and after bar removal (parents: $p<0.05$, patients: $p<0.05$). However, well-being score was not increased after the Nuss procedure (parents: p=NS, patients: p=NS) (Table). Overall satisfaction with the final result was 4.1±1.02 in parents and 4.1±1.08 in patients. Medical team's view of overall satisfaction was 4.5±0.64, which was different from parent's view ($p<0.05$) but similar with patient's view (p=NS).

Conclusions:
The Nuss procedure contributed positively to parents' and patients' quality of life. A more positive impact on social belonging and empowerment of parents and patients was found after bar removal.

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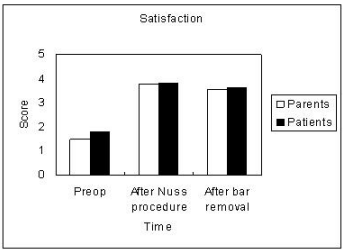

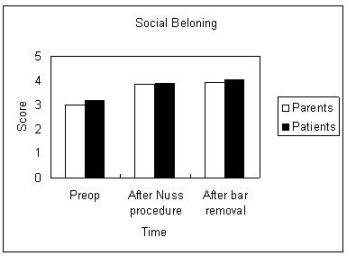

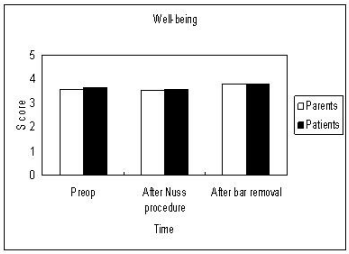

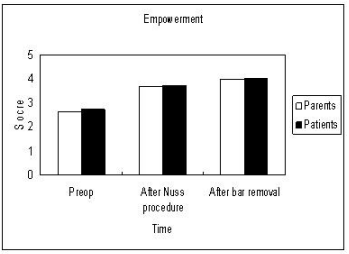

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30 PROSPECTIVE MULTICENTER STUDY OF SURGICAL CORRECTION OF PECTUS EXCAVATUM: DESIGN, PERIOPERATIVE COMPLICATIONS, PAIN AND BASELINE PULMONARY FUNCTION FACILITATED BY INTERNET-BASED DATA COLLECTION (6 MINUTE)

Robert E. Kelly, Jr., M.D.[1], Robert C. Shamberger, M.D.[2], Robert Mellins, M.D.[3], Karen Mitchell, RN[1], Louise Lawson, Ph.D.[4], Keith T. Oldham, M.D.[5], Richard G. Azizkhan, M.D.[6], Andre Hebra, M.D.[7], Donald Nuss, MB, ChB[1], Michael J. Goretsky, M.D.[1], Ronald J. Sharp, M.D.[8], George W. Holcomb, III, M.D.[8], Walton K. T. Shim, M.D.[9], Barry Hicks, M.D.[10], Lawrence Moss, M.D.[11], Annie H. Fecteau, M.D.[12], Paul M. Colombani, M.D.[13], Traci Bagley, RN, BSN[1], Alan Moskowitz, M.S.[1]

[1]Children's Hospital of the King's Daughters, Norfolk, VA, USA, [2]Children's Hospital Boston, Boston, MA, USA, [3]Children's Hospital of New York-Presbyterian, New York, NY, USA, [4]Kennesaw State Univ., Kennesaw, GA, USA, [5]Children's Hospital of Wisconsin, Milwaukee, WI, USA, [6]Children's Hospital Medical Center, Cincinnati, OH, USA, [7]Pediatric Surgical Group, St. Petersburg, FL, USA, [8]Children's Mercy Hospital, Kansas City, MO, USA, [9]Children's Surg Ltd., Honolulu, HI, USA, [10]Children's Medical Center Dallas, Dallas, TX, USA, [11]Yale Univ. School of Medicine, New Haven, CT, USA, [12]Univ. of Toronto, Toronto, ON, Canada, [13]Johns Hopkins Univ. Hospital, Baltimore, MD, USA.

Background:
Pectus excavatum management has not been prospectively studied.

Study Design:
This observational study followed patients with pectus excavatum treated surgically at 11 centers in the United States and Canada according to the method of choice of the patient and surgeon. Before operation, all patients underwent a standard evaluation with CT scan, pulmonary function tests, and body image survey. Data were collected regarding associated conditions, hospital complications, and perioperative pain. One year following completion of treatment, patients will undergo repeat CT scanning, pulmonary function testing, and body image survey.

Results:
Of 416 patients screened, 327 patients were enrolled. Of those, 284 underwent the Nuss procedure and 43 the open procedure. Median preoperative CT scan index was 4.4. Pulmonary function testing before operation showed median FVC of 89% of predicted values; FEV1 88% predicted, and FEF25-75 84% predicted. Early post-correction results show that surgery was performed without mortality and with minimal morbidity at 30 days post-operation. Median hospital stay was four days. Postoperative pain was a median of three on a scale of 10 at time of discharge; the worst pain experienced was the same as was expected by the patients, median eight out of 10; and by 30 days postop median pain score was one of 10. Because of disproportionate enrollment and similar early complication rates, no meaningful statistical comparison between operation types was possible.

Conclusions:
Pectus excavatum of sufficient severity to merit operative correction is associated with reduced pulmonary function. Initial operative correction performed at a variety of centers can be completed safely. Perioperative pain is successfully managed by current techniques.

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31 IS EPIDURAL ANESTHESIA THE BEST PAIN MANAGEMENT STRATEGY AFTER PECTUS EXCAVATUM REPAIR? (3 MINUTE)

Shawn D. St. Peter, M.D., Kathryn Weesner, M.D., Troy L. Spilde, M.D., Ronald J. Sharp, M.D., Susan W. Sharp, Ph.D., Daniel J. Ostlie, M.D., George W. Holcomb, III, M.D., MBA.
Children's Mercy Hospital, Kansas City, MO, USA.

Purpose:
The Nuss operation for pectus excavatum is associated with substantial postoperative pain. Many institutions assume an epidural offers the best pain control for these patients. We conducted a retrospective evaluation to examine the validity of this assumption and to determine the role for a prospective study on this important topic.

Methods:
A retrospective review of patients undergoing the Nuss operation from January 2000 - February 2006 was conducted. Demographics included age, gender, weight and Haller index scores. Outcome variables included total operating room time, hours until complete transition to oral pain medication, length of stay, and maximum pain scores for each of the first five days. Patients with an epidural were compared to those managed with intravenous narcotics (PCA) by intention-to-treat and subgroup analysis.

Results:
Of 203 patients, epidural was attempted in 188 compared to 15 with PCA. There were no differences in the demographic variables between groups. The epidural catheter could not be placed or was removed within 24 hours due to poor function in 65 patients (35%). Intention-to-treat analysis showed PCA patients had significantly shorter operating room time (P=0.004), decreased time to oral pain medication (P=0.042) and decreased length of stay (P=0.037). Mean maximum pain scores were lower in the PCA group compared to those with functioning epidural catheters (Table 1).

Conclusions:
Our data suggest routine epidural catheter placement in all patients undergoing the Nuss operation may not be the best pain management strategy. PCA appears to offer recovery benefits without compromising pain control, which should be verified by a prospective trial.

Table 1: Mean daily maximum pain scores (0=none 10=worst)

GROUP	DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
PCA only	3.7	4.2	4.5	4.3	4.4	HOME
Epidural working beyond 24 hrs	4.2	4.7	4.9	5.3	4.9	5.4

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32 EXPERIENCE IN THE MANAGEMENT OF 82 NEWBORNS WITH CONGENITAL DIAPHRAGMATIC HERNIA TREATED WITH HIGH FREQUENCY OSCILLATORY VENTILATION AND DELAYED SURGERY WITHOUT THE USE OF EXTRACORPOREAL MEMBRANE OXYGENATION (3 MINUTE)

Delphine Mitanchez, M.D., Ph.D.[1], Valerie Datin-Dorriere, M.D.[2], Veronique Rousseau, M.D.[2], Elisabeth Walter-Nicolet, M.D.[1], Sophie Parat, M.D.[2], Alexandra Benachi, M.D.[2], Pierre Taupin, M.D.[2], Claire Nihoul-Fékété, M.D.[2], Philippe Hubert, M.D.[2], Yann Revillon, M.D.[2]

[1]Hopital Armand Trousseau, Paris, France, [2]Hopital Necker Enfants-Malades, Paris, France.

Purpose:
To analyze the neonatal outcome of patients with isolated congenital diaphragmatic hernia (CDH) treated with early high frequency oscillatory ventilation (HFVO) and delayed surgery without the use of extracorporeal membrane oxygenation.

Methods:
A retrospective single institution contemporary series (January 2000 to November 2005) of isolated CDH neonates was reviewed. Following respiratory care strategy was applied: early HFVO, nitric oxide in case of pulmonary hypertension and delayed surgery after respiratory and hemodynamic stabilization.

Results:
Eighty-two consecutive isolated CDH patients were identified. Among them, 79 (96%) were prenatally diagnosed and 78 (95%) were inborn. Survival rate at one month was 65.9% [55.1-75.9] according to the Kaplan-Meier survival curve. Surgery was performed at a mean age five [1-14] days. Survivors were weaned off the ventilator at a mean age 16 days [3-37]. The 82 patients of the study group were stratified into three groups reflecting the severity of the disease: patients weaned off the ventilator before 15 days of life, those weaned off the ventilator after 15 days of life and the non-survivors. The presence of an intra-abdominal stomach may be the most accurate predictor of survival in left CDH. Preoperative pulmonary hypertension was more severe in the non-survivor group and was predictive of the length of mechanical ventilation in the survivors. During the first 48 hours of life, the best oxygenation index above 13 and the best PaCO2 above 45 Torr were predictive of poor outcome.

Conclusion:
When treating high-risk isolated CDH patients with early HFVO and delayed surgery but excluding ECMO support, survival rates compare favourably with other reported series and respiratory morbidity is low. Selected prenatal and postnatal criteria during the first 48 hours of life may help predict neonatal outcome and thereby improve the management of these patients.

Notes:

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33 IMPROVED SHORT TERM OUTCOMES WITH THORACOSCOPIC NEONATAL CONGENITAL DIAPHRAGMATIC HERNIA (3 MINUTE)

David M. Gourlay, Thomas T. Sato, M.D., Dave Lal, M.D., Laura Cassidy, Ph.D., Marjorie J. Arca, M.D.

Children's Hospital of Wisconsin, Milwaukee, WI, USA.

Purpose:

Minimally invasive repair of congenital diaphragmatic hernia (CDH) in the newborn period has the potential for lower morbidity than the traditional open repair in select patients. We used previously identifed selection criteria for successful neonatal thoracoscopic CDH repair to compare the short-term outcomes of thoracoscopic to open repair.

Methods:

We reviewed the experience at a single institution with neonatal CDH repair between 1999-2003. A case control was performed comparing matched cohorts of thoracoscopic versus open neonatal CDH repair. The study met with institutional IRB approval. Data were analyzed using a t-test, Mann Whitney, and Fisher's exact test. A p-value ≤0.05 was considered significant.

Results:

From 2004-2006, 13 of 20 (65%) patients underwent successful neonatal thoracoscopic CDH repair. From 1999-2003, 40 patients underwent an open neonatal CDH repair; 18 (45%) patients matched our selection criteria for thoracoscopic repair. These two cohorts were similar in age, estimated gestational age, weight, APGAR scores, oxygenation index, and peak inspiratory pressures. Measured outcomes are shown in Table. Major complications were less frequent with the thoracoscopic repair (eight vs. 28%) as were total hospital charges ($130,869 vs. 162,665, p=0.25).

Conclusions:

Successful thoracoscopic CDH repair can be expected in newborns with limited respiratory compromise (PIP<25 mmHg & OI<5), no cardiac anomalies, and no need for ECMO. Thoracoscopic CDH repair was associated with lower morbidity, quicker recovery and shorter hospital stay than traditional open repair.

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Short Term Outcomes			
Mean Variable (range)	Thoracoscopic (n=13)	Open (n=18)	p-value
PIP on Post-op Day 1 (cmH2o)	22.2 (20-26)	24.6 (20-31)	0.01
Postoperative Days on Ventilator	4.6 (1-19)	5.5 (1-21)	0.18
Postoperative Days on O2	8.5 (1-31)	10.3 (3-34)	0.43
Postoperative Days Requiring Narcotics	7.2 (0-20)	10.1 (3-40)	0.36
Postoperative Days Unitl Tolerating Full Feeds (days)	8.5 (2-18)	17.4 (7-34)	0.002
Total Length of Stay (days)	22.5 (5-49)	29.4 (12-55)	0.26

Notes:

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34 CENTRAL VENOUS CATHETER PLACEMENT AT THE TIME OF ECMO DECANNULATION: IS IT SAFE? (3 MINUTE)

Thomas P. Rauth, M.D., B. Paul Scott, RN, Cynthia K. Thomason, RN, Randall E. Bartilson, RN, Tracy M. Hann, RN, John B. Pietsch, M.D.
Vanderbilt Univ., Nashville, TN, USA.

Purpose:

Due to concern for infectious and hemorrhagic complications, methods of obtaining central venous access following extracorporeal membrane oxygenation (ECMO) vary by institution. For infants requiring ECMO, it has been our practice to exchange the venous cannula for a tunneled central venous catheter (Broviac) at the time of decannulation. The purpose of this study is to compare the incidence of catheter related complications in these patients to a national registry.

Methods:

The medical records of all non-cardiac surgery infants, ≤12 months of age, requiring ECMO at our institution from 1993-2005 (n=138) were reviewed. Complete information was available for 134. Center for Disease Control criteria was used to identify cases of catheter related blood stream infections (BSI). Data from the National Nosocomial Infections Surveillance system (NNIS) served as a comparative group. Logistic regression was used to determine risk factors for catheter related BSI.

Results:

One hundred thirty-four infants spent a mean of 8.1±4.5 days (range 1-21d) on ECMO. At the time of decannulation, a Broviac catheter was placed in the right internal jugular vein of 94 and remained in place for a mean of 18.3±17 days (range 1-109d). The incidence of BSI related to these catheters was not significantly different than that reported by the NNIS for all central venous catheters over a similar time period (7.6/1000 vs. 7.3/1000 catheter days; p=0.43). The number of days on ECMO and number of catheter days were independent predictors of catheter related BSI in both univariate and multivariate logistic regression models ($p \leq 0.02$).

Conclusions:

Critically ill neonates have limited vascular access. The placement of Broviac catheters in the internal jugular vein following ECMO decannulation maximally utilizes this limited resource. Despite concerns that such catheters are at increased risk for complications, we have found this practice to be safe and effective in this high risk population.

Notes:

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35 A 21-YEAR EXPERIENCE WITH GLOBAL EXTRACORPOREAL MEMBRANE OXYGENATION TRANSPORT (3 MINUTE)

Christopher P. Coppola, M.D., Karen V. Larry, Robert J. Digeronimo, Melissa M. Tyree.
Wilford Hall Medical Center, San Antonio, TX, USA.

Purpose:
Extracorporeal membrane oxygenation (ECMO) transport is a specialized and technology-intensive service, currently limited to a very few centers. We report a 21-year experience from the only team providing global ECMO transport.

Methods:
Retrospective review of medical records, the Extracorporeal Life Support Organization registry, and a database of patients undergoing ECMO transport and in-house ECMO runs at one site from 1985-2006.

Results:
In the time period studied, 66 patients were transported on ECMO. Of these, 55 were transported on ECMO from an outside location to our facility. The remaining 11 patients were moved between two outside facilities as an extra-institutional ECMO transport (EET). Both ground vehicles and fixed-wing aircraft were used. The distance transported on ECMO ranged from seven to 7499 miles with an average of 1422 miles. In the same time period, 115 in-house, non-transport ECMO runs were performed. Survival was comparable between groups, and no patient died during transport or due to a complication of transport.

(table on next page)

Conclusion:
ECMO transport is feasible and effective, with survival rates comparable to in-house ECMO. It is an expensive and complex service requiring specialized equipment and a coordinated team. It should be avoided whenever possible by early conventional transfer of vulnerable patients to facilities providing ECMO.

Table 1: Survival rates for transport and in-house ECMO runs
(data expressed in percentages, number surviving/total number in group, EET: extra-institutional ECMO transport, ECPR: ECMO cardiopulmonary resuscitation)

INDICATION	Transport	EET	in-house	Combined
Neonatal Respiratory	68% (25/37)	33% (1/3)	73% (62/85)	70% (88/125)
Neonatal Cardiac	67% (4/6)	100% (2/2)	89% (8/9)	82% (14/17)
Pediatric Respiratory	64% (7/11)		60% (6/10)	62% (13/21)
Pediatric Cardiac	0% (0/1)	83% (5/6)	50% (4/8)	60% (9/15)
Pediatric ECPR			33% (1/3)	33% (1/3)
All Indications	65% (36/55)	73% (8/11)	70% (81/115)	69% (125/181)

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36 FIRST DECADE'S EXPERIENCE WITH THORACOSCOPIC LOBECTOMY IN INFANTS AND CHILDREN (6 MINUTE)

Steven S. Rothenberg, M.D.

The Mother and Child Hospital atP/SL, Denver, CO, USA.

Purpose:

This study evaluates the safety and efficacy of thoracoscopic anatomic lobectomy in infants and children.

Methods:

From January 1995 to August 2006, 87 patients underwent video assisted thoracoscopic lobe resection by, or under the direct supervision of a single surgeon. Ages ranged from two days to 18 years and weights from 2.8 to 78 kg. Pre-operative diagnosis included sequestration/congenital adenomatoid malformation (57), severe bronchiectasis (19), congenital lobar emphysema (eight), and malignancy (three). The initial procedures were performed with a combination of standard thoracic and endoscopic instruments, through a mini-thoracotomy and 2-3 endoscopic ports. The majority of procedures were performed completely through 3-5 valved trocars with no mini-thoracotomy.

Results:

Eighty-three of 87 procedures were completed thoracoscopically. Operative times ranged from 35 minutes to 210 (avg 115 minutes). There were 18 upper, 10 middle, and 59 lower lobe resections. There were three intra-operative complications (3.4%) all requiring conversion to an open thoracotomy. Chest tubes were left in 73 of 81 procedures for one to 12 days (avg 2.1). Hospital stay ranged from one to 12 days (avg 2.4). One patient with cystic fibrosis developed a pneumothorax on post-op day seven, but this resolved with tube thoracostomy alone. One patient had a brochopleural fistula which was repaired on day nine thoracoscopically. Two patients required blood transfusion.

Conclusions:

Thoracoscopic lung resection is a safe and efficacious technique and can be performed using formal anatomic dissection. It avoids the inherent morbidity of a major thoracotomy incision and is associated with the same decrease in post-operative pain, recovery, and hospital stay as seen in minimally invasive procedures.

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37 INTRAOPERATIVE MANOMETRY DURING LAPAROSCOPIC HELLER MYOTOMY IMPROVES OUTCOME IN PEDIATRIC ACHALASIA (3 MINUTE)

Mubeen Jafri, Maria Alonso, Ajay Kaul, John Racadio, Fredrick Ryckman, Gregory Tiao.
Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA.

Background:
Achalasia is a rare disorder with 5% of patients diagnosed in childhood. Although Heller esophagocardiomyotomy is a proven intervention, incomplete myotomy can lead to clinical failure and need for reoperation. Intraoperative esophageal manometry has been employed to ensure adequacy of myotomies in adult patients. The purpose of the present study was to review our experience in the management of children with achalasia.

Methods:
A retrospective review was conducted on patients with a diagnosis of achalasia from November 1999 to October 2006. Patient demographics (age at diagnosis, sex, symptoms, and methods of diagnosis) and interventions (Heller myotomy, esophageal dilation, or botulism toxin injection) were recorded. Outcomes following surgical intervention (intraoperative complications, length of stay, and postoperative results) and esophageal dilation (complications, relief of symptoms, and need for repeat dilation or surgery) were assessed. Intraoperative manometry was utilized over the past three years.

Results:
Eighteen patients were treated for achalasia. The diagnosis was confirmed by EGD, esophagram, and manometry. The average age at diagnosis was 14±0.8 years. Most patients underwent esophageal dilation (14/18), receiving on average 2.1±0.3dilations. One patient experienced a contained perforation that was treated with conservative management. Two patients were treated with botulism toxin as an adjuvant to other therapies. Ten patients underwent myotomy as primary therapy (n=4) or a result of recurrent symptoms following dilation (n=6). Five patients underwent intraoperative manometry with average pre-myotomy and post-myotomy lower esophageal sphincter (LES) pressures of 37.6±7.3mmHg and 14±2.8mmHg, respectively. One patient had an esophageal mucosal tear which was identified intraoperatively and treated. A significant percentage of patients who did not undergo intraoperative manometry had recurrence of symptoms with manometric evidence of elevated LES pressure (60%vs.0%, $p<0.05$).

Conclusions:
Inadequate myotomy is a potential cause for recurrent symptoms after esophagocardiomyotomy in childhood achalasia. Intraoperative esophageal manometry is a safe technique that improves the success rate of surgery by confirming adequacy of myotomy and decreasing surgical failures.

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38 THE EXTRACELLULAR MATRIX DEGRADATION INHIBITORS TIMP-1 AND PAI-1 ARE UPREGULATED IN EXPERIMENTAL BILIARY ATRESIA (4 MINUTE)

Danielle Patterson, Evan P. Nadler, M.D.
New York Univ., New York, NY, USA.

Introduction:

Biliary atresia (BA) is a progressive obliteration of the extrahepatic bile ducts resulting in hepatic fibrosis. The underlying mechanisms of this fibrosis have not been defined. Specifically, the balance between increased extracellular matrix (ECM) deposition and decreased breakdown has not been evaluated. Therefore we examined the expression of known inhibitors of ECM breakdown and promoters of hepatic fibrosis in a mouse model of BA.

Methods:

Newborn Balb/c mice were randomized to receive an intraperitoneal injection with 1.5×10^6 fluorescence forming units (n=10) of rhesus rotavirus (RRV) or saline control (n=8) within 24 hours of birth. Livers were harvested days seven (n=6) and 14 (n=4). RNA expression of mediators of fibrogenesis were evaluated using quantitative real-time PCR. Data represent the mean ± SEM. Statistical analysis was performed using one-way ANOVA with significance assigned to a p-value less than 0.05.

Results:

All mice injected with RRV displayed clinical characteristics of BA. At seven days, an 18-fold (18.6 ± 4.04) increase in tissue inhibitor of metalloproteinase (TIMP-1) mRNA expression was observed compared to controls (graph). At 14 days, TIMP-1 mRNA was increased 48-fold (48.05 ± 1.53) (graph). Additionally, at 14 days a 38-fold increase in plasminogen activator inhibitor-1 (PAI-1) mRNA expression was observed (38.8 ± 9.22). The expression of transforming growth factor beta (TGF-β) isoforms 1, 2, and 3 did not reach the level of significance at either time point.

Conclusions:

Increased expression of the ECM breakdown inhibitor TIMP-1 mRNA is significantly elevated at day seven, and twice as elevated by day 14. Expression of the ECM breakdown inhibitor PAI-1 mRNA is also elevated at day 14. TGF-β mRNA expression is not upregulated at either time point. These data suggest that inhibition of ECM breakdown may precede increased deposition in the pathogenesis of liver fibrosis in the mouse model of BA.

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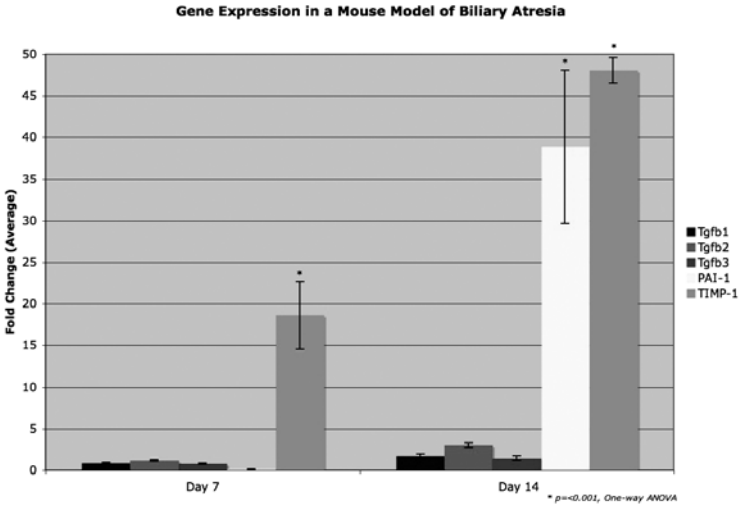

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39 TUMOR NECROSIS FACTOR-ALPHA INDUCES INTESTINAL MITOCHONDRIAL DYSFUNCTION DURING NECROTIZING ENTEROCOLITIS (6 MINUTE)

Naira Baregamian, John Papaconstantinou, B. Mark Evers, Dai H. Chung.
Univ. of Texas Medical Branch, Galveston, TX, USA.

Purpose:
Reactive oxygen species (ROS) and tumor necrosis factor (TNF)-α are thought to be involved in the pathogenesis of necrotizing enterocolitis (NEC); however, the exact cellular mechanisms involved remain unknown. ROS and TNF-α have been shown to disrupt redox state of mitochondria, a major source of intracellular free oxygen radical production. Activation of apoptosis signal-regulating kinase 1 (ASK1)-JNK/p38 pathway occurs with TNF-α/ROS-induced dissociation of thioredoxin-ASK1 inhibitory complex resulting in apoptosis; however, this process in intestinal cells is unknown. Therefore, the purpose of our study was to examine the role of TNF-α on mitochondrial function, free oxygen radical homeostasis and apoptosis in intestinal epithelial cells during NEC.

Methods:
We analyzed paraffin-embedded intestinal sections from 20 neonates with NEC and from three neonates with non-inflammatory condition of the GI tract (control, intestinal atresia) undergoing bowel resection. Immunohistochemical analysis was performed to assess expression of ASK1, TNF-α and nitrotyrosine, an *in vivo* marker for tissue ROS. To elucidate cellular signaling mechanisms, we used rat intestinal epithelial cells (RIE-1) to determine the effects of TNF-α on mitochondrial membrane potential (MMP), ROS production, cytochrome c release, activation of ASK1-JNK/p38 pathway and apoptosis. Western blotting, JC-1 assay, DCFH flow cytometry and immunofluorescent staining were performed.

Results:
Neonatal intestinal NEC sections showed increased expression of ASK1, TNF-α and overwhelming ROS when compared to control. In RIE-1 cells, TNF-α treatment resulted in significant MMP disruption, rise in intracellular ROS and cytochrome c release into cytosol at 15 min. TNF-α treatment also increased phosphorylation of ASK1-JNK/p38.

Conclusions:
Our results demonstrate that significant rise in intestinal ROS is found in NEC. Moreover, TNF-α treatment rapidly alters mitochondrial redox function and contributes to ROS production in intestinal epithelial cells. Therapies targeted against ROS/TNF-α-induced mitochondrial dysfunction may be beneficial in protecting intestinal cells from oxidative stress-induced injury in NEC.

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40 MUCOSAL TOLL-LIKE RECEPTORS 2 AND 4 MAY INITIATE CHRONIC PROINFLAMMATORY STATE IN A TWO-HIT MODEL OF SHORT BOWEL SYNDROME AND SEPSIS (4 MINUTE)

Charles J. Aprahamian, Andrea L. Stanus, Ying-kui Yang, M.D., Ph.D., Carroll M. Harmon, M.D., Ph.D.

Univ. of Alabama Birmingham, Birmingham, AL, USA.

Introduction:

We have previously reported that SBS, independent of total parenteral nutrition, is a proinflammatory state that is magnified by sepsis and injurious to the liver. We hypothesize that after second-hit sepsis, mucosal up-regulation of TLRs 2 and 4 initiates a harmful proinflammatory response that may promote liver injury.

Method:

All experiments were performed with IACUC approval. Sprague-Dawley rats were divided into sham laparotomy (SH) or 75% small bowel resection (SBS) groups. Each group underwent cecal ligation and puncture (CLP) as a model of intestinal sepsis and were sacrificed at one and seven hours (n=4/group). Collected specimens included serum for IL-6 and LFTs. Liver and mucosal specimens were collected for real-time PCR determination of IL-6, TLR2, and TLR4 mRNA. Data was analyzed using One-way ANOVA and student's t test, with $p<0.05$ considered significant. Real-time PCR data was normalized to 18s and by group and expressed as fold change (FC).

Results:

Mucosal TLR2 and TLR4 mRNA were significantly up-regulated at both one (10.9 FC and 59 FC) and seven (52 FC and 912 FC) hours in SBS/Sepsis compared to SH/Sepsis. Similarly, mucosal IL-6 mRNA was significantly up-regulated at both time points (20 FC and 2609 FC) in SBS/Sepsis compared to SH/Sepsis. Serum IL-6 was significantly higher in SBS/sepsis at one hour versus SH/sepsis at one hour (42.6 ± 5.5 vs. 17.3 ± 6.1 pg/mL, $p<0.05$). Serum AST was significantly higher in SBS/sepsis at four hours compared to SBS/sepsis or SH/sepsis at one hour (151 ± 16.1 vs. 85.2 ± 4.8 and 94.0 ± 6.1 U/L, $p<0.05$).

Conclusion:

In a model of SBS, second-hit sepsis leads to an up-regulated mucosal immune response which may promote for mucosal damage and bacterial translocation. This may initiate the harmful proinflammatory response seen clinically in children with SBS as worsening liver function after episodes of sepsis.

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41 ANGIOTENSIN-CONVERTING ENZYME INHIBITOR REDUCES THE SEVERITY OF INFLAMMATION AND APOPTOSIS IN A MOUSE COLITIS MODEL (4 MINUTE)

Hiroyuki Koga, M.D., Hua Yang, M.D., Ph.D., Xiaoyi Y. Sun, M.D., Keisuke Nose, M.D., Daniel H. Teitelbaum, M.D.

Univ. of Michigan, Ann Arbor, MI, USA.

Purpose:

We previously showed that intravenous angiotensin converting enzyme inhibitor (ACE-I) improved pathology and survival in a dextran sodium sulfate(DSS)-induced model of colitis. The aims of this study were 1) develop a new compound which avoided systemic side-effects, and 2) investigate mechanisms of the action. We hypothesized that this compound would reduce colonic inflammation and apoptosis.

Method:

Colitis was induced in C57BL/6 mice with 2.5% DSS in drinking water for seven days. Enalaprilat, an ACE-I (not absorbed through normal mucosa), suspended in polyethylene glycol (PEG, MW 1000, also not absorbed through intact mucosa) administered via the transanal route. Study groups: Control group, received placebo(PEG); and ACE-I groups, received ACE-I/PEG compound daily (doses 1.45 μg to 300μg) throughout the seven days of DSS. Colonic mucosal injury was scored histologically and apoptosis detected with TUNEL staining. Date are expressed as mean±SD. Results were analyzed using ANOVA.

Result:

ACE-I/PEG compound had a dose dependent effect on colitis, with protection against weight loss, improved histological score and reduced epithelial cell (EC) apoptosis. To address mechanisms of ACE-I/PEG action, several pro-inflammatory cytokines were measured (RT-PCR normalized to beta actin; Table). Several pro-apoptotic pathways associated with colitis were also studied (Table). Many of the pro-inflammatory cytokines and pro-apoptotic pathways factors increased with DSS, and were down-regulated with ACE-I/PEG.

(table on next page)

Conclusion:

ACE-I/PEG reduced the severity of colitis; most likely by decreasing both EC apoptosis and expression of pro-inflammatory cytokines. Colitis promoted EC apoptosis via TNF receptor type-1 mediating caspase9 activation pathway. The ACE-I/PEG compound may also work to down-regulate this pathway. ACE-I/PEG may be a potential new option for treating inflammatory bowel disease.

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*P<0.05 vs. control; #P<0.05 vs. naive; and **P<0.05 vs. control						
Study Group ACE/PEG dose	Decline in body weight (%)	Histologic Score (0 to 16, normal to worst)	Apoptosis Index (#EC apoptosis/# EC per crypt)	TNF- α (mRNA)	IL-1b (mRNA)	IL-6 (mRNA)
Control (PEG only)	-17.6±4.9	11.7±2.5	2.4±0.5	1.1±0.3	0.51±0.34	0.45±0.25
1.45μg	-14.9±3.4	11.4±2.6	2.4±0.2	0.88±0.27	0.27±0.19	0.38±0.14
14.5μg	-11.6±1.3*	9.5±1.2	1.3±0.5*	0.07±0.01*	0.10±0.02*	0.19±0.06
145μg	-11.0±3.2*	6.2±5.5*	1.0±0.3*	0.18±0.20*	0.07±0.04*	0.20±0.17
300μg	-14.5±1.7	7.0±1.0*	1.0±0.3*	0.25±0.15*	0.02±0.03*	0.34±0.15
Group	Caspase8 (mRNA)	Caspase3 (mRNA)	Cytochrome C(mRNA)	Caspase9 (mRNA)	Caspase6 (mRNA)	TNF-α Receptor-1(mRNA)
Naive (PEG, but No DSS)	1.4±0.3	10.4±1.8	1.4±0.5	1.2±0.2	1.3±0.2	1.3±0.2
Control (PEG in DSS mouse)	14.1±3.5#	10.8±4.5	22.3±6.8#	3.4±1.6#	16.1±7.0#	6.8±3.1#
ACE-I 145μg	4.0±1.9**	11.0±5.1	8.8±2.9**	1.2±0.3**	4.6±2.4**	3.3±1.8

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42 HEPATOCYTE SURVIVAL AND FUNCTION IN A TISSUE ENGINEERED IMPLANTABLE LIVER ASSIST DEVICE *IN VITRO* AND *IN VIVO* (4 MINUTE)

Wen-Ming Hsu, M.D.[1], Katayun Irani, M.D.[1], Amedeo Carraro, M.D.[1], Katherine Kulig, BA[1], Eleanor Pritchard, BA[2], Kimberly Bonner, BA[2], Brian Orrick, MBA[2], Kimberly Morgan, BA[1], Mohammed Kaazempur-Mofrad, Ph.D.[3], Eli Weinberg, MS[3], Jeffrey Borenstein, Ph.D.[2], Joseph Vacanti, M.D.[1]

[1]Massachusetts General Hospital, Boston, MA, USA, [2]Draper Laboratories, Cambridge, MA, USA, [3]Massachusetts Institute of Technology, Cambridge, MA, USA.

Purpose:

The only cure for end stage liver disease is transplantation, which is limited by the shortage of available organs. We have designed and constructed a tissue engineered implantable liver-assist device with a vascular-like network and tested its ability to support hepatocyte viability and function *in vitro* and *in vivo*.

Methods:

A bilayer device was designed consisting of a vascular-like network and a parenchymal chamber separated by a microporous membrane. This concept is scalable in size to further accommodate large biomass needed for hepatic function augmentation. The vascular-like network was created using computational modeling to mimic a native capillary bed. Bilayer devices were tested *in vitro* using a syringe pump perfusing media through the vascular-like network with either rat primary cells or human hepatoma cells seeded in the parenchymal chamber. We performed *in vivo* experiments on adult immuno-compromised rats, implanting devices by cannulating the inlet catheter of devices into the femoral artery and the outlet catheter into the femoral vein. Allogenic rat hepatocytes or human hepatoma cells were seeded in the parenchymal chamber. In both *in vitro* and *in vivo* experiments, viability of hepatocytes and hepatocyte specific functions were assayed.

Results:

Viability was excellent both *in vitro* and *in vivo*. *In vitro* functional data, including albumin secretion, alpha-fetoprotein secretion, and ammonia metabolism, showed greater activity from cells in devices compared to well plates. *In vivo* functional data included protein production by the cells in the device, and secretion of alpha-feto protein into the serum of the animal.

Conclusions:

We have constructed a bilayer device that is scalable in design and have shown that seeded liver cells survive and maintain function *in vitro* and *in vivo*, enabling us to begin large animal studies and expand our device to assess further hepatic support

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43 HAPLOIDENTICAL *IN UTERO* HEMATOPOIETIC CELL TRANSPLANTATION AND POSTNATAL MINIMALLY MYELOABLATIVE TRANSPLANTS IN A CANINE MODEL (6 MINUTE)

William H. Peranteau, M.D.[1], Todd E. Heaton, M.D.[1], Andrea T. Badillo, M.D.[1], Yuchen Gu, Ph.D.[2], Susan Volk, DVM, Ph.D.[1], Laura Tuschong[2], Thomas R. Bauer, Ph.D.[2], Mark P. Johnson, M.D.[1], Dennis D. Hickstein, M.D.[2], Alan W. Flake, M.D.[1]

[1]The Children's Hospital of Philadelphia, Philadelphia, PA, USA, [2]National Cancer Institute, Bethesda, MD, USA.

Purpose:

In utero hematopoietic cell transplantation (IUHCT) offers the potential to provide levels of chimerism sufficient to treat hematologic diseases or induce tolerance to facilitate postnatal transplants with minimal conditioning. A large animal model is required to evaluate this approach prior to expanded clinical application. Dogs with leukocyte adhesion deficiency (CLAD), like children with LAD, experience life threatening infections due to impaired leukocyte migration. We evaluate IUHCT in the CLAD model using a haploidentical donor.

Methods:

After receiving IACUC approval, fetuses (n=13) of two pregnant females were injected intraperitoneally by ultrasound guidance at gestational day 37 and 50 with CD34+ enriched BM cells reconstituted with nonenriched BM to provide 1.36% - 2.4% CD3+ cells. One recipient of IUHCT which demonstrated decreased host anti-donor reactivity by mixed lymphocyte culture received a same donor transplant following 10 mg/kg Busulfan conditioning at four months. Engraftment was assessed by CD18 expression (CLAD pups), the presence of the Y chromosome or by quantitative PCR for donor specific variable number tandom repeats.

Results:

Six normal CLAD carriers and two CLAD diseased pups were born. All are alive at seven months. Chimerism analysis was possible in three pups, all of which demonstrated evidence of engraftment. Donor chimerism in CLAD pups is stable and contributes to multiple lineages (Fig 1A). CLAD1 has a normal phenotype and CLAD2 demonstrates a mildly affected phenotype compared to a 100% six month mortality in historical controls. Chimerism in the CLAD carrier who received a postnatal transplant increased from undetectable pre-postnatal transplant levels to 38.2% at 10 weeks post transplant (Fig 1B).

Conclusion:

This study confirms the ability of IUHCT to achieve levels of haploidentical engraftment that markedly improve the lethal phenotype in a large animal model and provide a platform on which minimally myeloablative postnatal transplants can significantly increase donor chimerism levels.

(graphic on next page)

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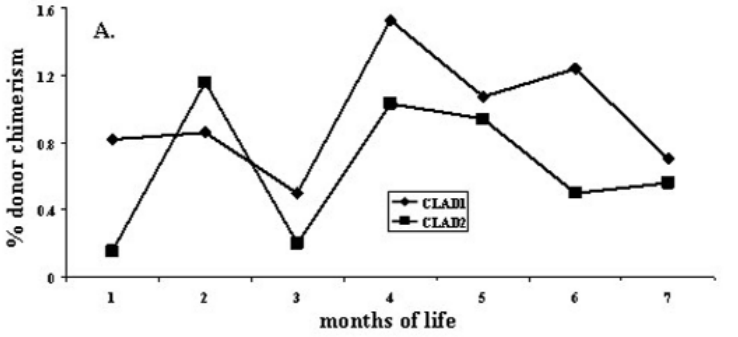

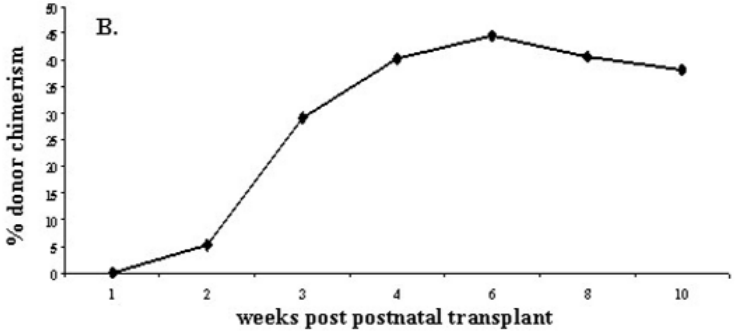

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44 THE IMPACT OF SURGICAL RESECTION ON CIRCULATING HEMATOPOIETIC PROGENITOR CELLS (6 MINUTE)

Daniel N. Rutigliano, D.O.[1], Rosandra N. Kaplan, M.D.[2], Hannah K. Lederman, B.A.[3], Philip Cawkwell[3], Michael P. La Quaglia, M.D.[1], David Lyden, M.D., Ph.D.[2]

[1]Memorial Sloan-Kettering Cancer Center, New York, NY, USA, [2]Weill Cornell Medical College of Cornell Univ., Memorial Sloan-Kettering Cancer Center, New York, NY, USA, [3]Children's Blood Foundation, Weill Cornell Medical College of Cornell Univ., New York, NY, USA.

Purpose:

Metastasis remains the leading cause of cancer death. Recently, we determined that a subset of hematopoietic progenitor cells (HPCs) expressing vascular endothelial growth factor receptor 1 (VEGFR-1) mobilize from the bone marrow and travel to sites of distant metastatic spread. These cells form cellular clusters which may help to initiate the metastatic process. Previous research has suggested that surgery and tumor resection may result in increased circulating levels of angiogenic factors. Based upon this we are examining the impact of surgical resection on mobilization of these $VEGFR1^+$ cells and their role in metastatic progression.

Methods:

C57/B6 mice were inoculated with Lewis Lung carcinoma cells via intradermal injection. After 2-3 weeks, when tumors measured approximately 1.5cm, surgical resection was performed. Mice with unresected tumors as well as mice without tumors served as controls. Blood samples were obtained prior to surgery as well as at one, five, 12 and 28 days after surgery. Using flow cytometry, circulating levels of $VEGFR1^+$ HPCs were measured from peripheral blood mononuclear cells. Quantitative polymerase chain reaction (qPCR) was used to detect metastatic tumor cells in lung tissue taken from these animals at necropsy.

Results:

As shown graphically below, mice that underwent surgery to remove the tumor had a sharp rise in circulating HPCs postoperatively starting at post-operative day (POD) 1, peaking by POD 5, and returning to normal by POD 28. In addition, using qPCR analysis, these mice had a ten-fold increase in metastatic tumor cells with in the lung tissue.

Conclusions:

Surgical resection of tumors in these animals induces mobilization of HPCs and may be linked to enhanced metastatic disease. Further investigation into the exact chronology and etiology is necessary to identify a 'pro-angiogenic window'. Use of anti-angiogenic treatment as adjuvant therapy around the time of primary surgery may reduce late disease recurrence.

(graphic on next page)

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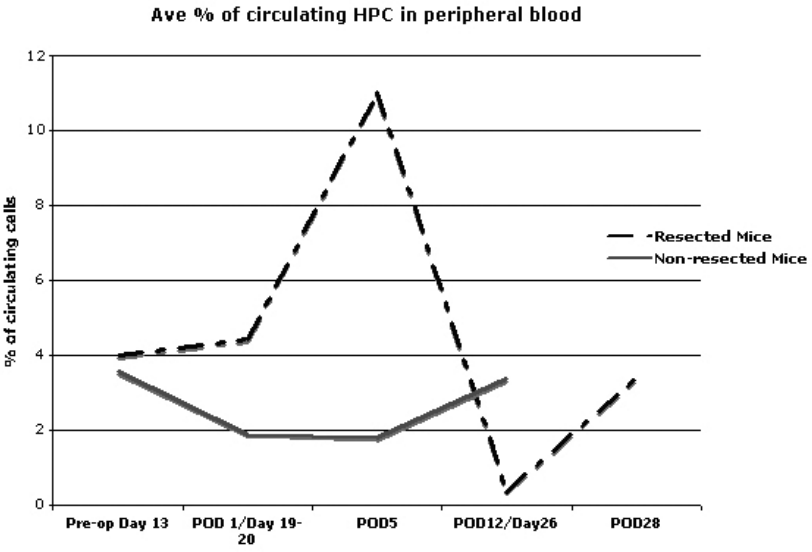

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45 EMBRYONIC ESSENTIAL MYOSIN LIGHT CHAIN REGULATES FETAL LUNG DEVELOPMENT IN RATS (4 MINUTE)

Marta Santos[1], Rute Moura, Ph.D.[1], Cristina Nogueira-Silva[1], Steffen Ohlmeier, Ph.D.[2], Jorge Correia-Pinto, M.D., Ph.D.[1]

[1]Life and Health Sciences Research Institute, School of Health Sciences, Univ. of Minho, Braga, Portugal, [2]Proteomics Core Facility, Biocenter Oulu, Department of Biochemistry, Univ. of Oulu, Oulu, Finland.

Purpose:

Congenital diaphragmatic hernia (CDH) remains a life-threatening congenital anomaly largely due to associated lung hypoplasia. The pathophysiology of lung hypoplasia involves an early developmental defect in branching morphogenesis and a late mechanical defect in maturation and differentiation, mediated by herniation of abdominal viscera. Since early determinants of lung hypoplasia might be promising targets for prenatal therapy, we assessed the proteomics signature of CDH lung prior to the end of the pseudoglandular stage with the aim of finding potential molecular targets for therapy.

Methods:

Proteomics analysis of normal and nitrofen-induced hypoplastic lungs was carried out at 17.5 days post-conception (dpc). The major differentially expressed protein was identified by mass spectrometry as myosin light chain 1a (MLC1a). Thus, embryonic essential MLC1a and regulatory myosin light chain 2 (MLC2) were characterized throughout normal and abnormal lung development by immunohistochemistry and western blot. Furthermore disruption of MLC1a expression was assessed in normal lung explant cultures by antisense oligodeoxynucleotides.

Results:

From the early stages of normal lung development, MLC1a was expressed in the vascular smooth muscle (VSM) cells of pulmonary arteries and MLC2 was present in parabronchial smooth muscle and VSM cells of pulmonary vessels. Disruption of MLC1a expression during normal pulmonary development led to significant growth and branching impairment. Western blot analysis confirmed that MLC1a and MLC2 were absent from hypoplastic fetal lungs during the pseudoglandular stage of lung development.

Conclusions:

These results suggest that MLC1a regulates lung branching morphogenesis. Furthermore, MLC1a and MLC2 may play a role in the early molecular determination of lung hypoplasia in the nitrofen-induced rat model of CDH.

Notes:

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46 ANGIOPOIETIN-1 MEDIATES VASCULAR RECOVERY AND TUMOR RECURRENCE DURING POTENT VEGF BLOCKADE (6 MINUTE)

Jianzhong Huang, Jae-O Bae, Judy Tsai, Darrell Yamashiro, Jessica Kandel, M.D.
Columbia Univ. College of Physicians & Surgeons, New York, NY, USA.

Purpose:
Metastatic anaplastic Wilms tumor (MAWT) remains refractory to most current chemotherapies. Vascular endothelial growth factor (VEGF) blockade is a validated therapy for advanced adult cancers, now in clinical trials for treatment-refractory pediatric tumors. However, despite meaningful responses, virtually all treated patients ultimately develop progressive disease. We previously demonstrated that MAWT can be regressed by VEGF inhibition, but may recur during long-term blockade with associated alterations in vessel architecture. Angiopoietin-1 (Ang-1) is a proangiogenic factor known to stimulate vascular survival and remodeling. We hypothesized that activation of the Ang-1 cascade would mark tumors recurring during VEGF blockade.

Methods:
The University Animal Care Committee approved all experiments. Orthotopic MAWTs were established by injecting 10(6) cultured SK-NEP-1 cells intrarenally in nude mice (N=100). After six weeks, tumor-bearing animals were randomly assigned to receive 500mcg of 1) the anti-VEGF construct VEGF-Trap or 2) control-Fc biweekly intraperitoneally. Maximal tumor regression occurred at day 36 (as previously reported). In this study, we maintained a cohort of animals (N=12) on VEGF-Trap after this point of maximal regression, monitored for tumor recurrence by calipers. Animals were killed when the greatest tumor axis reached 2.5cm.

Results:
All tumors and metastases recurred by treatment day 68, displaying striking vascular remodeling. Ang-1 expression was markedly increased by Western, immunohistochemical, and in situ hybridization analysis, as was expression of the transcriptional complex that controls transactivation of the Ang-1 promoter. Recurrent tumor vessels displayed activation of the Ang-1 receptor, Tie-2, and its downstream target phosphorylated-Akt.

Conclusions:
We show that even those advanced AWT initially regressed by VEGF blockade inexorably recur, and that recurrence is characterized by activation of the angiopoietin/Tie-2 signaling cascade. Thus, sustained VEGF blockade can elicit increased expression of Ang-1, a known mediator of vascular survival. Targeting this pathway may enhance current anti-angiogenic therapies.

Notes:

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47 PEDIATRIC BAYESIAN LOGISTIC INJURY SEVERITY SCORE (P-BLISS): AN ACCURATE AND GENERALIZABLE METHOD FOR PREDICTING MORTALITY IN INJURED CHILDREN (3 MINUTE)

Randall S. Burd, M.D., Ph.D.[1], Ming Ouyang, Ph.D.[1], David Madigan, Ph.D.[2]
[1]UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ, USA, [2]Rutgers Univ., Piscataway, NJ, USA.

Purpose:
Studying outcomes in injured children using administrative data requires an accurate method for risk adjustment based on ICD-9 codes. The ICD-9 based Injury Severity Score (ICISS) has performed adequately in initial studies but is mathematically flawed and has not been validated in children. Because of the large number of injury codes, standard regression methods cannot be used to estimate the independent risk of death for each injury, particularly when modeling interactions between injuries. Bayesian logistic regression is a method that can handle a large number of predictors without loss of performance. The purpose of this study was to use this method to develop a model predicting mortality in injured children using ICD-9 codes and to evaluate the effect of injury interactions on performance.

Methods:
Records of children (age <15 yrs) from the NTDB (n=93,996) from 1995-2002 and NPTR (n=42,006) from 1996-2001 were combined (overlap permitted) and used to train Bayesian logistic regression models predicting mortality using injury ICD-9 codes. Generalizability was assessed by testing 'reproducibility' using NTDB data (n=44,150) from 2003-2004 and 'transportability' using data from the Kids' Inpatient Database 2003 (KID, n=58,472). Discrimination was evaluated using area under the ROC curve (AUC) and calibration using the Hosmer-Lemeshow (HL) h-statistic.

Results:
Models were developed showing excellent discrimination in each test dataset. Calibration was good in each model and improved (lower) when age and 2-way injury interactions were considered.

(table on next page)

Conclusions:
Bayesian logistic regression yields estimates of injury severity in children (P-BLISS) that are accurate and generalizable. These results show the importance of modeling injury interactions when predicting mortality in children using ICD-9 codes.

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			NTDB Test Data		KID Test Data	
	# of Variables Entered into Model	# of Variables in Final Model	AUC	HL h-statistic	AUC	HL h-statistic
ICD-9 codes alone	1,844	705	0.90	525	0.96	238
+age	1,845	688	0.90	471	0.97	217
+2-way injury interactions	80,446	828	0.91	263	0.97	198
+3-way injury interactions	409,085	1,339	0.91	315	0.97	195
+injury-age interactions	5,534	706	0.91	455	0.97	187
+age & 2-way injury interactions	80,457	808	0.90	252	0.97	191

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48 RECOMBINANT FACTOR VIIa AS AN ADJUNCT IN NON OPERATIVE MANAGEMENT OF SOLID ORGAN INJURIES IN CHILDREN (3 MINUTE)

Saleem Islam, M.D., MPH[1], Laura R. Vick, M.D.[2], Rupa Seetharamiah, M.D.[2]
[1]Univ. of Florida, Gainesville, FL, USA, [2]Univ. of Mississippi, Jackson, MS, USA.

Ongoing bleeding after blunt solid organ injury in children may require invasive therapy in the form of either angiographic or operative control. We report our experience in the use of a pro coagulant, recombinant Factor VIIa (rFVIIa) for controlling persistent bleeding.

Methods:
Records of six children who had blunt abdominal trauma with persistent bleeding were reviewed after obtaining IRB approval.

Results:
All six patients presented to us after sustaining blunt abdominal trauma and solid organ injury. All had evidence of persistent bleeding with an increase in the heart rate and a drop in hematocrit (see table). We were able to control the bleeding succesfully in all cases with a single dose of rFVIIa at 90 μg/kg, avoiding any therapeutic intervention. No patients were transfused after the administration of rFVIIa. None of the six children experienced any thromboembolic issues

Conclusions:
rFVIIa is a useful adjunctive therapy in pediatric patients with evidence of ongoing hemorrhage from blunt abdominal injury, and may reduce the need for invasive therapeutic procedures as well as transfusion rate.

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Patients who received rFVIIa						
Age and Sex	Mechanism of Injury	Injuries	Initial HCT	HCT at time of rFVIIa treatment	Outcome	Follow up
13 year old male	Bicycle and handlebars	Grade 3 left renal laceration	38.7	22.2	Bleeding stopped, d/c day 6	1 year, no issues
7 year old male	Ped vs. car	Grade 4 Liver laceration with blush	42.7	26.4	Bleeding controlled, d/c day 9	14 months, no compli-cations
12 year old female	MVC	Grade 3 right renal laceration, open book pelvic fx	38.0	21.5	Pelvic angio after FVIIa showed no bleeding. d/c after pelvic repair	10 months, slight limp
15 year old male	sports injury	Grade 3 spleen injury with blush	38.6	20.0	vitals stabilized, d/c day 5	8 months, no issues
8 year old male	MVC	Grade 3 liver laceration with blush	38	21.0	Bleeding controlled, d/c day 6	7 months without problems
13 year old female	MVC	Grade 4 Spleen lac with blush, T9 fracture	30	21.0	HCT stabilized, spine fixed day 6.	5 months with back brace, u/s with healing spleen

Notes:

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49 JUSTIFICATION FOR AN ABBREVIATED PROTOCOL IN THE MANAGEMENT OF BLUNT SPLEEN AND LIVER INJURY (3 MINUTE)

Shawn D. St. Peter, M.D., Troy L. Spilde, M.D., George W. Holcomb, III, M.D., MBA, Scott J. Keckler, M.D., Daniel J. Ostlie, M.D.
Children's Mercy Hospital, Kansas City, MO, USA.

Purpose:
Current management for blunt spleen/liver injury in children requires a number of days of bedrest equal to the grade of injury plus one. This is employed even when there are no clinical indicators of ongoing bleeding. In order to establish a prospective protocol with abbreviated periods of observation, we conducted a retrospective review of our trauma experience to examine the safety of such a protocol.

Methods:
A retrospective analysis of our most recent nine year experience with blunt spleen or liver injury was performed. Demographics, vital signs, hemoglobin levels, transfusions, operations and outcomes were measured. An abbreviated protocol using overnight bedrest for grade I and II lesions and two nights for higher grades was designed, and then applied to the population to assess its safety. Data is expressed as mean +/- standard deviation.

Results:
During the study period, 242 patients were admitted with spleen and/or liver injury. Mean age was 9.0 +/- 4.6 years with a weight was 35.3 +/- 19.3 kg. 63% were male. Spleen was injured in 148 (61.2%), liver in 121 (50.0%), and 26 (10.6%) had both. The mean grade was 2.0 +/- 1.1, for which mean bed rest was 3.5 +/- 1.1 days resulting in 5.6 +/- 6.5 days of hospitalization. There were nine patients who died, seven with severe brain injury and two with massive hemorrhage on presentation. No patient required an operation or transfusion after two nights of observation who did not have clinically obvious signs. Implementation of the abbreviated protocol would have affected 65.8% of our patients and saved a mean of 2.0 +/- 1.5 hospital days per patient.

Conclusions:
According to our data, an abbreviated trauma protocol with overnight bedrest for grade I and II lesions and two nights for higher grades could be safely employed. This protocol would immensely improve current resource utilization.

Notes:

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50 PANCREATIC INJURY IN CHILDREN: GOOD OUTCOME OF NONOPERATIVE TREATMENT (3 MINUTE)

Ivo de Blaauw, M.D., Ph.D., Johan Blickman, M.D., Ph.D., Rene S. V. M. Severijnen, M.D., Ph.D., Rene M. H. Wijnen, M.D., Ph.D.

Univ. Medical Centre St. Radboud, Nijmegen, The Netherlands.

Purpose:
Treatment of blunt injury of the pancreas in children remains controversial. Nonoperative treatment is the primary choice for some whereas others mandate operative management in selective cases. This report reviews the treatment of patients with blunt pancreatic trauma admitted to a Level I Pediatric Trauma Centre in the Netherlands

Methods:
All medical records of patients with pancreatic trauma in the period 1975-2003 were retrospectively analysed. We further reanalysed the CT scans by two independent radiologists for its predictive value of nonoperative or operative treatment.

Results:
Thirty-four children were included, age 3-14 years. The majority were due to bicycle accidents (58%). On admission amylase was raised in 90% of the patients. Five patients had pancreatic duct injuries identified by imaging or at surgery. ERCP was used once, MRCP twice. Pancreatic surgery was performed in three children (1 Roux-Y, 2 drainage only). three others had laparotomy for concurrent injury. Thirty-one children were primarily managed nonoperatively. Mean hospital stay was 29 days in the operated patients and 24 days in the nonoperative group. Small fluid collections developed in drained patients. Both resolved spontaneously. In 16 of the 31 non-operated patients a pseudocyst developed. Only six of these needed secondary intervention. Of these, three were percutaneously drained. There was no mortality, no long term morbidity in both groups. CT scan were reanalysed in 11 of 34 patients. In grade I-II injury there was a 15% match, in grade III-IV a 80% match.

Conclusions:
Nonoperative management of pancreatic injury in children has good clinical outcome. In 50% pseudocysts develop of which half can be managed nonoperatively. Only 10% need secondary surgery. The reliability of primary CT scan grading is limited to decide for primary surgical interventions. There is little to gain with ERCP and stenting. The value of MRCP remains to be determined.

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St. Joseph's Hospital

Table Number: T26

3003 W. Dr. MLK Jr. Boulevard
Tampa, FL 33607
Phone: 813/636-2087
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St. Joseph's Specialty Services is looking for a third Board Certified Pediatric Surgeon seeking a casual, family-friendly lifestyle in a warm-weather, cosmopolitan city. The practice is solely based at St. Joseph's Children's Hospital of Tampa, on Florida's playful Gulf Coast. We provide a broad spectrum of pediatric sub-specialists, loan forgiveness, bonus, one-in-three-call, competitive salary, and comprehensive benefits package.

Stryker Endoscopy

Booth Number: B4

5900 Optical Court
San Jose, CA 95138
Phone: 408/754-2709
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