AMERICAN PEDIATRIC SURGICAL ASSOCIATION

APSA 35th Annual Meeting

FINAL PROGRAM

MAY 27 – 30, 2004

SAWGRASS MARRIOTT RESORT
PONTE VEDRA BEACH, FLORIDA

IPSO MEETING

INTERNATIONAL PEDIATRIC SURGICAL ONCOLOGISTS

MAY 26, 2004

PLEASE BRING THIS PROGRAM WITH YOU

American Pediatric Surgical Association
Administrative Offices
60 Revere Drive
Suite 500
Northbrook, IL 60062
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Final Program

Membership Directory

Directory begins on the flipside of the Final Program

Educational Objective

APSA's 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 Cancer/Oncology and the second addressing Informatics/Technologies. 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 about what is relevant to their practices. The scientific sessions consist of basic research and practical clinical presentations. The poster sessions allow younger 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

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

Credit Designation

APSA designates this educational activity for a maximum of 20.25 category 1 credits toward the American Medical Association Physician's Recognition Award. Each physician should claim only those credits he/she actually spent in the activity.

Policy on Faculty and Provider Disclosure

It is the policy of the ACCME and APSA that the faculty and sponsors disclose real or apparent conflicts of interest relating to the topics of the educational activity, and also disclose discussions of unlabeled/unapproved uses of drugs or devices during their presentations. Detailed disclosure will be made in the meeting handout materials.

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 education grant for the transcription of the annual meeting technical sessions.

APSA also thanks the following sponsors for their educational grants:

- Karl Storz Endoscopy – Telesurgery Demonstration and Lunch
- LifeCell – Saturday Coffee Breaks

Committee Meetings

The following is a listing of committee meetings during the APSA Annual Meeting:

Wednesday, May 26

7 a.m. – 8 a.m.	Education Committee	Suite 100
9:30 a.m. – 4 p.m.	APSA Board of Governors	Stadium Room
4 p.m. – 5 p.m.	Multicenter Pectus Study	Suite 100
5 p.m. – 6:30 p.m.	Ethics & Advocacy Committee	Commissioners Room
6 p.m. – 10 p.m.	Publications Committee Dinner	Gallery A/B

Thursday, May 27

6:30 a.m. – 8 a.m.	Practice Committee	Heritage D
6:30 a.m. – 8 a.m.	Trauma Committee	Governor Room
6:30 a.m. – 8:30 a.m.	Pediatric Surgery Training Directors	Stadium Room
7 a.m. – 8 a.m.	Bariatric Study Group (by invitation)	Commissioners Room
7 a.m. – 8:30 a.m.	Special Taskforce on Manpower	Gallery B
3:30 p.m. – 5 p.m.	Florida Association of Pediatric Surgeons	Gallery A
4 p.m. – 6 p.m.	Outcomes Center Committee	Gallery B

Friday, May 28

6:30 a.m. – 7:30 a.m.	Committee on Manpower	Gallery A
6:30 a.m. – 7:30 a.m.	Informatics Committee	Gallery B
6:30 a.m. – 7:30 a.m.	Membership/Credentials Committee	Commissioners Room
6:30 a.m. – 7:30 a.m.	International Relations Committee	Stadium Room
6:30 a.m. – 7:30 a.m.	APSA Foundation Board Meeting	Governor Room
6:30 a.m. – 8 a.m.	Endoscopic Surgery Committee	Patrons Room
4 p.m. – 5:30 p.m.	Advisory Council for ACS Ped Surg	Governor Room
4:30 p.m. – 6 p.m.	*Journal of Pediatric Surgery* Editorial Board Reception	Gallery A/B

Saturday, May 29

3:30 p.m. – 5 p.m.	COG Surgeon's Meeting	Champions Ballroom
3:30 p.m. – 5:30 p.m.	AAP – Program Committee	Stadium Room

Sunday, May 30

7 a.m. – 8 a.m.	Obesity Meeting	TBD
7 a.m. – 8 a.m.	Cancer Committee	TBD

Schedule at a Glance

Wednesday, May 26, 2004

8 a.m. – 5 p.m.	Registration open
8:45 a.m. – 5 p.m.	APSA/IPSO Meeting (open to all APSA meeting attendees)
9:30 a.m. – 4 p.m.	APSA Board of Governors meeting
1 p.m. – 5 p.m.	Committee meetings
6 p.m. – 10 p.m.	Publications committee meeting/dinner
6:30 p.m. – 10 p.m.	APSA Board of Governors dinner

Thursday, May 27, 2004

6:30 a.m. – 8:30 a.m.	Committee meetings
7 a.m. – 5:30 p.m.	Registration open
7:30 a.m. – 10:30 a.m.	Poster set-up
8 a.m. – 10:30 a.m.	Symposium: Cancer/Oncology
10:30 a.m. – 11 a.m.	Coffee break
11 a.m. – Noon	Robert E. Gross Lecture: Giulio J. (Dan) D'Angio, M.D.
Noon – 1 p.m.	Lunch with video session
1 p.m – 3:30 p.m.	Symposium: Technologies Which May Enhance Your Practice/Training Program
3:45 p.m. – 5:15 p.m.	Poster Presentations/ Poster Viewing Area: Authors in Attendance
5:30 p.m. – 6:30 p.m.	Exhibit set-up
6:30 p.m. – 8:30 p.m.	Welcome Reception

Friday, May 28, 2004

6 a.m. – 7:30 a.m.	Annual Fun Run
6:30 a.m. – 7:30 a.m.	Committee meetings
6:45 a.m. – 1 p.m.	Registration open
6:45 a.m. – 7:30 a.m.	Continental breakfast; exhibits open; poster viewing
7:30 a.m. – 8 a.m.	Welcome and Introduction/New members introduced
8 a.m. – 10 a.m.	Scientific Session I
10 a.m. – 10:30 a.m.	Coffee break; exhibits open; poster viewing
10:30 a.m. – Noon	Scientific Session II
Noon – 1 p.m.	Presidential Address: Bradley M. Rodgers, M.D.
1:30 p.m.	Golf Tournament
2 p.m.	Tennis Tournament
7 p.m. – 8:30 p.m.	President's Reception

Schedule at a Glance (Continued)

Saturday, May 29, 2004

6:30 a.m. – 8 a.m.	Member business meeting and breakfast
6:30 a.m. – 1 p.m.	Registration open
7 a.m. – 8 a.m.	Continental breakfast (nonmembers); exhibits open; poster viewing
8 a.m. – 10 a.m.	Scientific Session III
10 a.m. – 10:30 a.m.	Coffee break; exhibits open; poster viewing
10:30 a.m. – Noon	Scientific Session IV
Noon – 1 p.m.	Overseas Guest Lecture: David Lloyd, M.D.
1 p.m. – 1:30 p.m.	Coffee break; exhibits open; poster viewing
1:30 p.m. – 3:30 p.m.	Telesurgery demonstration with lunch
2 p.m. – 5 p.m.	Exhibit dismantle
3:30 p.m. – 5 p.m.	COG Surgeon's Meeting (open to all APSA meeting attendees)
6:30 p.m. – 10:30 p.m.	President's Banquet

Sunday, May 30, 2004

7 a.m. – 8 a.m.	Continental breakfast; poster viewing
7 a.m. – 8 a.m.	Committee Meetings
7:30 a.m. – 11:15 a.m.	Registration open
8 a.m. – 8:15 a.m.	APSA Foundation Scholar: Peter F. Ehrlich, M.D.
8:15 a.m. – 9:15 a.m.	*Journal of Pediatric Surgery* Lecture: R. Scott Jones, M.D.
9:15 a.m. – 11 a.m.	Scientific Session V
11 a.m.	Annual Meeting Adjourns
	Posters dismantle

General Information

1. Registration

Please note that all authors presenting a paper at the 35th APSA Annual Meeting are required to pay a registration fee.

The onsite registration fees for the Annual Meeting are:

APSA or IPSO Member	$540
Physician Non-Member	$640
Student/Resident/Fellow*	$365
Nurse/Allied**	$365
Accompanying Person	$290

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

*** Registration for APSA/IPSO Meeting and the APSA 35th Annual Meeting only; APSNA registration is by separate subscription.*

APSA Registration Desk

Registration will be located at the Champions Desk during the following times:

Wednesday, May 26	8 a.m. – 5 p.m.
Thursday, May 27	7 a.m. – 5:30 p.m.
Friday, May 28	6:45 a.m. – 1 p.m.
Saturday, May 29	6:30 a.m. – 1 p.m.
Sunday, May 30	7:30 a.m. – 11:15 a.m.

2. Scientific Sessions

All educational sessions will be held in Champions Ballroom. The daily dress code is business or business casual attire.

3. Poster Viewing

Scientific Posters will be available for viewing during the following hours:

Thursday, May 27	
Poster Set-up	7:30 a.m. – 10:30 a.m.
Poster Viewing	11:30 a.m. – 5:15 p.m.
Friday, May 28	6:45 a.m. – Noon
Saturday, May 29	7 a.m. – 1:30 p.m.
Sunday, May 30	7 a.m. – 11 a.m.

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

4. Speaker-Ready Room

The speaker-ready room will be available daily, beginning Thursday, May 27 at 7 a.m. in the Players D room. Computers will be provided for speakers to review their presentations.

5. Presentation Check-In

Speakers must use Microsoft PowerPoint® slides during their presentations; 35mm slides will not be accepted. Please 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 turn their computer presentations in to the technican in the Speaker Ready Room (Players D) by 1 p.m. on the day before they are scheduled to speak.

6. Exhibits

Commercial exhibits will be located in Champions ABC. Exhibits will be open during the following hours:

Friday, May 28	6:45 a.m. – 11 a.m.
Saturday, May 29	7 a.m. – 11 a.m.
	1 p.m. – 2 p.m.

Continental breakfast will be served in the Exhibit Hall Friday and Saturday morning. Coffee and soft drinks will also be available in the Exhibit Hall during the refreshment breaks each day. For a list of exhibitors and booth assignments, see pages A157 – A161.

7. APSA Business Meeting

The APSA Business Meeting will be held from 6:30 a.m. – 8 a.m. on Saturday, May 29, in the Island Green Pavilion. This is a breakfast meeting and is for APSA members only.

8. Welcome Reception

A Welcome Reception for all registrants will take place poolside from 6:30 p.m. – 8:30 p.m. on Thursday, May 27. Tickets for this reception will be included in your registration packet and will be required for admission to the reception. All accompanying persons 12 years and older will require a ticket to be admitted to the Welcome Reception. Casual attire is appropriate.

9. President's Reception

All registered guests are invited to attend the President's Reception on Friday, May 28, from 7 p.m. – 8:30 p.m. in the Champions Foyer.

10. President's Banquet

The President's Banquet will be held in the Champions Ballroom on Saturday, May 29. The reception will begin at 6:30 p.m. 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 accompanying persons 12 years and older will require a ticket to be admitted to the banquet. Business or cocktail attire is requested.

11. Accompanying Persons Program

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

12. Accompanying Persons Event

Trolley Tour of St. Augustine – $58
The tour will leave the hotel at 8:45 a.m. on Saturday, May 29, from the outside ramp of the convention entrance. Everybody is welcome to sign up for the tour. This is a four-hour guided tour and is appropriate for everyone ages seven and older.

13. Optional Activities

The annual 5K Fun Run will be on Friday, May 28, at 6 a.m. Bibs will be issued at the registration table beginning at 5:15 a.m. A light breakfast will be included and the cost to participate is $40.

The golf tournament will take place at 1:30 p.m. on Friday, May 28. It will be a shotgun start at the Stadium Course. Transportation to the course departs promptly at 1:20 p.m. at the convention entrance. Lunch will be included and the cost to participate is $255.

The tennis tournament will be a round-robin tournament beginning at 2 p.m. Friday, May 28, at the ATP tennis courts. Please meet at the convention entrance at 1:30 p.m. to catch the shuttle service to ATP Headquarters. Light refreshments will be included and the cost to participate is $30.

Additional information about these events will be available at the APSA registration desk.

14. Messages

A message board will be maintained in the registration area during registration hours. Please check the board frequently. There will be NO PAGING during the conference. The following phone number may be used to contact the message center: 904/285-7777. Please instruct callers to ask for the APSA registration desk in order to leave a message.

Guidelines for Authors and Discussants

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

2. Computer disks and CD-ROMs must be turned in to the technician in the Speaker Ready Room by 1 p.m. on the day *before* they are to be presented.

3. Posters: Please note that the poster session format has changed this year. There will be two poster sessions, both of which will be presented in "walk rounds" format. Scientific posters should be set up Thursday morning from 7:30 a.m. – 10:30 a.m., and presenters must be available with their posters on Thursday between 3:45 p.m. to 5:15 p.m. to participate in the poster sessions. In addition, authors are asked to be in attendance during the morning refreshment breaks and the reception on Thursday evening to discuss their presentations. All poster displays must be dismantled on Sunday, immediately following the annual meeting.

4. Discussants from the floor should state their name and affiliation prior to their remarks. The discussions will be audio recorded for transcription at a later date.

5. Typed discussion should be limited to a maximum of 200 words or less. Typed discussions that exceed 200 words will be edited before they are submitted to the *Journal* 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 March 19, 2004.

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Past APSA Annual Meeting Dates and Locations

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

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

Invited Speakers

Robert E. Gross Lecture: Giulio J. (Dan) D'Angio, M.D.
"The Role of the Surgeon in the Past, Present, and Future of Pediatric Oncology"

Giulio D'Angio, a native New Yorker, graduated from Columbia College in 1943 and Harvard Medical School in 1945 and trained in pediatric surgery at Boston Children's Hospital, where he first encountered cancer in children. After two years of army service, he trained in radiology and pathology, and then rejoined Boston Children's Hospital in 1956 to assume responsibility for pediatric radiation therapy. As Sidney Farber's radiation and chemotherapeutic regimens bore fruit and cure rates climbed, it became evident that these effective treatments sometimes caused disturbing late effects, such as organ dysfunctions and growth abnormalities. Since then, Dr. D'Angio's career has been devoted largely to mitigating or avoiding these effects. He spent a year at the Lawrence Radiation Laboratory in California, where he studied the biological effectiveness of heavy ion beams. This research later became a basis for clinical trials at Memorial Sloan-Kettering Cancer Center, where he spent eight years after four years at the University of Minnesota. He and Dr. Evans were instrumental in organizing the National Wilms' Tumor study, the first inter-group study to deal with a childhood neoplasm. He also founded the Late Effects Study Group, an international multi-institutional program, and, more recently, the Histiocyte Society to promote study of the normal and abnormal physiology of that cell. He has been honored widely and received an honorary doctorate from the University of Bologna for contributions to pediatric oncology.

Overseas Guest Lecture: David Lloyd, M.D.
"Tomorrow's Surgeons: Who Cares for the Patient?"

David Lloyd was born and educated in South Africa. Son of a doctor in rural Zululand, he was exposed from an early age to the fascinations and various faces of medical practice and was particularly impressed by the plight of disadvantaged children. He received his medical undergraduate training in England at Cambridge University and St. Bartholomew's Hospital London, returning to South Africa for his specialist training in general and then pediatric surgery in Cape Town under Professor Jannie Louw and Professor Sid Cywes. Here he also undertook an original experimental study into 'Colonic interposition for short gut syndrome', the subject of his thesis for the Degree of Master of Surgery.

In 1977 he achieved a long-term goal when he joined Professor Robert Mickel as senior lecturer in pediatric surgery at the University of Natal in Durban, South Africa, not far from his home, the only pediatric surgeons serving a population of 8 million. However, in 1983 he accepted an invitation from Professor Marc Rowe to move to the Children's Hospital of Pittsburgh as associate professor in the Department of Pediatric Surgery. He crossed the Atlantic once again in 1988 to become professor of pediatric surgery in the University of Liverpool and Consultant pediatric surgeon at the Alder Hey Children's Hospital.

Dr. Lloyd is a Fellow of the College of Surgeons of England, South Africa, Canada and America. He is the immediate past-president of the British Association of Pediatric Surgeons and chairs the Trauma Committee of the Royal College of Surgeons of England. His clinical interests include pediatric trauma, oncology and nutrition, and he leads an experimental research program studying the aetiology of Hirschsprung's Disease and congenital diaphragmatic hernia.

Journal of Pediatric Surgery Lecture: R. Scott Jones, M.D.
"The American College of Surgeons Initiatives for Safety and Quality Improvement"

Rayford Scott Jones is the S. Hurt Watts Professor of Surgery at the University of Virginia Health System in Charlottesville, Virginia. He received his B.A. from the University of Texas and his M.D. from the University of Texas Medical Branch in Galveston, Texas. Dr. Jones served as professor of surgery at Duke University Medical Center before joining the faculty at the University of Virginia. He was the chairman of the surgery department of the University of Virginia from 1982-2002. He was a governor of the American College of Surgeons and vice chairman of the Advisory Council. He is the director of research and optimal patient care of the American College of Surgeons and the current president of the American Surgical Association. He is past president of the American College of Surgeons, the Society for Surgery and Alimentary Tract and the Southern Surgical Association. He served on the Residency Review Committee for Surgery and on the American Board of Surgery. Dr. Jones is the author of the *Atlas of Liver and Biliary Surgery* and co-author of the *Textbook of Liver and Biliary Surgery.* He is the author of numerous articles and chapters on liver and biliary disease.

PROGRAM IN DETAIL

Wednesday, May 26

8 a.m. – 5 p.m.	Registration open
8:45 a.m. – 5 p.m.	IPSO Meeting
9:30 a.m. – 4 p.m.	APSA Board of Governors meeting
1 p.m. – 5 p.m.	Committee meetings
6 p.m. – 10 p.m.	Publications Committee meeting/dinner

IPSO Meeting

Welcome

8:45 a.m. – 9 a.m.
Bruce Broecker, M.D. – President, IPSO
Bradley M. Rodgers, M.D. – President, APSA
Michael A. Skinner, M.D. – APSA Cancer Committee

The "Unresectable" Tumor Session 1: Liver

9 a.m. – 10:30 a.m.
Moderators: Dietrich Von Schweinitz, M.D., Michael P. LaQuaglia, M.D.

When is a Tumor Unresectable?

Unresectability Due to the Primary Tumor
Frederic Gauthier, M.D.

Unresectability Due to Metastatic Disease
Rebecka L. Meyers, M.D.

Discussion

Treatment of the Unresectable Liver Tumor

Hepatic Transplantation for Liver Tumors
Jean de Ville de Goyet, M.D.

Novel Strategies for the Unresectable Liver Tumor
Max R. Langham Jr., M.D.

Discussion

Coffee Break

10:30 a.m. – 11 a.m.

IPSO Free Papers

11a.m. – Noon
Moderators: Robert C. Shamberger, M.D., Hugo Heij, M.D.

THE PREDICTIVE VALUE OF THE PRETREATMENT EXTENT (PRETEXT) OF DISEASE STAGING SYSTEM IN HEPATOBLASTOMA
Aronson D., Schnater M., Staalman C., Weverling G., Plaschkes J., Perilongo G., Brown J., Phillips A., Otte J., Czauderna P., Mackinlay G.
Amsterdam, The Netherlands

3-DIMENTIONAL VISUALIZATION OF PEDIATRIC TUMORS FOR PREOPERATIVE PLANNING OF SURGICAL RESECTION
Szavay P., Kirschner H., Warmann S., Bourquain H., Peitgen H., Hennemuth A., Fuchs J.
Tuebingen, Germany

RESECTABILITY OF EXTENDED AND METASTASISED HEPATOBLASTOMA AFTER HIGH-DOSE CHEMOTHERAPY
von Scheweinitz D., et.al.
Munich, Germany

HEPATIC METASTASECTOMY IN CHILDREN
Su W., Gholizadeh M., Lal D., LaQuaglia M.
New York, NY, USA

GENE EXPRESSION ANALYSIS OF HEPATOBLASTOMA USING CDNA MICROARRAYS
Liniger P., Benit-Deekman J., Zwijnenburg D., Moerland P., Aronson D., Baas F., Kool M.
Amsterdam, The Netherlands

MORBIDITY OF SURGERY AND OUTCOME IN CHILDREN WITH LARGE PRETREATED NEPHROBLASTOMA
Hadley L., Govender D., Landers G.
Durban, South Africa

TUMORS IN THE DRASH AND FRASIER SYNDROMES
Sarnacki S., Auber F., Jaubert F., Sauvat F., Jeanpierre C., Nihoul-Fekete C.
Paris, France

Lunch Break (attendees on their own)

Noon - 1:30 p.m.

The "Unresectable" Tumor Session 2: Non Rhabdo Soft Tissue Sarcoma

1:30 p.m. – 3 p.m.
Moderators: Bhaskar N. Rao, M.D., Eugene S. Weiner, M.D.

Management of the Primary Tumor

Extremity Tumors
Giovanni Cecchetto, M.D.

Visceral Tumors
Charles N. Paidas, M.D.

Discussion

Management of Metastatic Disease

Nodal Metastasis
Richard J. Andrassy, M.D.

Visceral Metastasis
Helene Martelli, M.D.

Discussion

Coffee Break

3 p.m. – 3:30 p.m.

IPSO Free Papers

3:30 p.m. – 4:30 p.m.
Moderators: Larry Hadley, M.D., Michael A. Skinner, M.D.

INTRA-OPERATIVE TISSUE EXAMINATION (IOE): ITS ROLE IN PEDIATRIC PATHOLOGY
Dall'Igna P., Alaggio R., Famengo B., Cecchetto G.
Padua, Italy

SURGICAL MANAGEMENT OF LIPOBLASTOMA
Smith S., McVay M., Keller J., Jackson R., Wagner C.
Little Rock, AR, USA

OUTCOME AFTER RE-OPERATIONS FOR RECURRENT PULMONARY METASTASIS IN CHILDREN
Heij, H.
Amsterdam, The Netherlands

SENTINEL NODE BIOPSY FOR MELANOMA AND OTHER MELANOTIC SKIN LESIONS IN CHILDREN
Patrick D., Roaten J., McCarter M., Karrer F., Pearlman N., Gonzalez R., Gonzalez R.
Denver, CO, USA

LONG-TERM PHYSICAL, PSYCHOSOCIAL AND SEXUAL FUNCTIONING AFTER TREATMENT FOR UROGENITAL RHABDOMYOSARCOMA
Heij H., Hatzmann J., van Lunsen R., Grootenhuis M., Last B.
Amsterdam, The Netherlands

CHROMOGRAFFIN A IN NEURBLASTOMA: CORRELATION TO STAGE AND PROGNOSTIC FACTORS
Skoldenberg E., Stridsberg M., Jakobson A., Hedborg F., Kogner P., Christofferson R.
Uppsala, Sweden

HISTONE DEACETYLASE INHIBITORS DOWN-REGULATE N-MYC AND DECREASE NEUROBLASTOMA GROWTH
Chung D., Kang J., Kim S., Qiao J., Evers M.
Galveston, TX, USA

IPSO Poster Session

4:30 p.m. – 5 p.m.
(Posters available for viewing from 9 a.m. - 4:30 p.m.)
Moderators: Daniel C. Aronson, M.D., Gerald M. Haase, M.D.

EXTRAPLEURAL PNEUMONECTOMY IN CHILDREN
LaQuaglia M., et.al. New York, NY, USA

ABDOMINAL LYMPHOMA IN EGYPTIAN CHILDREN: A STUDY OF SURVIVAL IN 121 CASES
El-Din S., et.al., Alexandria, Egypt

DECREASED E-CADHERIN EXPRESSION CORRELATED WITH HIGHER STAGE OF WILMS' TUMOR
Safford S., et.al., Durham, NC, USA

THE DNA REPLICATION FIDELITY OF HUMAN NEUROBLASTOMA: A SOURCE OF GENETIC INSTABILITY?
Malkas L., et.al., Indianapolis, IN, USA

GIST: A RARE TUMOR WITH A NOVEL THERAPY
Moriarty K., et.al., Springfield, MA, USA

MANAGEMENT OF HEPATOCELLULAR CARCINOMA WITH BILIARY INVOLVEMENT
LaQuaglia M., et.al., New York, NY, USA

HODGKINS DISEASE PRESENTING AS A CYSTIC MEDIASTINAL MASS
Flageole H., et.al., Montreal, QC, Canada

THE AMOUNT OF REMOVED RENAL MASS AFFECTS RENAL FUNCTION IN CHILDREN WITH UNILATERAL RENAL TUMORS
Cozzi F., et.al., Rome, Italy

IPSO Meeting Concludes

Thursday, May 27

6:30 a.m. – 8:30 a.m.	Committee meetings
7 a.m. – 5:30 p.m.	Registration open
7:30 a.m. – 10:30 a.m.	Poster set-up

APSA Meeting

Symposium: Cancer/Oncology

8 a.m. – 10:30 a.m.

Educational Objective:

- Understand the surgical indications and techniques for open vs. thoracoscopic (VATS) management of metastatic lung nodules.
- Be able to evaluate and manage the airway and anesthetic difficulties associated with large anterior mediastinal tumors.
- Understand the indications for and techniques of VATS management of anterior and posterior mediastinal tumors.

Instructors:

- Martin L. Blakely, M.D., Assistant Professor, Pediatric Surgery, University of Texas, Houston, M.D. Anderson Cancer Center, Houston, TX
- Peter C. W. Kim, M.D., Associate Professor of Surgery, University of Toronto, Hospital for Sick Children, Toronto, ON, Canada
- Richard R. Ricketts, M.D., Professor of Surgery, Emory University, Atlanta, GA
- Eugene D. McGahren III, M.D., Associate Professor of Surgery, University of Virginia, Charlottesville, VA
- Rebecka L. Meyers, M.D., Chief, Division of Pediatric Surgery, Primary Children's Medical Center, University of Utah, Salt Lake City, UT

Agenda:

Metastatic Lung Nodules

- INDICATIONS FOR SURGERY
  Martin L. Blakely, M.D.
- LOCALIZATION AND VATS TECHNIQUE
  Rebecka L. Meyers, M.D.

Mediastinal Tumors

- AIRWAY MANAGEMENT, ANTERIOR MEDIASTINAL TUMORS
  Richard R. Ricketts, M.D.
- SURGICAL MANAGEMENT OF ANTERIOR AND POSTERIOR TUMORS, VATS VS. OPEN TECHNIQUE
  Eugene D. McGahren, M.D.
- MYASTHENIA GRAVIS, VATS THYMECTOMY
  Peter C. W. Kim, M.D.

Thursday, May 27 (Continued)

10:30 a.m. – 11 a.m.	Coffee break
11 a.m. – Noon	Robert E. Gross Lecture: Giulio J. (Dan) D'Angio, M.D. "The Role of the Surgeon in the Past, Present and Future of Pediatric Oncology"

Lunch with Video Session

Noon – 1 p.m.
Moderators: *Edward M. Barksdale Jr., M.D. and Daniel H. Teitelbaum, M.D.*
Educational Objective:
The video session will update the participants on clinical problems in pediatric surgery.

V1 LAPAROSCOPIC TOTAL COLECTOMY WITH J-POUCH
Andreas H. Meier, M.D.,Robert E. Cilley, M.D., Leslie Roth, M.D., Peter W. Dillon, M.D.; Penn State University, Hershey, PA, USA

V2 THOROCOSCOPIC INNOMINATE ARTERY PEXY
Evan P. Nadler, M.D., Timothy D. Kane, M.D.
Children's Hospital of Pittsburgh, Pittsburgh, PA, USA

V3 ROBOTIC MODIFIED HELLER MYOTOMY
James D. Geiger, M.D., Ambrosio Hernandez, M.D., Ronald B. Hirschl, M.D.
University of Michigan, Ann Arbor, MI, USA

V4 LAPAROSCOPIC ADRENALECTOMY
Bradley M. Rodgers, M.D., Stewart Long, M.D.
University of Virginia Medical Center, Charlottesville, VA, USA

V5 LAPAROSCOPIC PLACEMENT OF THE ADJUSTABLE GASTRIC BAND IN MORBIDLY OBESE ADOLESCENTS
Allen Browne, M.D.; Mark Holterman, M.D., Ph.D., Ai-Xuan Le Holterman, M.D., Garth Jacobsen, M.D., Santiago Horgan, M.D.
University of Illinois at Chicago, Chicago, IL, USA

Underlining denotes the author scheduled to present at the meeting.

Symposium: Technologies That May Enhance Your Practice/Training Program

1 p.m. – 3:30 p.m.

Educational Objective:

At the conclusion of this symposium, APSA meeting attendees will better understand:

- The uses and benefits of virtual reality for preoperative planning and intraoperative enhancement of the surgical field.
- The uses and benefits of surgical simulation for GME and CME.
- The uses and benefits of the internet and e-mail technologies.
- The uses and benefits of digital image capture and presentation.
- The uses and benefits of point of care and wireless technologies.
- The potential/future uses and benefits of technology and informatics in pediatric surgery.

Instructors:

- Ronald B. Hirschl, M.D., Professor of Surgery, Section of Pediatric Surgery, University of Michigan, Ann Arbor, MI
- Jacob C. Langer, M.D., Professor of Surgery, University of Toronto; Chief, Pediatric General Surgery, Hospital for Sick Children, Toronto, ON, Canada
- Richard M. Satava, M.D., FACS, Professor of Surgery, University of Washington Medical Center, Seattle, WA
- Kenneth S. Azarow, M.D., COL MC, Associate Professor of Surgery, Uniformed Services University; Chief of Surgery, Madigan Army Medical Center, Tacoma, WA
- Carroll M. Harmon, M.D., Ph.D., Associate Professor of Surgery, UAB Department of Pediatric Surgery at Children's Hospital, Birmingham, AL

Agenda:

- VIRTUAL REALITY AND SURGICAL SIMULATION FOR GME AND CME
  Kenneth S. Azarow, M.D., COL MC
- THE INTERNET AND E-MAIL: HOW THESE TECHNOLOGIES CAN ENHANCE YOUR PRACTICE
  Jacob C. Langer, M.D.
- MULTIMEDIA CAPTURE AND PRESENTATION
  Carroll M. Harmon, M.D., Ph.D.
- POINT OF CARE AND WIRELESS TECHNOLOGIES TO ENHANCE YOUR PRACTICE
  Ronald B. Hirschl, M.D.
- GUEST LECTURER:
  "THE FUTURE OF TECHNOLOGY AND INFORMATICS IN SURGERY"
  Richard M. Satava, M.D., FACS

Poster Sessions

3:45 p.m. – 5:15 p.m.
Moderator: *Edward M. Barksdale Jr., M.D.*
Educational Objective:
The poster sessions will update the participants on clinical problems in pediatric surgery and experimental examination of clinical and basic science issues.

Poster Session I
3:45 p.m. – 4:30 p.m.

P1 IDENTIFICATION OF A PAX3 PEPTIDE ANTIGEN ABLE TO INDUCE HUMAN NAÏVE CD8 CELLS TO RECOGNIZE MULTIPLE PEDIATRIC TUMORS
David A. Rodeberg, M.D.; Rebecca A. Nuss, MS; Esteban Celis, M.D., Ph.D.
Mayo Clinic, Rochester, MN, USA

P2 CLONING AND CHARACTERIZATION OF A NOVEL NEUROBLASTOMA SPECIFIC SECRETED PROTEIN
Sanjeev A. Vasudevan, M.D.; Zhiyun J. Liu; Sue M. Burlingame; Parul N. Patel; Jianhua Yang, Ph.D.; Jed G. Nuchtern, M.D.
Texas Children's Cancer Center, Department of Pediatrics and M.E. DeBakey Department of Surgery, Baylor College of Medicine, Houston, TX, USA

P3 THE ROLE OF MULLERIAN INHIBITING SUBSTANCE AND ITS TYPE II RECEPTOR IN GROWTH INHIBITION OF ENDOMETRIAL CANCER
Elizabeth J. Renaud, M.D.; Esther Oliva, M.D.; David T. MacLaughlin, Ph.D.; Patricia K. Donahoe, M.D.
Massachusetts General Hospital, Pediatric Surgery Research Laboratory, Boston, MA, USA

P4 NOVEL ORTHOTOPIC XENOGRAFT MODELS OF METSTATIC AND NON-METASTATIC HUMAN NEUROBLASTOMA
Andrea A. Hayes-Jordan, M.D.; Shimareet Kumar, M.D.; Simone Hettmer, M.D.; Karen Kaucic, M.D.; Stephan Ladisch, M.D.
Children's National Medical Center, Washington, DC, USA

P5 OUTCOME WITH PRIMARY SURGICAL MANAGEMENT OF LOCALIZED NEUROBLASTOMA
Michael P. La Quaglia, M.D.; Wendy T. Su, M.D.; Brian Kushner, M.D.; Dave R. Lal, M.D.; Kim Kramer, M.D.; Nai-Kong Cheung, M.D.
Memorial Sloan-Kettering Cancer Center, Department of Surgery, New York, NY, USA

P6 MANAGEMENT OF FETAL MEDIASTINAL TERATOMA
Aziz M. Merchant, M.D.; Holly L. Hedrick, M.D.; Timothy M. Crombleholme, M.D.; Mark P. Johnson, M.D.; R. Douglas Wilson, M.D.; N.Scott Adzick, M.D.; Alan W. Flake, M.D.
The Children's Hospital of Philadelphia, Center for Fetal Diagnosis and Treatment, Philadelphia, PA, USA

Underlining denotes the author scheduled to present at the meeting.

P7 PRIMARY LUNG MALIGNANCIES IN THE PEDIATRIC POPULATION
Dave R. Lal, M.D.; Wendy T. Su, M.D.; Ian Clark, M.D.; Robert Downey, M.D.; David S. Klimstra, M.D.; Michael P. LaQuaglia, M.D.
Memorial Sloan-Kettering Cancer Center, Department of Surgery, New York, NY, USA

P8 BENIGN ESOPHAGEAL FISTULAS IN CHILDREN WITH PEDIATRIC MALIGNANCY
Dave R. Lal, M.D.; Wendy T. Su, M.D.; Kenneth C. Loh, B.A.; Valerie W. Rusch, M.D.; Michael P. LaQuaglia, M.D.
Memorial Sloan-Kettering Cancer Center, Department of Surgery, New York, NY, USA

P9 THE CHANGING PATTERN IN URGENT AND EMERGENT PEDIATRIC SURGICAL CARE OVER THE PAST DECADE AT A SINGLE INSTITUTION
Felicia A. Ivascu, M.D.; Ambrosio Hernandez, M.D.; Robert A. Drongowski, MA; Arnold G. Coran, M.D.; Ronald B. Hirschl, M.D.
University of Michigan, Ann Arbor, MI, USA

P10 THE IMPACT OF HOSPITAL-WIDE COMPUTERIZED PHYSICIAN ORDER ENTRY ON MEDICAL ERRORS IN A PEDIATRIC HOSPITAL
Jeffrey S. Upperman, M.D.; Patricia Staley; Kerri Friend, B.A.; William Neches, M.D.; David Kazimer, B.A.; Jocelyn Benes, BSN; Eugene S. Wiener, M.D.
Children's Hospital of Pittsburgh, Pittsburgh, PA, USA

4:30 p.m. – 5:15 p.m.

P11 FOREGUT DUPLICATIONS: IS THERE AN ADVANTAGE TO THORACOSCOPIC RESECTION?
Ioana Bratu, M.D.; Jean-Martin Laberge, M.D.; Sarah Bouchard, M.D.
The Montreal Children's Hospital and Hôpital Ste-Justine, Montreal, Quebec, Canada

P12 LAPARASCOPIC VERSUS OPEN SURGICAL APPROACH FOR INTUSSUSCEPTION REQUIRING OPERATIVE INTERVENTION
Kevin Kia, B.S.; Vidya Mony, B.S.; Eustace S. Golladay, M.D.; Robert A. Drongowski, M.A.; James D. Geiger, M.D.; Ronald B. Hirschl, M.D.; Arnold G. Coran, M.D.; Daniel H. Teitelbaum, M.D.
University of Michigan, Ann Arbor, MI, USA

P13 BERIBERI AFTER GASTRIC BYPASS SURGERY IN ADOLESCENCE
Carroll Harmon, Ph.D.; Thomas H. Inge**, M.D., Ph.D.; Beverly Haynes*, R.N., B.S.N., C.P.N.***; Robert H. Clements*, M.D.; Victor F. Garcia**, M.D.*
** University of Alabama at Birmingham, Birmingham, AL, USA*
*** Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA*
**** Children's Hospital, Birmingham, AL, USA*

P14 SURGICAL COMPLICATIONS OF ASCARIASIS IN CHILDREN: MAGNITUDE OF THE PROBLEM AND METHODS OF THE TREATMENT
Yasser Saad-Eldin, M.D.
Pediatric Surgery Unit, Alexandria University, Alexandria, Egypt

Underlining denotes the author scheduled to present at the meeting.

P15 SURGICAL MANAGEMENT OF PERINEAL MASSES IN PATIENTS WITH ANORECTAL MALFORMATIONS
Donald B. Shaul, M.D.; Hector L. Monforte, M.D.; Marc A. Levitt, M.D.; Andrew R. Hong, M.D.; Alberto Pena, M.D.
Childrens Hospital Los Angeles, University of Southern California, Los Angeles, CA, USA and Schneider Children's Hospital, New Hyde Park, NY, USA

P16 INCIDENCE AND CLINICAL RELEVANCE OF WOLFFIAN DUCT REMNANTS IN FEMALES
Arlet G. Kurkchubasche, M.D.; Justine C. Chang; Donald L. Sorrells, M.D.; Conrad W. Wesselhoeft, M.D.; Thomas F. Tracy, M.D.; Francois I. Luks, M.D., Ph.D.
Brown Medical School, Providence, RI, USA

P17 MALROTATION IN CHILDHOOD: A POPULATION BASED STUDY
Marcus M. Malek, B.A.; Randall S. Burd, M.D., Ph.D.
UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ, USA

P18 BEDSIDE SILO AND DEFECT CLOSURE: A SIMPLIFIED AND SUCCESSFUL STRATEGY FOR GASTROSCHISIS
Milissa A. McKee, M.D.; Peter Yoo, M.D.; R. Lawrence Moss, M.D.; John Seashore, M.D.; Robert Touloukian, M.D.
Yale University School of Medicine, New Haven, CT, USA

P19 THE EFFECT OF PHENOL ON INGROWN TOENAIL EXCISION IN CHILDREN
Erin M. Lin, M.D.; Saleem Islam, M.D.; Robert A. Drongowski, MA; Daniel H. Teitelbaum, M.D.; James D. Geiger, M.D.; Arnold G. Coran, M.D.; Ronald B. Hirschl, M.D.
University of Michigan, Ann Arbor, MI, USA

P20 SUCCESSFUL NON-OPERATIVE MANAGEMENT OF ESOPHAGEAL PERFORATION IN EXTREMELY LOW BIRTH WEIGHT INFANTS
Te-Lu Yap, FRCS, MBBS; Anette Jacobsen, FRCS, MBBS; V. T. Joseph, FRCS, MBBS; Joyce H. Y. Chua, MBBS
KK Women's & Children's Hospital, Singapore

Poster Session II
3:45 p.m. – 4:30 p.m.

Moderator: *Daniel H. Teitelbaum, M.D.*

P21 PEDIATRIC TRAUMA PATIENTS WITH ISOLATED AIRWAY COMPROMISE OR GCS<8: DOES IMMEDIATE ATTENDING SURGEON PRESENCE MAKE A DIFFERENCE?
Felix Lui, M.D.; Paula Gormley, R.N.; Donald L. Sorrells, M.D.; Arlet G. Kurkchubasche, M.D.; Walter L. Biffl, M.D.; Thomas F. Tracy, M.D.; Francois I. Luks, M.D., Ph.D.
Hasbro Children's Hospital and Brown Medical School, Providence, RI, USA

Underlining denotes the author scheduled to present at the meeting.

P22 THE RISK OF CHILD ABUSE IN INFANTS AND TODDLERS WITH LOWER EXTREMITY INJURIES

Carla Coffey, R.N.; Kathy Haley, R.N.; John R. Hayes, Ph.D.; Jonathan I. Groner, M.D.
The Trauma Program, Columbus Children's Hospital, and the Division of Pediatric Surgery, Department of Surgery,
The Ohio State University College of Medicine and Public Health, Columbus, OH, USA

P23 BLUNT INJURY OF THE THORACIC AORTA: FEATURES OF A RARE INJURY IN CHILDREN

Seth R. Heckman, B.S.; Stanley Z. Trooskin, M.D.; Randall S. Burd, M.D., Ph.D.
UM.D.NJ-Robert Wood Johnson Medical School, New Brunswick, NJ, USA

P24 DEVELOPMENT OF A PARATHYROID HORMONE CONTROLLED RELEASE SYSTEM FOR THE SURGICAL TREATMENT FOR HYPOPARATHYROIDISM†

Patrick A. Dillon, M.D.; Robert P. Foglia*, M.D.; Tiffany L Anthony**, M.D.;*
*Peter Fong**, Ph.D.; Mark Saltzman**, Ph.D.; Lawrence Moss**, M.D.;*
*Christopher K. Breuer**,M.D.*
** St. Louis Children's Hospital, Department of Surgery, St. Louis, MO, USA*
*** Yale/New Haven Hospital, New Haven, CT, USA*
† Authors received an OSHE research grant (Department of Surgery grant. Yale School of Medicine/Yale New Haven Hospital)

P25 COMPLICATIONS ASSOCIATED WITH AN IMPLANTABLE VASCULAR ACCESS DEVICE

Patrick A. Dillon, M.D.; Robert P. Foglia, M.D.
St. Louis Children's Hospital, Department of Surgery, Washington University School of Medicine, St. Louis, MO, USA

P26 INTRATRACHEAL PULMONARY VENTILATION IMPROVES GAS EXCHANGE DURING LAPAROSCOPY IN A PEDIATRIC LUNG INJURY MODEL

Julie R. Fuchs, M.D.; Amir Kaviani, M.D.; Kenneth Watson, P.T.; John Thompson, P.T., Jay Wilson, M.D.; Dario O. Fauza, M.D.
Children's Hospital Boston, Boston, MA, USA

P27 IMPAIRED NEUTROPHIL RECRUITMENT BY FETAL ENDOTHELIAL CELLS: IMPLICATIONS IN SCARLESS FETAL WOUND HEALING

Oluyinka O. Olutoye, M.D., Ph.D.; Xi Zhu, B.S.; Darrell L. Cass, M.D.; C. Wayne Smith, M.D.
Michael E. DeBakey Department of Surgery and Department of Pediatrics, Baylor College of Medicine, Houston, TX, USA

P28 EFFECT OF NITRIC OXIDE ON THE DEVELOPMENT OF NITROFEN-INDUCED FETAL HYPOPLASTIC LUNG EXPLANTS

Masato Shinkai, M.D.; Toko Shinkai, Ph.D.; Martina Pirker; Prem Puri, M.D., FRCS
Children's Research Centre, Our Lady's Hospital for Sick Children, Dublin, Ireland

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P29 POSTNATAL LUNG MECHANICS AFTER TRACHEAL OCCLUSION AND PRENATAL PERFLUOROCARBONINSTILLATION IN THE FETAL RABBIT LUNG
Oliver J. Muensterer, M.D.; Andreas Flemmer, M.D.; Florian Bergmann, MS; Verena J. Klis, M.D.; Georg Simbruner, M.D.; Dietrich von Schweinitz, M.D.; Holger Till, M.D.*
University of Munich, Department of Pediatric Surgery, Munich, Germany
** Dr. Muensterer received a grant from the Support Program for Research and Teaching, University of Munich.*

P30 SEROTONIN TRANSPORTER OVEREXPRESSION IN PERSISTENT PULMONARY HYPERTENSION COMPLICATING CONGENITAL DIAPHRAGMATIC HERNIA (CDH) IN NEWBORNS
Valeria Solari, M.D.; Prem Puri, M.D., FRCS
Children's Research Centre, Our Lady's Hospital for Sick Children, Dublin, Ireland

4:30 p.m. – 5:15 p.m.

P31 NITROFEN INDUCED APOPTOSIS IS CALCIUM DEPENDENT: INSIGHTS INTO THE PATHOGENESIS OF CONGENITAL DIAPHRAGMATIC HERNIA
Pradeep P. Nazarey, M.D.; David E. Kling, Ph.D.; Trejeve Martyn; Jeremy T. Aidlen, M.D.; T. Bernard Kinane, M.D.; Patricia K. Donahoe, M.D.; Jay J. Schnitzer, M.D., Ph.D.
Massachusetts General Hospital, Boston, MA, USA

P32 INFLAMMATORY MYOFIBROBLASTIC TUMOR IN CHILDREN: CLINICAL REVIEW WITH ALK, EBV AND HHV-8 DETECTION ANALYSIS
Frederic Mergan, M.D.; Francis Jaubert, M.D.; Frederique Sauvat, M.D.; Olivier Hartmann, M.D., Ph.D.; Stephen Lortat-Jacob, M.D.; Yann Revillon, M.D.; Claire Nihoul-Fekete, M.D.; Sabine Sarnacki, M.D., Ph.D.
Hôpital Necker Enfants-Malades, Paris, France

P33 INFLUENCE OF HEPATOCYTE GROWTH FACTOR (HGF) ON THE GENE CONTROL OF INTESTINAL ADAPTATION
David M. Otterburn, M.D.; Marshall Z. Schwartz, M.D.; Lindsey G. Arthur, M.D.; Suzanne McCahan, Ph.D.; Shaheen J. Timmapuri, M.D.
Thomas Jefferson University Hospital, Philadelphia, PA, USA

P34 ALTERATIONS IN SMALL INTESTINAL SECRETORY LINEAGE AFTER SMALL BOWEL RESECTION
Marcus D. Jarboe, M.D.; Russell J. Juno, M.D.; Wolfgang Stehr, M.D.; Andrew W. Knott, M.D.; Nicole P. Bernal, M.D.; Sherri A. Profitt; Chris R. Erwin, Ph.D.; Brad W. Warner, M.D.
Cincinnati Children's Hospital, Cincinnati, OH, USA

P35 INFLAMMATORY CYTOKINES INHIBIT ENTEROCYTE MIGRATION BY ACTIVATING RHO-GTPASE IN A NITRIC OXIDE DEPENDENT MANNER
Selma Cetin, M.D.; Faisal G .Qureshi, M.D.; Jun Li, M.S.; Orkan Ergun, M.D.; Laura Sysko, MS; Ruben Zamora, Ph.D.; Henri R. Ford, M.D.; David J. Hackam, M.D., Ph.D.
Children's Hospital of Pittsburgh, Pittsburgh, PA, USA

Underlining denotes the author scheduled to present at the meeting.

P36 EARLY LINEAGE ALLOCATION FOLLOWING A MASSIVE SMALL BOWEL RESECTION IN MICE
Michael A. Helmrath, M.D.; Christopher M. Dekaney, Ph.D.; Susan J. Henning, Ph.D.
Baylor College of Medicine, Houston, TX, USA

P37 HUMAN HEPATOCYTES MAINTAIN PROTEIN SYNTHESIS AND CYTOCHROME P450 FUNCTION IN MICROFABRICATED DEVICE WITH A VASCULAR NETWORK OF CHANNELS
*Wing S. Cheung, M.D.; Jeffrey Borenstein**, Ph.D.;*
Mohammad R. Kaazempur-Mofrad, Ph.D.; Michael Shin, Ph.D.; Alexander Sevy, B.S.;*
Katherine Kulig, B.A.; Joseph P. Vacanti, M.D.
Massachusetts General Hospital, Boston, MA, USA
** Massachusetts Institute of Technology*
*** Charles Draper Laboratory, Cambridge, MA, USA*

P38 ABNORMAL DEVELOPMENT OF THE HEPATOBILIARY SYSTEM IN NITROFEN-EXPOSED MICE
Alexander L. Shifrin, M.D.; Mala R. Chinoy, Ph.D.; Peter W. Dillon, M.D.
Pennsylvania State University, Department of Surgery, Division of Pediatric Surgery, Hershey, PA, USA

P39 THE ROLE OF OXYGEN TENSION IN THE REGULATION OF EMBRYONIC DEVELOPMENT
Toko Shinkai, Ph.D.; Masato Shinkai, M.D.; Martina Pirker; Prem Puri, M.D., FRCS
Children's Research Centre, Our Lady's Hospital for Sick Children, Dublin, Ireland

P40 ASSESSMENT OF CYSTEINE SYNTHESIS IN VERY-LOWBIRTH-WEIGHT NEONATES USING A [$^{13}C_6$] GLUCOSE TRACER*
Stephen B. Shew, M.D.; Tamir H. Keshen, M.D.; Farook Jahoor, Ph.D.;
Tom Jaksic, M.D., Ph.D.
Children's Mercy Hospital and Clinics, Kansas City, MO, USA
** Grant/reseach support from the USDA/ARS Cooperative Agreement #6250-5100-600*

5:30 p.m. – 6:30 p.m.	Exhibit set-up
6:30 p.m. – 8:30 p.m.	Welcome Reception

Underlining denotes the author scheduled to present at the meeting.

Friday, May 28

6 a.m. – 7:30 a.m.	Annual Fun Run
6:30 a.m. – 7:30 a.m.	Committee meetings
6:45 a.m. – 1 p.m.	Registration open
6:45 a.m. – 7:30 a.m.	Continental breakfast; exhibits open; poster viewing
7:30 a.m. – 8 a.m.	Welcome and Introduction/ New members introduced: Bradley M. Rodgers, M.D.

Session I: Gastrointestinal Tract

8 a.m. – 10 a.m.
Moderators: *Terry L. Buchmiller-Crair, M.D. and John R. Gosche, M.D.*
Educational Objective:
Participants attending this session will be provided with current information regarding the surgical techniques and long-term outcome of conditions affecting the gastrointestinal tract in children.

1 THE FIRST DECADE'S EXPERIENCE WITH LAPAROSCPIC NISSEN FUNDOPLICATION IN INFANTS AND CHILDREN (6 minutes)
Steven S. Rothenberg, M.D.*
The Mother and Child Hospital at Presbyterian-Saint Lukes, Denver, CO, USA
** Dr. Rothenberg is a consultant for Storz, Intuitive and Valleylab.*

2 ABNORMAL GASTRIC MYOELECTRICAL ACTIVITY IN PATIENTS WITH EMESIS OR RETCHING AFTER FUNDOPLICATION OR GASTROSTOMY TUBE INSERTION (3 minutes)
Cynthia Reyes, M.D.; Ryan Krasnosky, PA-C; Iris Bain, R.N.
Nemours Children's Clinic, Pensacola, FL, USA

3 STRETTA AS THE INITIAL ANTI-REFLUX PROCEDURE IN CHILDREN: HOLY GRAIL OR HOLY WATER? (3 minutes)
C-C A. Jackson, M.D.; Stig Somme, M.D.; Peter G. Mavrelis, M.D.; Daniel Hurwich, M.D.; Mindy B. Statter, M.D.; Daniel H. Teitelbaum, M.D.; B. A. Zimmerman, ARNP; Donald C. Liu, M.D.
University of Chicago Children's Hospital, Chicago, IL, USA

4 HIRSCHSPRUNG'S DISEASE IN JAPAN: ANALYSIS OF 3,784 PATIENTS BASED ON NATION WIDE SURVEY IN 30 YEARS (6 minutes)
Sachiyo Suita, Professor; Tomoaki Taguchi, M.D.; Satoshi Ieiri, M.D.; Takanori Nakatsuji, M.D.
Kyushu University, Fukuoka, Japan

Underlining denotes the author scheduled to present at the meeting.

5 TOTAL COLONIC HIRSCHSPRUNG'S DISEASE: A 28-YEAR EXPERIENCE (6 minutes)
Barbara E. Wildhaber, M.D.; Daniel H. Teitelbaum, M.D.; Arnold G. Coran, M.D.
University of Michigan, Section of Pediatric Surgery, Ann Arbor, MI, USA

6 PEDIATRIC LAPAROSCOPIC-ASSISTED COLECTOMY WITH ILEAL-POUCH-ANAL ANASTOMOSIS: SURGICAL AND FUNCTIONAL OUTCOMES (3 minutes)
Abdalla E. Zarroug, M.D.; Penny Stavlo, FNP-G.; David A. Rodeberg, M.D.; Christopher R. Moir, M.D.
Mayo Clinic, Rochester, MN, USA

7 LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING FOR THE TREATMENT OF ADOLESCENT MORBID OBESITY IN THE U.S.: A SAFE ALTERNATIVE TO GASTRIC BYPASS (3 minutes)
Ai-Xuan Le Holterman, M.D.; Mark Holterman, M.D., Ph.D.; Garth Jacobsen, M.D.; Robert Berger, M.D.; Santiago Horgan, M.D.
University of Illinois at Chicago, Chicago, IL, USA

8 ERRORS IN THE MANAGEMENT OF NEWBORN CLOACAS (6 minutes)
Marc A. Levitt, M.D.; Alberto Pena, M.D.
Schneider Children's Hospital, North Shore–Long Island Jewish Health System, New Hyde Park, New York, NY, USA

9 RECTAL PROLAPSE FOLLOWING PSARP FOR ANORECTAL MALFORMATIONS (3 minutes)
Avraham Belizon, M.D.; Marc A. Levitt, M.D.; Gideon Shoshany, M.D.; Alberto Pena, M.D.
Schneider Children's Hospital, North Shore–Long Island Jewish Medical Center, Pediatric Surgery, New Hyde Park, NY, USA

10 USE OF CHOLECYSTOKININ-OCTAPEPTIDE TO PREVENT TPN-ASSOCIATED GALLSTONE DISEASE* (3 minutes)
Susan Tsai, M.D.; Strouse J. Peter, M.D.; Robert A. Drongowski, MA; Saleem Islam, M.D.; Daniel H. Teitelbaum, M.D.
University of Michigan, Section of Pediatric Surgery, Ann Arbor, MI, USA
** Grant/research support from the Food and Drug Administration*

11 GROWTH HORMONE ADMINISTRATION IMPAIRS THE BILE DUCT CELL PROLIFERATIVE RESPONSE TO BILE DUCT INJURY IN MICE (3 minutes)
Minhua Wang, Ph.D.; Ai-Xuan Holterman, M.D.
University of Illinois at Chicago, Chicago, IL, USA

12 CT SCAN IS ACCURATE IN THE DIAGNOSIS OF BOWEL OBSTRUCTION IN CHILDREN (3 minutes)
Jennifer L. Bruny, M.D.; David A. Partrick, M.D.; Richard J. Hendrickson, M.D.; Fredrick M. Karrer, M.D., John D. Strain, M.D.; Denis D. Bensard, M.D.
The Children's Hospital, University of Colorado, Denver, CO, USA

10 a.m. – 10:30 a.m. Coffee break; exhibits open; poster viewing

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Session II:
Congenital Diaphragmatic Hernia and Thoracic Diseases

10:30 a.m. – Noon
Moderators: *Wallace W. Neblett III, M.D. and Daniel H. Teitelbaum, M.D.*
Educational Objective:
The attendees of this session will be provided with contemporary insights on and long-term outcomes for the management of common congenital and acquired pediatric thoracic surgical diseases.

13 SURVIVAL OF SEVERE CONGENITAL DIAPHRAGMATIC HERNIA HAS MORBID CONSEQUENCES (6 minutes)
Raul A. Cortes, M.D.; Roberta L. Keller, M.D.; Tiffany Townsend, M.D.; Michael R. Harrison, M.D.; Diana L. Farmer, M.D.; Hanmin Lee, M.D.; Robert Piecuch, M.D.; Maria Hetherton, CS; Carol Leonard, Ph.D.; Robin Bisgaard, R.N.; Kerilyn K. Nobuhara, M.D.
University of California San Francisco, San Francisco, CA, USA

14 ECMO IS UNLIKELY TO SALVAGE CDH NEONATES REFRACTORY TO PERMISSIVE HYPERCAPNEA/SPONTANEOUS RESPIRATION AND DELAYED SURGERY (3 minutes)
Jae-O Bae, M.D.; Jen-Tien Wung, M.D.; Eric L. Lazar, M.D.; Charles J. Stolar, M.D.
Children's Hospital of New York, New York, NY, USA

15 MANAGEMENT AND LONG-TERM FOLLOW UP OF PATIENTS WITH TYPE III AND IV LARYNGOTRACHEOESOPHAGEAL CLEFT (6 minutes)
Akemi L. Kawaguchi, M.D.; Daniel P. Ryan, M.D.; Patricia K. Donahoe, M.D.
Massachusetts General Hospital for Children, Boston, MA, USA

16 THE MINIMALLY INVASIVE NUSS TECHNIQUE FOR RECURRENT OR FAILED PECTUS EXCAVATUM REPAIR IN 50 PATIENTS (3 minutes)
Daniel P. Croitoru, M.D.; Robert E. Kelly, Jr., M.D.*; Michael Goretsky, M.D.*; Donald Nuss, ChB**
Children's Hospital of The King's Daughters, Norfolk, VA, USA
** Drs. Croitoru, Kelly and Nuss are consultants for Walter Lorenz Surgical.*

17 THE OPERATIVE MANAGEMENT OF ASPHYXIATING THORACIC DYSTROPHY AFTER PECTUS REPAIR (3 minutes)
Thomas R. Weber, M.D.
St. Louis University, St. Louis, MO, USA

18 IMPACT OF PECTUS EXCAVATUM ON PULMONARY FUNCTION BEFORE AND AFTER REPAIR WITH THE NUSS PROCEDURE (3 minutes)
Louise Lawson, Ph.D.; Robert Mellins, M.D.; Meredith Tabangin, MA; Robert Kelly†, M.D.; Michael Goretsky, M.D.; Daniel Croitoru, M.D.; Donald E. Nuss*, M.D.*
Children's Hospital of the King's Daughters, Norfolk, VA, USA
** Dr. Croitoru received material support from Walter-Lorenz Surgical.*
† Dr. Kelly received a grant from Walter-Lorenz Surgical.

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19 PRIMARY VERSUS DELAYED SURGERY FOR SPONTANEOUS PNEUMOTHORAX IN CHILDREN: WHICH IS BETTER? (3 minutes)
Faisal G. Qureshi, M.D.; Vlad C. Sandulache, B.S.; Ward Richardson, B.S.; Orkan Ergun, M.D.; Henri R. Ford, M.D.; David J. Hackam, M.D., Ph.D.
Children's Hospital of Pittsburgh, Pittsburgh, PA, USA

20 A PROSPECTIVE COMPARISON OF THORACOSCOPIC VS. OPEN ANTERIOR INSTRUMENTATION AND SPINAL FUSION FOR IDIOPATHIC THORACIC SCOLIOSIS IN CHILDREN (3 minutes)
Harsh Grewal, M.D.; Randal R. Betz, M.D.; Linda P. D'Andrea, M.D.; David H. Clements, M.D.; Scott Porter, MS
Temple University Children's Hospital & Shriner's Hospital for Children, Philadelphia, PA, USA

21 PROSPECTIVE DETERMINATION OF THE INCIDENCE OF VOCAL CORD PARALYSIS AFTER PATENT DUCTUS ARTERIOSUS LIGATION (3 minutes)
Martin L. Blakely, M.D.; Kevin D. Pereira, M.D.; Charles S. Cox, Jr., M.D.; Sheela Matthews, R.N.; Kevin P. Lally, M.D.*
University of Texas, Houston, TX, USA
** Dr. Blakely receives grant/research support from the NIH.*

Noon – 1 p.m.	Presidential Address: Bradley M. Rodgers, M.D.
1:30 p.m.	Golf Tournament
2 p.m.	Tennis Tournament
7 p.m. – 8:30 p.m.	President's Reception

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Saturday, May 29

6:30 a.m. – 8 a.m.	Member business meeting and breakfast
6:30 a.m. – 1 p.m.	Registration open
7 a.m. – 8 a.m.	Continental breakfast; exhibits open; poster viewing

Session III: Cancer

8 a.m. - 10 a.m.
Moderators: *Stephen J. Shochat, M.D. and Ai-Xuan Holterman, M.D.*
Educational Objective:
The participants in this session will be presented with the latest advances in the treatment of pediatric cancer and provocative insights into cancer biology from pre-clinical investigative work.

22 QUALITY ASSESSMENT OF SURGERY FOR WILMS' TUMOR: REPORT OF NWTS-5 (6 minutes)
Peter F. Ehrlich, M.D.; Robert C. Shamberger, M.D.; Michael L. Ritchey, M.D.; Tomas E. Hamilton, M.D.; Gerald M. Haase, M.D.; Paul Grundy, M.D.; Daniel Green, M.D.; Patricia Norkool; Jennifer Becker
CS Mott Children's Hospital, University of Michigan, Ann Arbor, MI, USA

23 OPEN BIOPSY IS SUPERIOR TO NEEDLE FOR DETECTION OF ANAPLASIA IN PATIENTS WITH BILATERAL WILMS' TUMOR (3 minutes)
Thomas E. Hamilton, M.D.; Daniel Green, M.D.; Elizabeth Perlman, M.D.; Paul Grundy, M.D.; Michael L. Ritchey, M.D.; Robert C. Shamberger, M.D.
Maine Children's Cancer Program, Portland, ME, USA

24 PRE-OPERATIVE CHEMOTHERAPY FOR TREATMENT OF WILMS' TUMOUR REDUCES TUMOUR RUPTURE RATES AND OVERALL BURDEN OF THERAPY RESULTS FROM THE UNITED KINGDOM CHILDREN'S CANCER STUDY GROUP (UKCCSG) THIRD WILMS' TUMOUR TRIAL (UKW3) (6 minutes)
Jenny Walker; Boo Messahel***; Carolyn Hutton**; John Imeson**; Chris Mitchell†; Rosemary Shannon††; Kathy Pritchard-Jones***; Peter Gornall†††*
** Sheffield Children's Hospital, Sheffield, United Kingdom*
*** UKCSG Data Centre*
**** Royal Marsden Hospital*
† John Radcliffe, Oxford
†† Leicester Royal Infirmary
††† Birmingham Children's Hospital

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25 COX-2 INHIBITION IS ANTIANGIOGENIC IN EXPERIMENTAL WILMS' TUMOR (3 minutes)
Jason S. Frischer, M.D.; Jianzhong Huang, M.D.; Alice Lee, M.D.; Anna Serur, M.D.; Darrell Yamashiro, M.D., Ph.D.; Jessica J. Kandel, M.D.
Children's Hospital of New York-Presbyterian, New York, NY, USA

26 CHARACTERISTICS AND OUTCOMES OF RHABDOMYOSARCOMA PATIENTS WITH ISOLATED LUNG METASTASES FROM IRS-IV (3 minutes)
David A. Rodeberg, M.D.; Carola Arndt, M.D.; Sarah Donaldson; Charles N. Paidas, M.D.; Richard J. Andrassy, M.D.; William Meyer, M.D.; Eugene S. Wiener, M.D.
Mayo Clinic, Rochester, MN, USA

27 RESULTS OF MULTIMODAL TREATMENT FOR DESMOPLASTIC SMALL ROUND CELL TUMORS (3 minutes)
Dave R. Lal, M.D.; Wendy T. Su, M.D.; Kenneth C. Loh, B.A.; Michael P. LaQuaglia, M.D.
Memorial Sloan-Kettering Cancer Center, Department of Surgery, New York, NY, USA

28 PARTIAL SPLENECTOMY PRIOR TO HEMATOPOIETIC STEM CELL TRANSPLANTATION IN CHILDREN (3 minutes)
Jennifer G. Hall, M.D.; Joanne Kurtzberg, M.D.; Paul Szabolcs, M.D.; Michael A. Skinner, M.D.; Henry E. Rice, M.D.
Duke University Medical Center, Durham, NC, USA

29 APPENDICITIS IN CHILDHOOD HEMATOLOGIC MALIGNANCIES: ANALYSIS AND COMPARISON WITH TYPHILITIS (6 minutes)
Joseph Hobson, B.A.; David E. Carney, M.D.; Kimberly Molik, M.D.; Terry Vik, M.D.; L.R. (Tres) Scherer, III, M.D.; Thomas M. Rouse, M.D.; Karen W. West, M.D.; Jay L. Grosfeld, M.D.; Deborah F. Billmire, M.D.
J.W. Riley Hospital for Children, Indianapolis, IN, USA

30 NEUROBLASTOMA-INDUCED INHIBITION OF DENDRITIC CELL INTERLEUKIN-12 (IL-12) PRODUCTION VIA ABROGATION OF CD40 EXPRESSION (6 minutes)
Sonya R. Walker, M.D.; Richard E. Redlinger Jr., B.S.; Edward M. Barksdale Jr., M.D., FACS, FAAP
Division of Pediatric Surgery, Children's Hospital of Pittsburgh, University of Pittsburgh, Pittsburgh, PA, USA

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31 ADENO-ASSOCIATED VIRUS VECTOR MEDIATED DELIVERY OF PIGMENT EPITHELIUM-DERIVED FACTOR RESTRICTS NEUROBLASTOMA ANGIOGENESIS AND GROWTH (6 minutes)
Christian J. Streck, M.D.; Youbin Zhang, Ph.D.; Junfang Zhou, M.D.; Catherine Y. Ng, M.S.; Andrew M. Davidoff, M.D.
St. Jude Children's Research Hospital, Memphis, TN, USA

10 a.m. – 10:30 a.m. Coffee break; exhibits open; poster viewing

Session IV: Contemporary Issues & Surgical Education

10:30 a.m. – Noon
Moderators: *Richard J. Andrassy, M.D. and W. Raleigh Thompson, M.D.*
Educational Objective:
The participants of this session will be presented with techniques and outcomes for the management of common pediatric surgical conditions. The attendees of these sessions will also be presented with data on contemporary issues in pediatric surgical education, training and competency to initiate a dialogue on these important issues that may impact the future of the field.

32 EFFECTS OF SUBSPECIALITY TRAINING AND VOLUME ON OUTCOME AFTER PEDIATRIC INGUINAL HERNIA REPAIR (3 minutes)
Steven H. Borenstein, M.D., FRCS(C); Teresa To, Ph.D.; Anne Wajja; Jacob C. Langer, M.D., FRCS(C)
The Hospital for Sick Children, Toronto, Ontario, Canada

33 LAPAROSCOPIC INGUINAL HERNIA REPAIR - A CONSECUTIVE, PERSONAL SERIES OF 408 CHILDREN (3 minutes)
Felix Schier, M.D.
Department of Pediatric Surgery, University Medical Centre Mainz, Mainz, Germany

34 SCREENING FOR ANDROGEN INSENSITIVITY SYNDROME IN GIRLS WITH INGUINAL HERNIAS BY MEASUREMENT OF VAGINAL DEPTH (3 minutes)
Umut Sarpel, M.D.; Shani K. Palmer, B.S.; Stephen E. Dolgin, M.D., FACS
Mt. Sinai School of Medicine, New York, NY, USA

35 COST CONSIDERATIONS AND APPLICANT CHARACTERISTICS FOR THE PEDIATRIC SURGERY MATCH (3 minutes)
Danny C. Little, M.D.; Suzanne Yoder**, M.D.; Tracy C. Grikscheit***, M.D.; Carl-Christian A. Jackson†, M.D.; Julie R. Fuchs††, M.D.; Kimberly W. McCrudden†††, M.D.; George W. Holcomb**, M.D., MBA*
** Texas A&M University System Health Science Center, Temple, TX, USA*
*** Children's Mercy Hospital, Kansas City, MO, USA*
**** Massachusetts General Hospital, Boston, MA, USA*
† University of Chicago Hospitals, Chicago, IL, USA
†† Beth Israel Deaconess Medical Center, Boston, MA, USA
††† New York Presbyterian Hospital, New York, NY, USA

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36 THE IMPACT OF THE 80 HOUR WORK WEEK ON PEDIATRIC SURGICAL TRAINING: AN ASSOCIATION OF PEDIATRIC SURGERY TRAINING PROGRAM DIRECTORS SPONSORED STUDY (3 minutes)
Marion C.W. Henry, M.D.; Bonnie L. Silverman, Ph.D.; R. Lawrence Moss, M.D.
Yale University School of Medicine, Section of Pediatric Surgery, New Haven, CT, USA

37 TURNING WHINE INTO WINE: THE FISCAL IMPACT OF COMPREHENSIVE DOCUMENTATION AND BILLING FOR NON-OPERATIVE PEDIATRIC SURGICAL SERVICES (3 minutes)
Gerald Gollin, M.D.; Donald C. Moores, M.D.
Loma Linda University School of Medicine and Children's Hospital, Loma Linda, CA, USA

38 THE TIMING OF DELIVERY OF INFANTS WITH GASTROSCHISIS INFLUENCES OUTCOME (3 minutes)
Orkan Ergun, M.D.; Fisun S. Ergun, Ph.D., R.N.; Faisal G. Qureshi, M.D.; Edward M. Barksdale, M.D.; Tracy Prozen, M.D.; Kim Reblock, R.N.; Henri R. Ford, M.D.; David J. Hackam, M.D., Ph.D.
Children's Hospital of Pittsburgh, Pittsburgh, PA, USA

39 DIFFERENCES IN THE OUTCOME OF SURGICALLY PLACED LONG-TERM CENTRAL VENOUS CATHETERS IN NEONATES: NECK VS. GROIN PLACEMENT (3 minutes)
Ravindra K. Vegunta, FACS, FRCS, MBBS; Paul Loethen, B.S.; Lizabeth J. Wallace, ARNP, BSN, MS, R.N.; Viola L. Albert, BSN, R.N.; Richard H. Pearl, M.D., FACS, FRCS(C)
University of Illinois College of Medicine at Peoria, Peoria, IL, USA and Children's Hospital of Illinois at OSF St. Francis Medical Center, Peoria, IL, USA

40 COMPARISON OF KARYDAKIS VERSUS PRIMARY MIDLINE EXCISION FOR TREATMENT OF PILONIDAL SINUS DISEASE (3 minutes)
Peter Morden, B.S.; Robert A. Drongowski, MA; James D. Geiger, M.D.; Ronald B. Hirschl, M.D.; Daniel H. Teitelbaum, M.D.
University of Michigan, Ann Arbor, MI, USA

41 WOUND MANAGEMENT WITH VACUUM ASSISTED CLOSURE: EXPERIENCE IN 51 PEDIATRIC PATIENTS (3 minutes)
Steven Teich, M.D.; Brenda Ruth, R.N.; Donna A. Caniano, M.D.
Children's Hospital and Ohio State University College of Medicine and Public Health, Department of Pediatric Surgery, Columbus, OH, USA

42 SHORT BOWEL SYNDROME, CONGENITAL ANOMALIES AND COUNSELLING (3 minutes)
Germana Casaccia, M.D.; Claudio Giorlandino, M.D.; Elena Bilancioni, M.D.; Antonella Nahom, M.D.; Lucia Aite, M.D.; Alessandro Trucchi, M.D.; Pietro Bagolan, M.D.
Bambino Gesù Pediatric Hospital, Roma, Italy

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43 FALSE POSITIVES: UNDERESTIMATED DRAWBACK OF PRENATAL DIAGNOSIS
(3 minutes)
Alessandro Borsellino, M.D.; Antonio Zaccara, M.D.; Antonella Nahom, M.D.; Lucia Aite, M.D.; Claudio Giorlandino, M.D.; Pietro Bagolan, M.D.
Ospedale Pediatrico Bambino Gesù, Roma, Italy

Noon – 1 p.m.	Overseas Guest Lecture: David Lloyd, M.D.
1 p.m – 1:30 p.m.	Coffee break; exhibits open; poster viewing
1:30 p.m. – 3:30 p.m.	Telesurgery Demonstration and Box Lunch
3:30 p.m. – 5 p.m.	Children's Oncology Group Meeting (open to all APSA meeting attendees)
2 p.m. – 5 p.m.	Exhibits dismantle
6:30 p.m. – 10:30 p.m.	President's Banquet

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Sunday, May 30

7 a.m. – 8 a.m.	Continental breakfast; poster viewing
7:30 a.m. – 11:15 a.m.	Registration open
8 a.m. – 8:15 a.m.	APSA Foundation Scholar: Peter F. Ehrlich, M.D. "Injury Prevention Through Brief Intervention: A Novel Approach to Pediatric Injury Prevention"
8:15 a.m. – 9:15 a.m.	*Journal of Pediatric Surgery* Lecture: R. Scott Jones, M.D. "The American College of Surgeons Initiatives for Safety and Quality Improvement"

Session V: Trauma and Transplantation

9:15 a.m. – 11 a.m.

Moderators: *Edward M. Barksdale Jr., M.D. and Daniel H. Teitelbaum, M.D.*

Educational Objective:

Presentations in this session will provide the attendee with information regarding emerging concepts in the management and care of the pediatric trauma patient. The session will also provide the participant with evolving concepts in clinical care of patients following small bowel and liver transplantation and novel experimental approaches to immunosuppression.

44 CEREBRAL OXYGENATION IN MAJOR PEDIATRIC TRAUMA: ITS RELEAVENCE TO TRAUMA SEVERITY SCORES AND OUTCOMES (6 minutes)
Sathya C. Prasad, M.D., FRCS; Pradeep Narotam, M.D., FACS; Stephen C. Raynor, M.D., FACS; Malini B. Rao, M.D.; Charles Taylon, M.D., FACS*
Creighton University Medical Center, Omaha, NE, USA
** Dr. Narotam is a consultant for Integra Neurosciences.*

45 EXTRACORPOREAL LIFE SUPPORT IN PEDIATRIC AND YOUNG ADULT TRAUMA PATIENTS WITH SYSTEMIC INFLAMMATORY RESPONSE SYNDROME (3 minutes)
Mary Austin, M.D.; Charles Leys, M.D.; Ysela Carrillo, M.D.; Philip Smith, M.D.; John Pietsch, M.D.
Vanderbilt University, Nashville, TN, USA

46 A NEW PEDIATRIC TRAUMA MODEL-LIFE WITHOUT RESIDENTS (3 minutes)
Eric R. Scaife, M.D.; Kris W. Hansen, B.S., R.N.; Rebecka L. Meyers, M.D.; Daniel J. Vargo, M.D.; Earl C. Downey, M.D.; Richard E. Black, M.D.; Michael E. Matlak, M.D.
University of Utah, Salt Lake City, UT, USA

47 PULMONARY EMBOLISM: WHICH PEDIATRIC TRAUMA PATIENTS ARE AT RISK? (3 minutes)
Anne K. Truitt, M.D.; Donald L. Sorrells, M.D.; Eric Halvorson, M.D.; Paula Gormley, R.N.; Arlet G. Kurkchubasche, M.D.; Thomas F. Tracy, M.D.; Francois I. Luks, M.D., Ph.D.
Hasbro Children's Hospital and Brown Medical School, Providence, RI, USA

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48 PRELIMINARY OUTCOMES ASSESSMENT OF PEDIATRIC PELVIC FRACTURES: A PROSPECTIVE MULTICENTER STUDY (3 minutes)
Paul Signorino, M.D.; John Densmore, M.D.; Andrea L. Winthrop, M.D.; Steven Stylianos, M.D.; Karen S. Guice, M.D.; Keith T. Oldham, M.D.*
Children's Hospital of Wisconsin, Milwaukee, WI, USA
** Children's Hospital of New York, New York, NY, USA*

49 THE BENEFITS OF TRANSFER GUIDELINES FOR PEDIATRIC TRAUMA IN PENNSYLVANIA (3 minutes)
Christopher S. Hollenbeak, Ph.D.; Jennifer Findeis-Hosey, B.S.; Robert E. Cilley, M.D.; Andreas H. Meier, M.D.; Stanley J. Kurek, D.O.; Peter W. Dillon, M.D.
Penn State College of Medicine, Hershey, PA, USA

50 THE MULTI-INSTITUTIONAL VALIDATION OF THE NEW DIAGNOSTIC INDEX FOR PHYSICAL CHILD ABUSE (DIPCA) (6 minutes)
David C. Chang, Ph.D., M.P.H., M.B.A.; Vinita Knight, MPH; Susan Ziegfeld*, M.S.N.; Adil Haider†, M.D., M.P.H.; Ellen MacKenzie, Ph.D.; Charles Paidas*, M.D.*
Johns Hopkins Bloomberg School of Public Health;
**Johns Hopkins Medical Institutions Baltimore, MD, USA and †New York Medical College, Valhalla, NY, USA*

51 NEUROPEPTIDE, BOMBESIN AS AN AGENT FOR ALLOGRAFT SPECIFIC IMMUNOSUPPRESSION IN SMALL BOWEL TRANSPLANTATION IN RATS (3 minutes)
Osamu Kimura, M.D.; Koji Higuchi, M.D.; Taizo Furukawa, M.D.; Seitetsu Go, M.D.; Naomi Iwai, M.D.
Division of Surgery, Children's Research Hospital, Kyoto Prefectural University of Medicine, Kawaramachi Hirokoji Kamigyo-ku, Kyoto, Japan

52 EVOLUTIONARY EXPERIENCE WITH IMMUNOSUPPRESSION IN PEDIATRIC INTESTINAL TRANSPLANTATION (6 minutes)
Geoffrey J. Bond, M.D., George V. Mazariegos, M.D., Rakesh Sindhi, M.D., Kareem Abu-Elmagd, M.D., Jorge Reyes, M.D.
University of Pittsburgh Medical Center, Pittsburgh, PA, USA

53 ORTHOTOPIC LIVER TRANSPLANTATION IN CHILDREN UNDER ONE YEAR OF AGE (3 minutes)
Greg M. Tiao, M.D.; Maria Alonso, M.D.; John Bucuvalas, M.D.; William Balistreri, M.D.; Nada Yazigi, M.D.; Jorge Bezerra, M.D.; James Heubi, M.D.; Frederick Ryckman, M.D.
Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA

11 a.m. APSA 35th Annual Meeting Adjourns

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ABSTRACTS

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V1 LAPAROSCOPIC TOTAL COLECTOMY WITH J-POUCH

Andreas H. Meier, M.D.; Robert E. Cilley, M.D.; Leslie Roth, M.D., Peter W. Dillon, M.D.
Penn State University, Hershey, PA, USA

PURPOSE:
This video shows our minimally invasive technique for a total proctocolectomy and J-pouch reconstruction.

METHODS:
Many patients with ulcerative colitis or polyposis syndromes require a total proctocolectomy to be cured. Traditionally, this procedure is performed through an open approach.
Since 2000 we have performed total proctocolectomies with J-pouch reconstruction using a minimally invasive technique. The video demonstrates the critical steps of this procedure.

RESULTS:
Seven patients have undergone this operation since August of 2000. The average age was 11.7 (range 7 – 15) years. Three patients had ulcerative colitis, 2 familial polyposis and 2 patients suffered from Gardner's syndrome. All procedures were completed laparoscopically. In all cases we protected the pouch and ileoanal anastomosis with a diverting ileostomy. The average OR time was 510 (range 404 – 655) minutes, the median length of stay 4 (range 3 – 16) days. Two patients had a prolonged hospitalization. One patient suffered from a prolonged postoperative ileus, the other required a stoma revision for a partial obstruction. In follow-up, all patients are doing well with an average of 4-5 bowel movements per day and good continence.

CONCLUSIONS:
This technique provides a minimal invasive alternative to the traditional open procedure with comparible outcomes.

Notes

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V2 THOROCOSCOPIC INNOMINATE ARTERY PEXY

Evan P Nadler, M.D.; Timothy D Kane, M.D.
Children's Hospital of Pittsburgh, Pittsburgh, PA, USA

PURPOSE:
A 17-month-old male with stridor since birth underwent bronchoscopy revealing 50 percent compression of the right side of the trachea. Subsequent MRI demonstrated mid-tracheal compression by the innominate artery. The patient was taken to the operating room for a thoracoscopic innominate artery pexy.

METHODS:
After placing the patient in the supine position on the operating table, a bump was placed under the right side to supply approximately fifteen degrees of angulation.
One 5-mm port was placed posteriorly and two 3.5 mm instruments were placed directly into the chest through stab incisions. The three ports were placed in order to triangulate the operating field. The thymus was dissected off of the innominate artery using a combination of blunt and sharp dissection, and then positioned superiorly away from the artery. A small incision was then made to the right of the sternum in the second intercostal space to allow passage of 2-0 silk sutures into the chest. A fourth stab wound was made inferiorly through which a laparoscopic needle holder was used to pass the sutures through the artery and then back extracorporeally through the sternum. Three stitches were placed over the length of the innominate artery. The sutures were tied extracorporeally resulting in pexy of the innominate artery. A small pig-tail catheter was placed through the inferior-most incision. The other four small incisions were closed with subcuticular sutures alone.

RESULTS:
Post-operative bronchoscopy revealed complete resolution of the compression. The patient was extubated immediately after surgery. The pig-tail catheter was removed the next morning and the patient was discharged to home. The patient is off all pulmonary medications and remains symptom-free nine months after surgery.

CONCLUSIONS:
Thoracoscopic innominate artery pexy is both technically feasible and safe. It should be considered as a therapeutic option in patients with tracheal compression from either the innominate artery or the aorta.

Notes

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V3 ROBOT-ASSISTED LAPAROSCOPIC HELLER-MYOTOMY

James D. Geiger, M.D., Ambrosio Hernandez, M.D., Ronald B. Hirschl, M.D.
University of Michigan, Section of Pediatric Surgery, Ann Arbor, MI, USA

BACKGROUND:
Laparoscopic Heller-myotomy has become the preferred treatment for the majority of patients with achalasia. A significant portion of the early experience with robotic-assisted laparoscopy has been in foregut surgery including the treatment of achalasia.

METHODS:
A 13-year-old girl presented with severe dysphagia and chest pain, which started while eating solids and later progressed to liquids. An upper GI study demonstrated a classic "bird's beak" appearance of her distal esophagus with proximal dilation consistent with a diagnosis of achalasia. Utilizing a total of five ports, in similar location to what is utilized for laparoscopic Nissen fundoplication, the da Vinci robot was engaged. Minimal dissection of the hiatus was completed to allow clear identification of the esophagus. The phreno-esophageal attachments were divided and the esophagus was dissected well into the mediastinum without opening the retroesophageal space. Intraoperative endoscopy was utilized to facilitate identification of the GE junction and adequacy of the myotomy. The myotomy was started above the gastroesophageal junction and carried cephalad for 10 cm using a combination of blunt dissection, cautery, and ultra-sconic shears, and was then carried down onto the stomach approximately 2 cm. After completion of the myotomy, the hiatus was closed anteriorly and then the crura were attached laterally to the divided esophageal muscle.

RESULTS:
The operative time was 165 minutes and there were no intra-operative complications. The patient was discharged home on the morning of the second postoperative day tolerating a full liquid diet. She is currently tolerating a regular diet and is completely symptom free.

CONCLUSIONS:
The early experience with robot-assisted Heller myotomy indicates that the procedure is feasible and may offer some advantages including lower rates of esophageal perforation.

Notes

Underlining denotes the author scheduled to present at the meeting.

V4 LAPAROSCOPIC ADRENALECTOMY

Bradley M. Rodgers, M.D.; Stewart Long, M.D.
University of Virginia Medical Center, Department of Surgery, Charlottesville, VA, USA

PURPOSE:
Laparoscopic resection of many types of adrenal tumors in children has become a well-accepted technique for adrenalectomy.

METHODS:
We illustrate a case of a 6-year-old male who was involved in a bicycle accident. Because he had mild abdominal tenderness in the Emergency Room, an abdominal CT scan was obtained. This illustrated a 6x4 cm mass in the left adrenal gland. His past medical history was benign. Laboratory evaluation revealed normal serum electrolytes, normal fastening cortisol, normal urinary VMA, and normal serum epinephrine. A laparoscopic adrenalectomy was performed. The adrenal was exposed by reflecting the spleen and splenic flexure of the colon medically. The left adrenal vein was divided between clips. The tumor was removed in an endo sac through an expanded left lower quadrant trocar site. Total operative time was 70 minutes, with less than 10cc blood loss.

RESULTS:
The patient was discharged from the hospital the following morning, taking a normal diet. The pathology revealed a ganglioneuroma, with no evidence of malignancy.

CONCLUSIONS:
The patient has been well with a 1-year follow-up.

Notes

V5 LAPAROSCOPIC PLACEMENT OF THE ADJUSTABLE GASTRIC BAND IN MORBIDLY OBESE ADOLESCENTS

Allen Browne, M.D.; Mark Holterman, M.D., Ph.D.; Ai-Xuan Le Holterman, M.D.; Garth Jacobsen, M.D.; Santiago Horgan, M.D.
University of Illinois at Chicago, Chicago, IL, USA

PURPOSE:
Morbid obesity (MO) has reached epidemic proportions and has become a major public health problem in developed nations. In the adolescent with MO, early intervention can minimize obesity-related comorbidities, avoid premature mortality, improve quality of life and prevent obesity-related diseases as these patients mature into adulthood. In the U.S, the surgical management of adolescent patients meeting NIH criteria for bariatric surgery involves open or laparoscopic gastric bypass. Although these procedures have led to weight loss and improvement of comorbid conditions, justifiable concerns remain over the high incidence of post operative complications, the life-altering surgical reconstruction and long-term irreversible sequelae to the gastrointestinal tract. Based on the excellent results from large international adult series as well as the experience from our own institution with more than 300 adult patients, we offered laparoscopic adjustable gastric banding (LAGB) as an alternative to gastric bypass to eligible adolescents.

METHODS:
After medical, psychological and nutritional screening, three patients (17 to18 years of age) with a body mass index (BMI) above 40, who failed medical attempts at weight loss were selected for LAGB using the Bioenterics LAP-BAND device.

RESULTS:
The operative time was 40-90 minutes. All patients were discharged on the same day of surgery. There were no early or late complications. Two patients with follow up of at least 2 months lost 62 percent and 38 percent of their extra weight at 30 months and 3 months respectively.

CONCLUSIONS:
In this preliminary series of the U.S experience in the use of LAGB for the management of MO adolescent, the lack of operative morbidity, reduced operative time/hospital stay and encouraging initial weight loss mirror the adult experience and illustrate that LAGB can be a safe and effective alternative to gastric bypass. These encouraging results support further evaluation of LAGB as a surgical option in a comprehensive adolescent weight loss program.

Notes

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3:45 p.m. – 5:15 p.m.

P1 IDENTIFICATION OF A PAX3 PEPTIDE ANTIGEN ABLE TO INDUCE HUMAN NAÏVE CD8 CELLS TO RECOGNIZE MULTIPLE PEDIATRIC TUMORS

David A. Rodeberg, M.D.; Rebecca A. Nuss, M.S.; Esteban Celis, M.D., Ph.D.
Mayo Clinic, Rochester, MN, USA

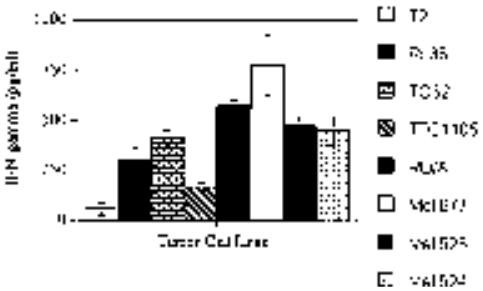
PURPOSE:
The identification of novel markers and therapeutic targets in advanced cancer is critical for improving diagnosis and therapy. PAX3 is an embryologically expressed transciption factor that is also expressed in embryonal rhabdomyosarcoma (ERMS), Ewing's sarcoma, and melanoma.

METHODS:
We have used a combination of computer-based algorithms to predict peptide sequences from PAX3 capable of stimulating in vitro cytotoxic T-lymphocytes (CTLs) restricted by the HLA-A2 MHC molecule. CTL recognition of peptide loaded target cells and tumors cells was tested using 51Cr release assay and IFN-gamma production.

RESULTS:
Using the peptide antigen algorithms we identified the potential antigen PAX3-282 which has the sequence QLMAFNHLI. This was subsequently modified to QLMAFNHLV (PAX3-282.9V) to improve its MHC binding. Naïve CD8 cells were then incubated with PAX3-282.9V loaded DCs. We were able to induce multiple CTL cell lines from several donors that were able to recognize peptide loaded target cells in a dose dependent fashion. In addition, these CTLs were able to recognize PAX3 containing tumors (ERMS, Ewing's sarcoma and melanoma) but not the negative control (bladder cancer). This anti-tumor activity was inhibited (>50%) by competitive inhibition assays. CTL recognition of peptide loaded target and tumor cells also resulted in IFN-gamma production. The CTL anti-tumor activity was MHC Class I restricted.

CONCLUSIONS:
Our results provide strong evidence that PAX3-282 (peptide QLMAFNHLI) is naturally processed by many tumor types and is presented in the context of HLA-A2 in sufficient amounts to allow recognition by CTLs. Also, PAX3-282.9V is an immunogenic peptide able to induce CTL recognition of these PAX3 containing tumors and may have potential as an anti-tumor peptide vaccine.

Notes



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P2 CLONING AND CHARACTERIZATION OF A NOVEL NEUROBLASTOMA SPECIFIC SECRETED PROTEIN

Sanjeev A Vasudevan, M.D.; Jianhua Yang, Ph.D.; Zhiyun J. Liu; Sue M. Burlingame; Parul N. Patel; Jed G. Nuchtern, M.D.

Texas Children's Cancer Center, Department of Pediatrics and M.E. DeBakey Department of Surgery, Baylor College of Medicine, Houston, TX, USA

PURPOSE:

Secreted proteins, such as chemokines and growth factors, are essential for the propagation of malignancy in cancer. We propose that expression microarray analysis can be used to identify novel secretory proteins specific to high risk neuroblastoma.

METHODS:

By comparing tissue samples from MYCN amplified stage 4 disease versus MYCN non-amplified stage 4S with a cDNA microarray, an expression sequence tag (EST) overexpressed in MYCN amplified, stage 4 disease was identified. The EST was analyzed using the National Center for Biotechnology Information (NCBI) database and the BLAST application both revealing a candidate gene and protein. The candidate gene was cloned and a C-terminus V5-tagged fusion protein was created in a mammalian expression vector. HEK-293 cells were transfected with the V5-tagged mammalian expression vector, and Western blot using anti-V5 antibody was used to confirm presence of secreted protein. The Cancer Genome Anatomy Project's SAGE Genie database (CGAP/SAGE) and reverse transcriptase polymerase chain reaction (RT-PCR) were used to screen expression.

RESULTS:

We have identified a novel protein unique to stage 4 neuroblastoma and given the name neuroblastoma derived secretory protein (NDSP). The NDSP gene is located on chromosome 1q24.3 and consists of a 501 base pair open reading frame. NDSP is a 167 amino acid (aa) peptide with a 30 aa signal peptide and putative cleavage site consistent with a secreted protein. Western blot of supernatant from V5-tagged/NDSP mammalian vector transfected cells shows a distinct 20 kDa band confirming that this molecule is secreted. The CGAP/SAGE and RT-PCR data show that NDSP is rarely expressed in non-neuroblastoma, normal, or malignant tissues (Figure 1). Also NDSP appears to be specific to malignant neuroblastic cells due to absent expression in SK-N-MC derived from neuroepithelioma.

CONCLUSIONS:

NDSP is a novel secreted protein successfully identified by microarray analysis and specific to high risk neuroblastoma.

Notes

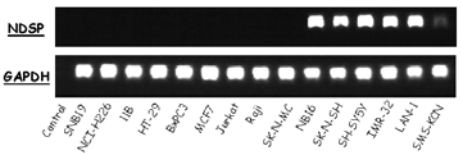

Figure 1: RT-PCR analysis of NDSP. Control-water;SNB19-glioblastoma;NCI-H226-NSCLC;11B-melanoma;HT-29-colon CA;BxPC3-pancreatic CA;MCF7-breast CA;Jurkat-leukemia;Raji-lymphoma;SK-N-MC-neuroepithelioma;NB16,SK-N-SH,SH-SY5Y,IMR-32,LAN-1,SMS-KCN-neuroblastoma.

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P3 THE ROLE OF MULLERIAN INHIBITING SUBSTANCE AND ITS TYPE II RECEPTOR IN GROWTH INHIBITION OF ENDOMETRIAL CANCER

Elizabeth J. Renaud, M.D.; Esther Oliva, M.D.; David T. MacLaughlin, Ph.D.; Patricia K. Donahoe, M.D.
Massachusetts General Hospital, Pediatric Surgery Research Laboratory, Boston, MA, USA

PURPOSE:
Endometrial cancer arises from the coelomic epithelium, the precursor of the endometrium and cervical and ovarian epithelium. Mullerian Inhibiting Substance (MIS), a TGF-B family-related hormone, causes regression of Mullerian structures in male embryos. Previous studies of ovarian and cervical cancers demonstrated that the MIS type II receptor (MISIIR), which confers MIS-binding specificity, mediates MIS-induced growth inhibition of malignant cells. We propose that endometrial cancers will express the MISIIR and that MIS will inhibit endometrial tumor growth.

METHODS:
Human samples were discarded specimens collected under IRB approval (2002-P-001324). Rat tissue was collected according to institutional protocol 1999-N-00138-Rats. Cells lines were obtained from American Tissue and Cell Culture. Cells and tissues were analyzed by Western, quantitative Real Time PCR (RTPCR), MTT growth inhibition assay, and FACS analysis.

RESULTS:
MISIIR protein was present by Western analysis in adult rat uterus (n=2 experiments) and AN3CA, a human endometrial cancer cell line derived from metastatic cancer (n=3). RTPCR detected MISIIR RNA in human testis, ovary, endometrium, and myometrium (n=3). In MTT assay, MIS inhibited AN3CA cell growth by 40-70 percent compared with untreated controls (n=4, $p<0.001$). Growth arrest of AN3CA cells correlated with hypophosphorylation of the Retinoblastoma (Rb) tumor suppressor protein and a decrease in E2F1, a transcription factor involved in G1 arrest and apoptosis, as detected by Western analysis.

CONCLUSIONS:
The MISIIR is expressed in both rat and human normal endometrium, as well as in the human endometrial cancer cell line AN3CA. MIS inhibits the growth of AN3CA through an Rb-pathway which mediates cell cycle arrest. In the future, MIS may prove a potential treatment option for advanced endometrial cancer.

Notes

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P4 NOVEL ORTHOTOPIC XENOGRAFT MODELS OF METSTATIC AND NON-METASTATIC HUMAN NEUROBLASTOMA

Andrea A. Hayes-Jordan, M.D.; Shimareet Kumar, M.D.; Simone Hettmer, M.D.; Karen Kaucic, M.D.; Stephan Ladisch, M.D.
Children's National Medical Center, Washington, DC, USA

PURPOSE:
The aim of this study was to establish an orthotopic model of human neuroblastoma that would allow exploration of the pathophysiology of highly diverse stages of this tumor. Previous work has demonstrated the feasibility of a clinically relevant murine orthotopic model in delineating angiogenic characteristics. Here we have characterized the in vivo propagation of two phenotypically different human neuroblastoma cell lines.

METHODS:
Two human neuroblastoma cell lines, SKNSH and IMR-32, which have a six-fold difference in complex ganglioside content, were studied. Six million cells were injected directly into the left adrenal gland of SCID/beige mice (six mice per group). The mice were observed biweekly until necropsy, at which time left adrenal, spleen, liver, omentum, retroperitoneum, lung, thoracic cavity, left femur, and brain were assessed grossly and histologically for tumor.

RESULTS:
Five of the six mice receiving SKNSH tumor cells developed a large left retroperitoneal mass without evidence of metastasis, at day 41 (3 mice) and day 46 (2 mice) after tumor injection. Tumors ranged in size from 15x17 mm to 20x32 mm. In contrast, mice that received IMR32 cells had no external evidence of tumor at the same time points. However, 3 of 4 IMR 32-injected mice examined on days 41-55 had small left adrenal tumors (< 5mm diameter). Strikingly, two mice examined on day 55 also had liver metastasis (10-15mm diameter).

CONCLUSIONS:
We have demonstrated strikingly different tumor progression of two human neuroblastoma cell lines in a relevant (orthotopic) xenogeneic tumor system. The development of large but non-metastatic tumors (SKNSH) in contrast to small but metastatic tumors (IMR32) mirrors the development of analogous stages of neuroblastoma in humans. These novel findings suggest that this model will be highly useful for probing the pathophysiology of these different neuroblastoma phenotypes.

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P5 OUTCOME WITH PRIMARY SURGICAL MANAGEMENT OF LOCALIZED NEUROBLASTOMA

Michael P. La Quaglia, M.D.; Wendy T. Su, M.D.; Brian Kushner, M.D.; Dave R. Lal, M.D.; Kim Kramer, M.D.; Nai-Kong Cheung, M.D.
Memorial Sloan-Kettering Cancer Center, Department of Surgery, New York, NY, USA

PURPOSE:
Although resection alone is accepted for treatment of Stage 1 neuroblastomas, locally invasive tumors are presently treated with adjuvant chemotherapy as well. We present our experience with surgery alone in a prospectively followed cohort of patients with non-disseminated and either localized or locally invasive disease at diagnosis.

METHODS:
Retrospective analysis of prospectively accumulated data was performed on patients with loco-regional neuroblastoma from June 1989 to October 2002.

RESULTS:
Forty-two consecutive patients were prospectively treated with surgery alone. This included 12 with INSS stage 1 disease, 22 with stage 2, and 8 with stage 3. The median age at diagnosis was 11 months and the median follow-up was six years. The primary tumor ranged in size from 2 to 15 cm., none were MYCN amplified, and more than 90 percent were aneuploid on flow cytometry. No nephrectomy was necessary. In this cohort there were two loco-regional recurrences that required chemotherapy and one of these patients died from progressive disease. Another death was secondary to severe neurologic sequelae of the opsoclonus-myoclonus syndrome in a patient with no evidence of disease. There was one stage progression to stage 4 treated with salvage chemotherapy and without evidence of disease at 8 years. The remaining patients (n=39 or 93 percent) are alive and without evidence of disease and have avoided chemotherapy and external beam radiation.

CONCLUSIONS:
Surgical treatment alone in patients with localized or locally invasive disease at diagnosis is feasible and results in excellent event-free, and overall survival. Cooperative group studies to confirm these findings should be undertaken.

Notes

P6 MANAGEMENT OF FETAL MEDIASTINAL TERATOMA

Aziz M. Merchant, M.D.; Holly L. Hedrick, M.D.; Timothy M. Crombleholme, M.D.; Mark P. Johnson, M.D.; R. Douglas Wilson, M.D.; N. Scott Adzick, M.D.; Alan W. Flake, M.D.

The Children's Hospital of Philadelphia, Center for Fetal Diagnosis and Treatment, Philadelphia, PA, USA

PURPOSE:

Mediastinal teratomas are rare congenital germ cell tumors that prenatally can compress mediastinal structures leading to polyhydramnios and fetal hydrops. Two presentations of massive fetal mediastinal teratoma include hydrops leading to fetal demise, or fetal esophageal and airway compression causing late gestation polyhydramnios, preterm labor and poor neonatal outcome. We present two cases of fetal mediastinal teratoma that illustrate successful strategies for either of these presentations. The previable fetus presenting with hydrops related to mediastinal teratoma requires in utero resection via median sternotomy for salvage. In contrast, the late gestational fetus with massive mediastinal teratoma is optimally managed by delivery via the EXIT procedure and controlled resection of the tumor with establishment of an airway on uteroplacental support.

METHODS:

A 37 year old G4P3 female was referred at 23 weeks gestation carrying a fetus with a large mediastinal mass and secondary hydrops. The fetus underwent *in utero* resection via median sternotomy and was subsequently delivered by cesarean section at 25 weeks gestation due to preterm labor. A 24 year old G3P0 mother was referred at 34 weeks gestation carrying a fetus with a large mediastinal mass and severe polyhydramnios. She was managed with serial amnioreductions and underwent delivery by the EXIT procedure at 36 weeks gestation. The tumor was resected and the airway established on uteroplacental support.

RESULTS:

These strategies resulted in physiologic improvement in the first case and controlled resection and resuscitation in the second. The first patient had significant sequelae of prematurity including bronchopulmonary dysplasia at 2 months. The second patient is well at seven months old. Histology revealed mature and immature components from all three germ layers within the teratomas.

CONCLUSIONS:

Massive fetal mediastinal teratoma can result in fetal or neonatal mortality by a variety of mechanisms. Optimal prenatal and perinatal management is required to salvage fetuses compromised by this lesion.

Notes

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P7 PRIMARY LUNG MALIGNANCIES IN THE PEDIATRIC POPULATION

Dave R. Lal, M.D.; Wendy T. Su, M.D.; Ian Clark, M.D.; Robert Downey, M.D.; David S. Klimstra, M.D.; Michael P. LaQuaglia, M.D.
Memorial Sloan-Kettering Cancer Center, Department of Surgery, New York, NY, USA

PURPOSE:
Primary lung malignancies in children and adolescents are rare. We reviewed our institutions experience with such patients.

METHODS:
A retrospective review was performed on patients less than 21 years of age treated for primary lung malignancy at our institution.

RESULTS:
We identified 11 patients, the table summarizes relevant data. The most common radiographic findings were a mass in 50 percent, a pleural effusion in 33 percent and consolidation in 25 percent. Half of the patients had metastatic disease at presentation. Seven patients underwent a complete surgical excision. Chemotherapy and external beam radiation were utilized in another six patients.

CONCLUSIONS:
When children present with primary lung malignancy, half will have a mass on chest x-ray and metastatic disease. The prognosis of these tumors is dependent on histology. Children with carcinoid tumors seem to have the best prognosis, followed by adenocarcinoma and the highly aggressive basaloid carcinoma have the worst.

Notes

Age (y)	Sex	Diagnosis	Treatment	Status/Follow-up
19	M	Adenocarcinoma	LUL	NED/9I
20	M	Adenocarcinoma	Chemo, XRT	DOD/3
21	M	Adenocarcinoma	Chemo, XRT	AWD/3
19	M	Adenocarcinoma	Chemo	AWD/3
21	F	Basaloid Carcinoma	RML,RLL,Chemo, XRT	DOD/136
17	F	Basaloid Carcinoma	Chemo	DOD/7
15	F	Carcinoid	LLL, XRT	NED/607
12	M	Carcinoid	L pneumonectomy	NED/38
21	F	Carcinoid	L pneumonectomy, Chemo, XRT	NED/45
17	M	Carcinoid	LLL	NED/15
13	F	Mucoepidermoid Carcinoma	RUL, Chemo, XRT	AWD/36

LUL,left upper lobectomy; LLL,left lower lobectomy; RUL, right upper lobectomy.
RML, right middle lobectomy; R.L, right lower lobectomy, XRT, radiotherapy
NED, no evidence of disease, AWD, alive with disease, DOD, died of disease

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P8 BENIGN ESOPHAGEAL FISTULAS IN CHILDREN WITH PEDIATRIC MALIGNANCY

Dave R. Lal, M.D.; Wendy T. Su, M.D.; Kenneth C. Loh, B.A.; Valerie W. Rusch, M.D.; Michael P. LaQuaglia, M.D.

Memorial Sloan-Kettering Cancer Center, Department of Surgery, New York, NY, USA

PURPOSE:

Benign tracheoesophageal and bronchoesophageal fistula have been reported as rare complications resulting from chemotherapy and radiation therapy in children.

METHODS:

We retrospectively reviewed our experience with pediatric oncology patients treated for esophageal fistula over a 33-year period.

RESULTS:

During the study period there was a 70 percent increase in the total number of pediatric operative cases, from 1342 to 2257. During this same period the percentage of cases performed during the nighttime hours decreased from 2.7 percent in 1993 to 0.7 percent in 2002 (p= .001). This represents a 75 percent decrease relative to the total of number of cases performed and a 60 percent absolute reduction in the number of nighttime cases. The number of nighttime appendectomies (0.5 percent 1993 vs 0 percent 2002, p= .0089) and ECMO cases (0.67 percent 1993 vs. 0.27 percent 2002, p= .0056) as a proportion of the total number of cases also showed a significant decline, although the majority of nighttime cases currently consist of ECMO and trauma at our institution.

CONCLUSIONS:

There has been a 75 percent relative and 60 percent absolute reduction in the proportion of nighttime pediatric surgical operative cases performed at our institution. These data have implications for the lifestyle of pediatric surgery practitioners, especially in the face of changing resident work hours and need for increased staff presence in the hospital for nonoperative trauma.

Notes

P9 THE CHANGING PATTERN IN URGENT AND EMERGENT PEDIATRIC SURGICAL CARE OVER THE PAST DECADE AT A SINGLE INSTITUTION

Felicia A. Ivascu, M.D.; Ambrosio Hernandez, M.D.; Robert A. Drongowski, MA; Arnold G. Coran, M.D.; Ronald B. Hirschl, M.D.
University of Michigan, Ann Arbor, MI, USA

PURPOSE:
Historically, the practice of pediatric surgery has involved a large number of urgent and emergent cases performed during the late hours of the night. Over the last 10 years our perception has been that this pattern has changed at our institution. The purpose of this study was to validate that change.

METHODS:
We retrospectively reviewed the operative experience at our children's hospital from July 1993 to July 2003. We divided cases into daytime/evening (7am-11pm) and nighttime (11pm-7am). The nighttime cases were further categorized into appendectomy, ECMO, trauma, foreign body removal, or other.

RESULTS:
During the study period there was a 70 percent increase in the total number of pediatric operative cases, from 1342 to 2257. During this same period the percentage of cases performed during the nighttime hours decreased from 2.7 percent in 1993 to 0.7 percent in 2002 (p= .001). This represents a 75 percent decrease relative to the total of number of cases performed and a 60 percent absolute reduction in the number of nighttime cases. The number of nighttime appendectomies (0.5 percent 1993 vs 0 percent 2002, p= .0089) and ECMO cases (0.67 percent 1993 vs. 0.27 percent 2002, p= .0056) as a proportion of the total number of cases also showed a significant decline, although the majority of nighttime cases currently consist of ECMO and trauma at our institution.

CONCLUSIONS:
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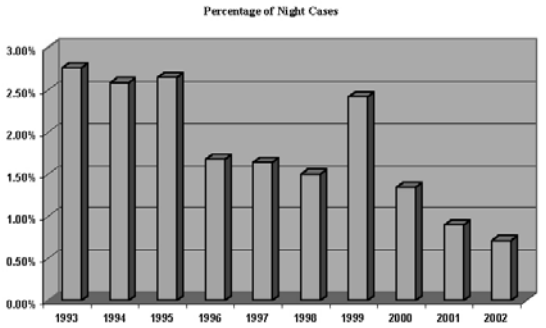
Notes



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P10 THE IMPACT OF HOSPITAL-WIDE COMPUTERIZED PHYSICIAN ORDER ENTRY ON MEDICAL ERRORS IN A PEDIATRIC HOSPITAL

Jeffrey S. Upperman, M.D.; Patricia Staley; Kerri Friend, B.A.; William Neches, M.D.; David Kazimer, B.A.; Jocelyn Benes, B.S.N.; Eugene S. Wiener, M.D.
Children's Hospital of Pittsburgh, Pittsburgh, PA, USA

PURPOSE:
Medication errors contribute significantly to the morbidity and costs of pediatric health care. Pediatric medication errors are multifactorial but many believe that medication ordering (i.e. transcription errors, verbal orders) is a major factor in the process. We hypothesized that hospital-wide computerized physician order entry (CPOE) in a pediatric hospital would lead to a decrease in medication errors.

METHODS:
We retrospectively evaluated and prospectively analyzed in-patient discharge, usage and adverse drug event (ADE) rate data pre- and post-introduction of a hospital-wide implementation of CPOE in a tertiary care pediatric hospital. During the same Pre-CPOE period ADE reporting was a hospital-wide initiative to increase ADE reporting. We compared Pre- and Post-intervention ADE's (Student t-test) and we computed the number needed to treat (NNT) analog. Data is presented as Mean±SEM with significance at $p<.05$.

RESULTS:
Over the 9-month study period, there were 45,615 in patient-days and 8,619 discharges. During the close of the Pre-CPOE era, 2,000 clinical staff including 250 physicians was trained in CPOE use over an eight week period. Pre-CPOE verbal order regulatory compliance was 80 percent while post-CPOE increased to 95 percent. Transcription errors were eliminated. All ADE's pre-CPOE were 0.3 ± 0.04 (C.I.-0.13) per 1000 doses while post-CPOE were 0.37±.05 per 1000 doses (C.I.-.15) ($p=0.3$). Harmful ADE's pre-CPOE were 0.05 ± 0.017 (C.I.-0.027) per 1000 doses while post-CPOE were 0.03±.003 per 1000 doses (C.I.-.009) (*$p=0.05$). Our NNT data demonstrates that CPOE would prevent 1 ADE every 64 (95 percent CI = 25-100) patient days.

CONCLUSIONS:
CPOE decreases harmful ADE's in a pediatric hospital leading to increased patient safety. In addition, CPOE provides an automated system for monitoring and improving health care quality.

Notes

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P11 FOREGUT DUPLICATIONS: IS THERE AN ADVANTAGE TO THORACOSCOPIC RESECTION?

Ioana Bratu, M.D.; Jean-Martin Laberge, M.D.; Sarah Bouchard, M.D.
The Montreal Children's Hospital and Hôpital Ste-Justine, Montreal, Quebec, Canada

PURPOSE:
Foregut duplications (bronchogenic cysts and esophageal duplications) are uncommon. Thoracoscopy has an evolving role in their treatment. The authors present their experience with resection of foregut duplications (FD).

METHODS:
All charts of children undergoing surgery for FDs in two pediatric hospitals were retrospectively reviewed from 1992 to 2003. Data gathered included: age, weight, symptoms, diagnostic tests, operative technique, post-operative course, complications, and outcome. The Student's test was employed for statistical analysis ($p<0.05$).

RESULTS:
There were 39 children with FD resected by thoracotomy in 21 patients, thoracoscopy in 11 patients (no conversions to open), cervical excision in 6 patients, and laparotomy in one patient for a FD near the gastroesophageal junction. Diagnosis was made by antenatal ultrasound in 7 cases, of which 4 neonates had tachypnea or cough, and the rest were asymptomatic. Of those symptomatic diagnosed postnatally, 75 percent had respiratory symptoms. Excision of isolated FD (without lung resection) was compared:

	Thoracotomy (N=16)	Thoracoscopy (N=11)	P-value
Age (years)	3.89 +/-1.1	5.31 +/-1.2	NS (p= 0.21)
Weight (Kg)	17.4+/-3.4	21.4+/- 3.3	NS (p= 0.21)
OR Time (min)	115+/-12	99+/-11	NS (p=0.18)
Anaesthesia time (min)	190+/-13	161+/-20	NS (p=0.10)
Chest tube (days)	3.3+/-0.45	1.6+/-0.5	*P=0.01
Length of stay (days)	6.6+/-1	2.6+/-0.54	*P=0.002

Intraoperative complications consisted of tracheal injury in 3 patients (2 thoracotomy, 1 thoracoscopy), and esophageal mucosal perforation injury in 2 patients (both thoracotomy) which were all recognized and repaired. The pathological diagnosis was bronchogenic cysts in 26 cases (67 percent) of which 5 had a concomitant congenital cystic adenomatoid malformation or pulmonary sequestration, and foregut duplication cyst in 13 cases. Follow-up ranged from 1 month to 11 years. Long-term complications consisted of: keloid scar (1), tracheal suture granuloma (1), reoperation for recurrent bronchogenic cysts (2), esophageal pseudodiverticulum (1), hypertensive lower esophageal sphincter (1), and pectus excavatum (1).

CONCLUSIONS:
Foregut duplications may present in a variety of ways and locations. Thoracoscopy is advantageous for isolated intrathoracic foregut duplications.

Notes

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	Thoracotomy (N=16)	Thoracoscopy (N=11)	P-value
Age (years)	3.89 +/- 1.1	5.3 +/-1.2	NS (p= 0.21)
Weight (Kg)	17.4+/- 3.4	21.4+/- 3.3	NS (p= 0.21)
OR Time (min)	115+/-12	99+/-11	NS (p=0.19)
Anaesthesia time (min)	190+/-23	161+/-20	NS (p=0.13)
Chest tube (days)	3.3+/-0.45	1.6+/-0.5	*P=0.01
Length of stay (days)	6.6+/-1	2.64+/-0.54	*P=0.002

Table 1. Excision of Foregut Duplications

P12 LAPARASCOPIC VERSUS OPEN SURGICAL APPROACH FOR INTUSSUSCEPTION REQUIRING OPERATIVE INTERVENTION

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PURPOSE:
Laparoscopy has recently been used to treat intussusception which cannot be reduced radiologically. The effectiveness of this approach, however, has been questioned. We hypothesized that laparoscopy for intussusception would result in decreased patient hospital stay and reduced complication rates, compared to the open approach.

METHODS:
A retrospective study of 40 patients surgically treated for intussusception since 1994 was performed. Selection of a lapraroscopic (LAP) or open approach was based on surgeon preference. Data collected included operative time, intra-operative and post-operative complications, length of stay (LOS) and hospital costs. Data was analyzed using Chi Square and Student's t-test with $P<0.05$ considered significant.

RESULTS:
Fifteen patients were treated via LAP, with 3 of these requiring conversion to an open procedure (20%). Mean age of the LAP group was 14.9±15.6 compared to 17.8±20 months for the open group (p=0.64). Twenty-five (62.5 percent) patients underwent an open surgical reduction. Comparing LAP versus open approaches, operative time was not significantly different (P=0.61) between the LAP (51.3±29 minutes) and open groups (45.0±25). LOS, however, was significantly reduced (p=0.016) in the LAP group (3.1±1.3 days) compared to the OPN group (4.5±2.0). Total hospital charges were lower in the LAP ($8,171±2595) compared to the open group ($11,672±5466), but this difference was not significant (p=0.14). There were no significant differences in post-operative complication rates (P=0.32) between the two approaches.

CONCLUSIONS:
Laparoscopy is an effective and safe alternative to open reduction of intussusception. LOS is reduced, and costs are slightly lower with the laparoscopic method. Although there remains a group who will require a conversion to an open procedure, the laparoscopic approach should be considered for all infants who fail a radiologic reduction.

Notes

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P13 BERIBERI AFTER GASTRIC BYPASS SURGERY IN ADOLESCENCE

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PURPOSE:
Bariatric surgery is well established in the treatment of adult obesity, however, despite recent enthusiasm, its use for the treatment of severely obese adolescents has not been sufficiently studied. Compliance with postoperative diet, and vitamin and mineral supplementation is critical after the Roux Y gastric bypass to avoid significant risk of both macronutrient and micronutrient deficiencies. Compliance with medical instruction can be particularly challenging in the adolescent population. The purpose of this report is to describe two cases of beriberi (thiamine deficiency) after gastric bypass in adolescent females.

METHODS:
After approval by institutional review boards, medical records of both patients were reviewed and data analyzed.

RESULTS:
Two severely obese adolescent females, 15- and 14-years-old, underwent Roux Y gastric bypass two and four months before presentation. Both patients presented with bilateral foot pain and weakness and numbness to the lower extremities. Both had a decreasing ability to ambulate without assistance. Both described numbness of the hands, and both complained of hearing loss, dizziness, and impaired vision. Both underwent extensive neurologic evaluation. Nutritional assessment revealed low plasma vitamin B1 levels (undetectable in one patient and 67 nmol/l (normal 87-280 nmol/l) in the other. Treatment included IV thiamine, multivitamins and control of pain. One child required hyperalimentation. At four and six months following treatment, symptoms had resolved.

CONCLUSIONS:
These two cases of beriberi following gastric bypass in adolescents highlight the importance of compliance and meticulous postoperative management after this operation for morbid obesity. Careful monitoring of vitamin and mineral intake, and periodic surveillance to detect deficiencies should be performed to optimize nutritional outcomes.

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P14 SURGICAL COMPLICATIONS OF ASCARIASIS IN CHILDREN: MAGNITUDE OF THE PROBLEM AND METHODS OF THE TREATMENT

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PURPOSE:
The objective of this work was to study the magnitude of surgical complications of ascaris worms in Egyptian children, including the different ways of presentation, the methods of diagnosis and the modalities of treatment.

METHODS:
Fifty-four patients with surgical complications due to ascariasis were treated within a period of 22 years. 37 boys and 17 girls, with age ranging from 1.25 to 7 years, with a mean age of 4.25 years.

RESULTS:
The presenting symptom was vomiting (100 percent), abdominal colic (92.6 percent), abdominal distension (90.7 percent), constipation (81.5 percent),palpable mass in (68.5 percent), abdominal tenderness in (31.48 percent), abdominal rigidity in (31.48 percent), rebound tenderness in (16.6 percent). Clinical diagnosis of ascariasis obstruction was achieved in 37 patients. The remaining were diagnosed clinically as strangulation in 16 patients and peritonitis in one , ascariasis was proved to be the cause at exploration. Gastrograffin followthrough used in the prospective cases, verifed the presence of Ascaris (linear defects of filling). Conservative treatment was successful in 23 patients. Surgical treatment was performed for 31 patients (14 patients with failed conservative treatment and 17 patients indicated for exploration from the start and proved to be due to ascaris, only on exploration. The operative treatment was in the form of manual milking in 10 cases (32.26 percent), enterostomy andextraction 4 cases (112.9 percent), untwist of viable volvulus 5 cases (16.13 percent), resection of gangrenous volvulus with anastomosis 8 cases (25.8 percent), simple reduction of intussusceptions and manual milking 3 cases (9.68 percent), and appendectomy with peritoneal drainage in one case of perforated appendix (3.2 percent).

CONCLUSIONS:
The early diagnosis of ascaris obstruction increases the chance of effective conservative treatment. In addition, Gastrograffin is not only useful for diagnosis, but also has its therapeutic value in the early cases. Moreover, early segregation of cases that failed conservative treatment should be done without delay to avoid loss of the validity of the gut.

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P15 SURGICAL MANAGEMENT OF PERINEAL MASSES IN PATIENTS WITH ANORECTAL MALFORMATIONS

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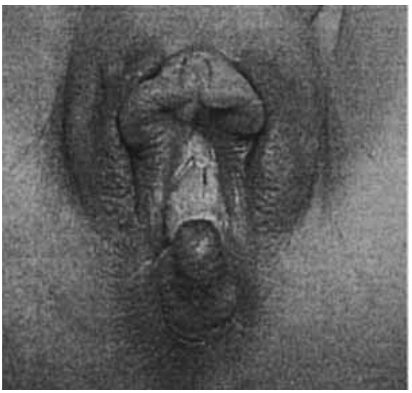
PURPOSE:
To review the outcomes of surgical management of various types of perineal masses encountered in patients with anorectal malformations (ARM) and to provide guidelines for future management.

METHODS:
Retrospective review from two large pediatric anorectal referral centers. All masses were removed by one of the authors and all pathological material was reviewed for uniformity.

RESULTS:
Twenty-two patients with a perineal mass were identified among over 1,000 patients treated for an ARM over a 15 year period. The 22 patients represented all levels of severity of ARMs. Four patients were male. The lesions were of three types: lipomas (n=10), hamartomas/choristomas (n=8) and vascular (n=4). The lipomas were carefully removed from between the muscle fibers during the PSARP leaving the sphincter muscle complexes to be reapproximated as needed. The hamartomas/choristomas all occurred in females and 50 percent arose as a pedunculated mass from the vulva. The hamartomas contained tissues such as glia, osteoid, nephrogenic rests and endocervical mucosa. One was initially misinterpreted as a teratoma prompting a wider excision, which still extended to the margin. This and all subsequent patients have been correctly diagnosed pathologically as having either hamartomas or choristomas, which were not widely excised. The vascular lesions (three of four were capillary hemangiomas) underwent MR imaging preoperatively but none were found to invade deeply and all were excised at the time of the PSARP. Followup ranges from 5m to 12y. Six of the 10 lipoma patients are continent. None of the hamartoma/choristoma patients recurred. One vascular lesion was rexcised and another suffered a minor wound separation.

CONCLUSIONS:
The presence of unusual perineal masses can add to the complexity of anorectal malformations, however, most of these lesions can be carefully excised with preservation of the muscle complex and ultimate continence. Hamartomatous lesions can be mistaken for teratomas but do not require aggressive excision with clear margins.



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P16 INCIDENCE AND CLINICAL RELEVANCE OF WOLFFIAN DUCT REMNANTS IN FEMALES

Arlet G. Kurkchubasche, M.D.; Justine C. Chang; Donald L. Sorrells, M.D.; Conrad W. Wesselhoeft, M.D.; Thomas F. Tracy, M.D.; Francois I. Luks, M.D., Ph.D.
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PURPOSE:
Paratubal cysts are Wolffian duct remnants that reside within the adnexal ligaments. Although generally considered incidental findings, they occasionally become symptomatic through enlargement and/or torsion. Radiographically they are often mistaken for simple ovarian cysts, leading to inappropriate recommendation for hormonal treatment. We sought to determine the clinical relevance of these lesions in patients with abdominal pain and adnexal cysts.

METHODS:
We reviewed the charts of all patients who underwent either laparoscopic or open surgical management for cystic adnexal lesions. IRB approval was obtained for chart review. Age, clinical presentation, radiographic evaluation and surgical findings, procedure and outcomes were evaluated.

RESULTS:
52 patients with adnexal masses were treated over a four-year period. 24 (46 percent) patients had solid masses or ovarian torsion without a cystic component. Of the remaining 30 patients, 12 (40 percent) were found to have paratubal cysts. All patients were peri- or post menarchal (age>13yrs). Paratubal cysts tended to be bilateral (10/12). Abdominal pain was found to be due to cyst enlargement (>6cm) without torsion in three, complete adnexal torsion secondary to the paratubal cyst in three, and isolated torsion of the paratubal cyst in one. In the remaining 5 patients, small paratubal cysts were identified either alone (2) or in conjunction with evidence of ruptured ovarian cysts (2) and endometriosis (1). Laparoscopy was used in 11/12 patients. Isolated cyst resection was performed (8/12) unless adnexal torsion required oophorectomy (1) or salpingectomy (2). Preoperative CT or ultrasound was unable to discriminate between these and true ovarian cysts.

CONCLUSIONS:
Paratubal cysts occur as a significant subset of adnexal cysts and have the potential to cause abdominal pain via torsion or enlargement. Significantly, with their propensity for bilaterality, they may endanger one or both adnexa. Laparoscopy provides a diagnostic and therapeutic technique for most patients.

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P17 MALROTATION IN CHILDHOOD: A POPULATION BASED STUDY

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PURPOSE:

Because malrotation most commonly presents in newborns, treatment recommendations for older children have been based on small case series, usually from single centers. The purpose of this study was to use population–based data to determine the presentation and epidemiology of children undergoing the Ladd procedure after infancy and to develop recommendations for managing malrotation in this group.

METHODS:

Records of children (<18 yrs) undergoing a Ladd procedure (n=633) in 2000 were identified in KIDS, an administrative database containing 2.5 million records from 27 states. Patient characteristics, associated diagnoses and procedures, and mortality were evaluated. Estimates of the annual number of procedures performed were calculated using discharge weighting. Group differences were compared using the Student's t test.

RESULTS:

167 children older than >1 yr were identified who underwent a Ladd procedure in KIDS. Fifty-one children (31 percent) were admitted from the emergency room or transferred from another hospital with a primary diagnosis related to malrotation. Among these patients, 23 children (45 percent) had volvulus or intestinal ischemia, and one child died (2 percent). Children with volvulus or intestinal ischemia were younger than those without these diagnoses (5±4 [range 1-13] vs 7±5 [range 1-17] yrs, $p<0.05$). Twenty-seven children (16 percent) underwent at least one additional abdominal operation--most commonly an anti-reflux procedure (8 percent) or an appendectomy for appendicitis (3 percent). Thirty children (18 percent) had a primary diagnosis not related to malrotation. Based on case weighting, 371 children >1 and <18 yrs underwent a Ladd procedure in the US in 2000 with 49 children presenting with volvulus or intestinal ischemia.

CONCLUSIONS:

Although most older children underwent the Ladd procedure electively or with another operation, nearly one third required this procedure during an emergency admission, often prompted by volvulus or intestinal ischemia. Surgical treatment of malrotation is recommended in older children to prevent the rare but potentially devastating complications of this anomaly.

Notes

P18 BEDSIDE SILO AND DEFECT CLOSURE: A SIMPLIFIED AND SUCCESSFUL STRATEGY FOR GASTROSCHISIS

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PURPOSE:
Multiple reports have advocated the routine use of a silo at the bedside immediately after birth. The authors report their experience with bedside treatment and propose a further simplified strategy for management.

METHODS:
A retrospective review was performed (IRB approved) of all infants with gastroschisis treated during a 2 year period from 2001 to 2003. During the initial 2 months of the interval reviewed, there was overlap of two different management strategies (based on surgeon preference). Subsequently, management of all gastroschisis patients changed from operating room closure to bedside management as a standard technique. Infants were treated at the bedside in the neonatal intensive care unit. Intubation was not utilized unless indicated by respiratory compromise. The defect and viscera were inspected and a silo placed using mild analgesics. Fluid recusitation was conservative with a goal of maintaining adequate perfusion. Viscera reduction was performed frequently limited only by clinical indicators (reduced urine output, respiratory compromise, decreased distal perfusion). When reduction was complete, abdominal wall defect closure was then performed. Skin approximation only or fascial closure was based on surgeon preference.

RESULTS:
Twelve patients were treated with bedside management. All patients were completely reduced in a mean of 34 hours (range 4-72). Defect closure was accomplished at an average of 58 hours (range 18-132). Only two patients required intubation at birth (for unrelated respiratory indications). No patient required intubation for complications of gastroschisis. Fluid requirements were met with maintenance fluid and 1-2 boluses of 20cc/kg NS. There were no deaths or complications referable to method of closure.

CONCLUSIONS:
Bedside management of gastroschisis is a safe and simple technique with similar outcomes to previous management strategies and published results. Recusitation requirements including intubation, fluid boluses and general anesthesia can be minimized. Furthermore, resource utilization is optimized while maintaining excellent care and outcomes in these patients.

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P19 THE EFFECT OF PHENOL ON INGROWN TOENAIL EXCISION IN CHILDREN

Erin M. Lin, M.D.; Saleem Islam, M.D.; Robert A. Drongowski, MA; Daniel H. Teitelbaum, M.D.; James D. Geiger, M.D.; Arnold G. Coran, M.D.; Ronald B. Hirschl, M.D.

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PURPOSE:

Ingrown toenail in children is a common problem with a high recurrence rate. The objective of this retrospective data review is to compare simple excision of the nail matrix versus excision plus phenol application in the treatment of ingrown toenails.

METHODS:

The charts of 69 children who underwent surgical treatment of one or more ingrown toenails from 1994 to 2000 were reviewed. The primary procedure was noted (excision alone [EA] versus excision plus phenol [EPP]), and dates of recurrences and re-operations were recorded. Parents were then surveyed by phone regarding complications, cosmetic outcome, and overall satisfaction with the procedure. Five scale categories ranging from strongly agree to strongly disagree were used, with responses of strongly agree and agree considered a good outcome. Either Student's t-test or Chi square test ($P<0.05$ considered significant) were used for analysis.

RESULTS:

Thirty-one patients (45 percent) were in the phenol group (EPP), while the remaining 38 had excision alone (EA). Mean length of follow-up was 3.4 ±1.4 years. There was no difference in age at operation or length of follow-up between the two groups. Males were predominant in both groups (66 percent). The recurrence rate of ingrown toenails in the EA group was 42.1 percent versus 4.3 percent in the EPP group ($p= 0.003$). Survey response rate was 50/69 (73 percent). There were no significant differences in parental response with regard to the operative experience ($p=0.31$) and the cosmetic result ($p=0.13$), with a majority of respondents (78 percent) indicating a good outcome for both questions.

CONCLUSIONS:

The addition of phenol to the surgical excision of ingrown toenail significantly reduced the incidence of recurrence, with similar patient satisfaction and an equivalent cosmetic result.

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P20 SUCCESSFUL NON-OPERATIVE MANAGEMENT OF ESOPHAGEAL PERFORATION IN EXTREMELY LOW BIRTH WEIGHT INFANTS

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PURPOSE:

Iatrogenic perforation of the thoracic esophagus from oro-gastric tube placement is an uncommon but potentially catastrophic event in extremely low birth weight (ELBW) infants. Controversy exists as to whether surgical intervention is necessary in all cases. We present four patients managed successfully with conservative measures.

METHODS:

From April 2001 to July 2003, we treated four cases of esophageal perforation (EP) in premature infants. Their birth weights were 481 grams, 720 grams, 770 grams and 820 grams respectively.EP ocurred within the first two weeks of life following passage of orogastric (OG) tube. The presenting features included blood-stained aspirateafter tube insertion, sudden respiratory deterioration with right-sided pneumothorax and pneumomediastinum, abdominal distension and total asymptomatic in one neonate. Chest X-ray revealed OG tube malpositioned in the right pleural cavity or below the right hemi-diaphragm. The diagnosis ofEP was comfirmed with water soluble esophagraphy and CT scan of thorax. Oral feds were withheld immediately upon diagnosis. Broad spectrum antibiotic coverage and total parenteral nutrition were instituted for two weeks. Three of four patients required chest tube for drainage and decompression. All were closely monitored for signs of sepsis related to the EP. Contrast study 14 to 18 days later confirmed complete healing with no stricture formation.

RESULTS:

Unlike older children where surgical intervention, i.e. primary repair or diversion is mandatory for EP, lessons learned from management of leakage after esophageal atresia suggest otherwise. Conservative management obviates the high risk associated with thoracotomy in this group of patient.Our experience confirms that both early an late presentation can be managed similarly with good outcome. Portable fluoroscopic guidance in NICU can be used to re-insert subsequent OG tube.

CONCLUSIONS:

Accurate diagnosis coupled with aggressive medical management for EP in ELBW infants have completely replaced surgical intervention in our patients.

Notes

P21 PEDIATRIC TRAUMA PATIENTS WITH ISOLATED AIRWAY COMPROMISE OR GCS<8: DOES IMMEDIATE ATTENDING SURGEON PRESENCE MAKE A DIFFERENCE?

Felix Lui, M.D.; Paula Gormley, R.N.; Donald L. Sorrells, M.D.; Arlet G. Kurkchubasche, M.D.; Walter L. Biffl, M.D.; Thomas F. Tracy, M.D.; Francois I. Luks, M.D., Ph.D.
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PURPOSE:
Optimal trauma care requires an attending pediatric surgeon to head the trauma team for the most severely injured patients. Recently, the ACS Committee on Trauma has added "Glasgow Coma Scale (GCS)<8" and "Airway compromise" to the existing anatomic and physiologic criteria for immediate attending presence. The present report analyzes the outcome of children who met these isolated criteria, treated prior to the change in guidelines.

METHODS:
The institutional Trauma Registry was queried for all pediatric patients with GCS<8 or airway compromise. Age, gender, initial GCS, revised trauma score (RTS), injury severity score (ISS), outcome and probability of survival (TRISS methodology) were recorded. The subgroup of patients for whom an attending surgeon was not immediately present was further analyzed.

RESULTS:
Over a five-year period, 2,895 trauma patients (aged 0-16 years) were admitted. An attending surgeon was not immediately present in 68 patients with GCS<8 and/or airway compromise. Of these, 25 died (group D), 15 were discharged to a rehabilitation facility (R) and 27 were discharged home (H). GCS, RTS, ISS and probability of survival are shown below. Only four of the 25 patients who died had a probability of survival>0.5 (mean 0.697). All four had an ISS>25 and a GCS 4. All deaths were reviewed through a quality improvement program and were deemed non-preventable by two objective reviewers. Ten patients with a probability of survival <0.5 survived.

CONCLUSIONS:
Outcome of severely injured children with GCS<8 or airway compromise met, and in some cases exceeded expectations of survival according to TRISS methodology. The lack of immediate attending surgeon presence does not appear to have negatively influenced the outcome in these children. Based on this series, there is no evidence to justify mandatory immediate presence of an attending surgeon for these two criteria alone.

Notes

	Group D	Group R	Group H
GCS	3.1±0.2	4.2±1.6	4.3±1.8
RTS	2.2±2.9	6.1±2.3	6.4±2.6
ISS	34.1±18.3	29.0±11.9	21.6±15.9
Probability of survival	0.3±0.27	0.87±0.21	0.69±0.27

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P22 THE RISK OF CHILD ABUSE IN INFANTS AND TODDLERS WITH LOWER EXTREMITY INJURIES

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PURPOSE:
To assess the risk of child abuse in children less than 18 months admitted to a pediatric trauma service with lower extremity injuries.

METHODS:
An IRB approved retrospective case series of children admitted to a regional pediatric trauma center with lower extremity injuries from 1998-2002 (n=5497) was performed. Factors analyzed included age, injuries, and injury mechanism.

RESULTS:
Among 5,497 total trauma patients, the incidence of abuse was 104/4942 (2 percent) for children 18 months and 175/555 (32 percent) for < 18 months (OR (odds ratio)=21.4±2.9, p<0.001). There were 1,252 (23 percent) patients with lower extremity injuries in the entire sample and 66 of these were < 18 months. In the lower extremity trauma group, for patients 18 months, 16/1186 (1 percent) were abused compared to 44/66 (67 percent) patients < 18 months OR=146±53, p,0.001). Among all trauma patients < 18 months, 41/55 lower extremity fractures were linked to abuse, whereas 134/500 other injuries were due to abuse (OR=8.0±2.6,p<0.001). Among the 41 abuse-related fractures, femur fracture was the most common followed by tibia fracture.

CONCLUSIONS:
Among children 18 months, abuse is an uncommon cause of lower extremity trauma. In children <18 months, lower extremity injuries, particularly fractures, are highly associated with child abuse. Clinicians must thoroughly investigate lower extremity injuries in this age group.

Notes

P23 BLUNT INJURY OF THE THORACIC AORTA: FEATURES OF A RARE INJURY IN CHILDREN

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PURPOSE:
Because blunt injury to the thoracic aorta is rare, reports of this injury in children have been limited to small case series from single centers. The purpose of this study was to use a large trauma database to identify risk factors for blunt thoracic aortic injury and to define the outcome of children hospitalized with this injury.

METHODS:
Children (<18 yrs) sustaining a blunt thoracic aortic injury from 1994-2001 were identified in the National Trauma Database. Diagnosis codes were translated to the abbreviated injury scale (AIS) using the ICDMAP-90 converter. Demographics, mechanism of injury, associated injuries and mortality were compared between blunt trauma patients with and without a thoracic aortic injury using the Fisher's exact or Student's t-test when appropriate.

RESULTS:
Among 49,207 children with a blunt injury, 34 children (0.07 percent) sustained a thoracic aortic injury. These children were older (16±3 vs 10±6 yrs, $p<0.001$), more often injured in a motor vehicle traffic accident (100 percent vs 47 percent, $p<0.001$), more severely injured (ISS 45±16 vs 9±9, $p<0.001$) and more likely to die (41 percent vs 3 percent, $p<0.001$) than patients without this injury. While no relationship was observed for other body regions, thoracic aortic injuries were strongly associated with severe injuries (AIS >3) involving the head (relative risk 4.3 [95 percent CI 2.2-8.5]), other thoracic organs (RR 17.9 [CI 8.9-35.5]), abdomen (RR 21.2 [CI 10.7-43.1]) and lower extremities (RR 11.5 [CI 5.9-22.7]). Among the 14 children who died, two were dead on arrival, four underwent attempted aortic repair before death and all died within 48 hours.

CONCLUSIONS:
Blunt thoracic aortic injury should be suspected in older children with severe head, torso and lower extremity injuries. This injury is associated with high early hospital mortality even after attempted repair. A high index of suspicion is needed to identify this rare, potentially lethal injury in children sustaining blunt trauma.

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P24 DEVELOPMENT OF A PARATHYROID HORMONE CONTROLLED RELEASE SYSTEM FOR THE SURGICAL TREATMENT FOR HYPOPARATHYROIDISM

Patrick A. Dillon, M.D.; Robert P. Foglia*, M.D.; Tiffany L Anthony**, M.D.; Peter Fong**, Ph.D.; Mark Saltzman**, Ph.D.; Lawrence Moss**, M.D.; Christopher K. Breuer**, M.D.*

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† Authors received an OSHE research grant (Department of Surgery grant. Yale School of Medicine/Yale New Haven Hospital)

PURPOSE:

Hypothyroidism is a life threatening disorder that if left untreated can cause seizures, tetany and even death. Hypoparathyroidism can be acquired as a result of complications of thyroid or parathyroid surgery, or inherited as in DiGeorge syndrome resulting from congenital dysgenesis of the parathyroid glands. Conventional treatment for hypoparathyroidism involves the use of vitamin D analogs instead of hormone replacement therapy. Vitamin D analogs such as calcitrol can normalize serum calcium but do not have the full calcium retaining renal action of parathyroid hormone (PTH). Patients treated with Vitamin D analogs have increased risks of nephrolithiasis, nephrocalcinosis, and impaired renal function. We hypothesize controlled release of PTH can maintain calcium homeostasis and will have the added benefit of its innate renal calcium retaining effects. As such, we have developed a surgically implantable controlled release system for the delivery of PTH.

METHODS:

Biodegradable poly (Lactide-co-Glycolide) (PLGA) microspheres loaded with PTH were made using a modification of the double emulsion (water/oil/water) solvent evaporation technique. To simulate the release of PTH from microspheres after implantation in an animal, the in vitro release profile for the PTH microspheres was determined by incubating the PTH microspheres in phosphate buffered saline (PBS), serially sampling the effluent, and determining the concentration of effluent over time using an enzyme-linked immunosorbent assay (ELISA).

RESULTS:

(1) PTH was successfully incorporated into controlled release microspheres. (2) The *in vitro* release profile for PTH was constructed as seen in the graph below. (3) We were able to achieve release of physiological concentrations of PTH.

CONCLUSIONS:

Controlled release of physiological concentrations of PTH can be achieved using PLGA microsphere encapsulation. In vivo surgical implantation studies evaluating the efficacy of PTH in a hypoparathyroid animal model are on going.

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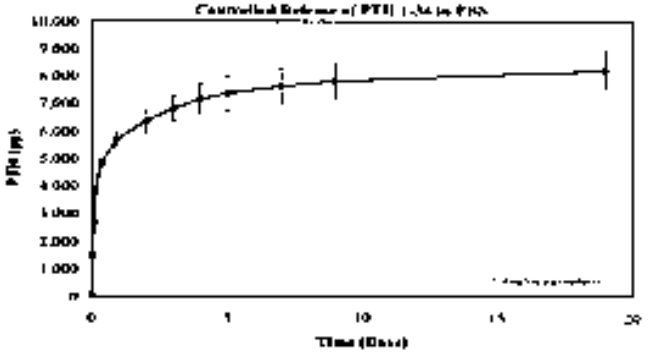

P25 COMPLICATIONS ASSOCIATED WITH AN IMPLANTABLE VASCULAR ACCESS DEVICE

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PURPOSE:
Implantable vascular access devices (ports) are well accepted in the management of many pediatric conditions. Modifications have improved port function, patient satisfaction and enhanced compatibility with imaging studies. We reviewed our experience with a port system and identified unique mechanical complications.

METHODS:
From 1998 to present, 301 patients underwent 296 port insertions and 175 port removals. We assessed medical records, radiographs and operative findings. The 6.6F MRI Low-Profile Implanted Port (Bard Access Systems) was utilized almost exclusively and was assembled by the operating surgeon. Outcome measures included, port reservoir leakage, catheter dislodgement and number of device days until complication.

RESULTS:
Ports were implanted for multiple medical problems including 74.2 percent in hematology/oncology patients. For 296 port insertions, 15 complications (5.1 percent) were identified in 13 patients (mean age 7.5 yrs.). Eleven leaks (3.7 percent) in nine patients were found with nine leaks resulting from needle perforation of the port base and two leaks seen at the catheter connection site. Average port duration was 425 days (range 12-1266) prior to leakage. Four patients had catheter dislodgement (1.4 percent) with three of four catheters embolizing to the heart or pulmonary artery. Patients were asymptomatic and catheters were retrieved utilizing interventional radiology. Dislodgement at the catheter-port connection site was seen in three of four cases and average port duration was 1,075 days (range 269-2657) until catheter separation. Twelve of 13 patients had successful implantation of a new port system.

CONCLUSIONS:
This study identifies that: a) mechanical port complications (5.1 percent) are not rare for this device; b) regardless of port age, the thin plastic base may result in a risk of perforation not seen in other devices; c) the extended period of time prior to embolization likely indicates device wear rather than faulty assembly; d) complications could be successfully managed including retrieval of embolized catheters.

Notes

P26 INTRATRACHEAL PULMONARY VENTILATION IMPROVES GAS EXCHANGE DURING LAPAROSCOPY IN A PEDIATRIC LUNG INJURY MODEL

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PURPOSE:
Hypercarbia, high ventilatory pressures, as well as hypoxemia are known complications of laparoscopy in children with respiratory failure. This study was aimed at determining whether intratracheal pulmonary ventilation (ITPV) could prevent and/or treat those complications in this setting.

METHODS:
Severe lung injury was induced in 0-2-month-old lambs (n=5) by repeat endotracheal saline lavage under general anesthesia. Animals then underwent establishment of CO2 pneumoperitoneum. Intraperitoneal pressures were progressively raised from 0 to 15 mmHg, at 5 mmHg intervals. At each pressure interval, blood gas values and hemodynamic data were recorded, along with ventilatory parameters, 20 minutes after initiation of both conventional ventilation and pure (100 percent) ITPV, in alternating fashion. The FiO2, respiratory rate (RR), and inspiratory/expiratory pressures were constant and identical on both modes of ventilation. Consequently, the mean airway pressure (MAP) and the ventilation index (defined as RR x MAP) were always the same on both ventilation modes. Statistical analysis was by repeated measures ANOVA, with significance set at $p<0.05$.

RESULTS:
On conventional ventilation, CO2 pneumoperitoneum resulted in severe respiratory acidosis at intraperitoneal pressures 5 mmHg and in severe hypoxemia at pressures 10 mmHg. Compared with conventional ventilation, ITPV led to statistically significant increases in pO2 at 10 mmHg (92±10.2 vs. 61±8.1 mmHg) and to significant decreases in pCO2 at intraperitoneal pressures of 5 mmHg (43.2±5.2 vs. 56.1±6.6 mmHg) and 10 mmHg (45.1±3.2 vs. 61±6.3 mmHg), virtually resolving the acidosis and hypoxemia at those pressure levels (graph).

CONCLUSIONS:
Compared with conventional ventilation, intratracheal pulmonary ventilation significantly improves CO2 removal and oxygenation during CO2 pneumoperitoneum in a pediatric lung injury model. Intratracheal pulmonary ventilation may be a safer intra-operative mode of ventilation for children with respiratory failure who require laparoscopy.

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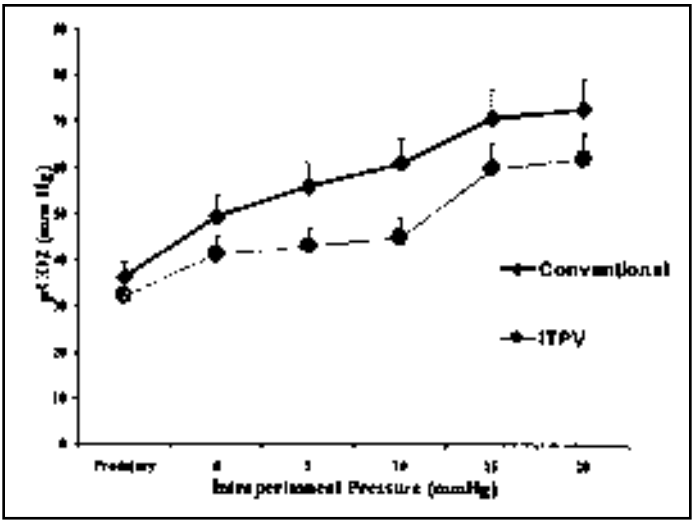

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P27 IMPAIRED NEUTROPHIL RECRUITMENT BY FETAL ENDOTHELIAL CELLS: IMPLICATIONS IN SCARLESS FETAL WOUND HEALING

Oluyinka O. Olutoye, M.D., Ph.D.; Xi Zhu, B.S.; Darrell L. Cass, M.D.; C. Wayne Smith, M.D.
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PURPOSE:
Unlike the adult, fetal dermal wounds heal scarlessly and with a minimal inflammatory response. When a robust inflammatory response is induced at the site of fetal dermal wounds by the application of cytokines, healing results in fibrosis. To test the hypothesis that the reduced inflammatory response in fetal wounds is due to impaired leukocyte-endothelial interactions, the contributions of fetal endothelial cells to the inflammatory response in the fetus was investigated using a novel model of fetal inflammation.

METHODS:
Endothelial cells were isolated from blood vessels of adult and mid-gestational fetal pigs by collagenase digestion and cultured in media until confluent monolayers were established. Adult porcine neutrophils were isolated and resuspended at a concentration of 1 million cells/ml. Interactions between neutrophils and endothelial cells were observed under static and flow conditions. Endothelial monolayers were exposed to neutrophils with and without prior stimulation of the endothelial cells with proinflammatory cytokines (TNF-alpha and IL-1 beta) for four hours. The neutrophil-endothelial interactions were observed with a phase-contrast microscope, videotaped, and analyzed for neutrophil adhesion, rolling velocity and transmigration. At least four cell lines each were analyzed in triplicate. Statistical analysis was performed using ANOVA with $p<0.05$ considered significant.

RESULTS:
A novel in-vitro model of fetal inflammation is described. Both adult and fetal endothelial cells demonstrated a dose-dependent increase in neutrophil adhesion and transmigration with increasing doses of proinflammatory cytokines. The fetal response was significantly lower than the adult. As would be expected, rolling velocity (which is inversely proportional to the degree of interaction between the neutrophils and endothelial cells) was lower with higher concentrations of proinflammatory cytokines.

CONCLUSIONS:
Fetal endothelial cells are less permissive to adhesion and transmigration of neutrophils than adult endothelial cells. This may contribute to the paucity of inflammation seen in the fetal response to dermal injury.

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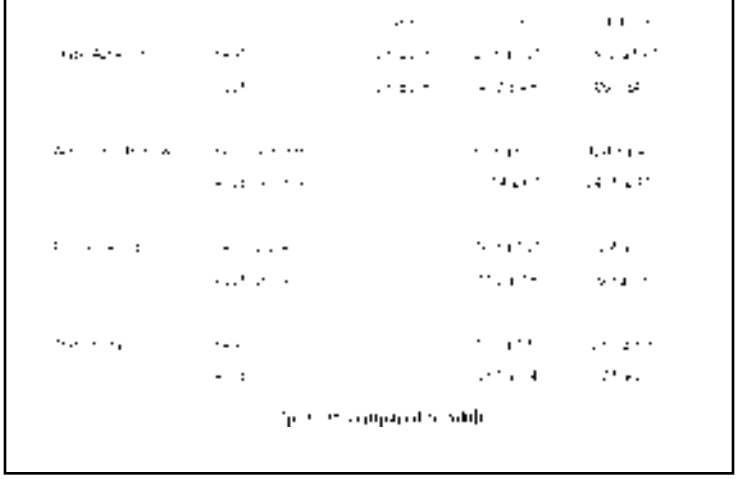
Neutrophil-Endothelial Interaction in Response to TNF-alpha Stimulation.



P28 EFFECT OF NITRIC OXIDE ON THE DEVELOPMENT OF NITROFEN-INDUCED FETAL HYPOPLASTIC LUNG EXPLANTS

Masato Shinkai, M.D.; Toko Shinkai, Ph.D.; Martina Pirker; Prem Puri, M.D., FRCS
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PURPOSE:
Nitric oxide (NO) is an important cell-signaling molecule and its generator, nitric oxide synthase (NOS) is expressed temporospacially in fetal rat lung. Recently NO has been reported to modulate branching of the fetal rat lung lobe *in vitro*. We designed this study to evaluate the effect of NO on the morphogenesis of hypoplastic lung using nitrofen-induced rat lung explant model.

METHODS:
A hypoplastic fetal lung model and a normal control lung model were induced by feeding a pregnant rat with nitrofen (100 mg) or olive oil on day 9.5 of gestation, respectively. Fetal lungs were harvested on day 13.5 and placed in organ culture containing serum-free medium DMEM. A NO-donor, DETA NONOate (DETA/NO)(100 ¥ìM) was added daily in the culture medium. The lung cultures were divided into four groups: group I (n=5), normal controls without DETA/NO; group II (n=5), normal controls with DETA/NO; group III (n=5) hypoplastic lungs without DETA/NO; group IV (n=5) hypoplastic lungs with DETA/NO. The fetal lungs were incubated for 48 hours at 37¨¬C with 5 percent CO2. Lung bud count and area of the specimens were measured under the computer-assisted digital tracings. The increase in bud count and lung area was calculated as the ratio of each value at 48 hr minus each value at 0 hr, divided by the value at 0 hr.

RESULTS:
Area and lung bud count were significantly increased in group IV (Area 1.0¡_0.7, Bud 3.3¡_0.9) compared to group III (Area 0.4¡_0.2, Bud 1.9¡_0.3) ($p<0.05$). However, these values were not significantly different in group II (Area 0.7¡_0.2, Bud 2.5¡_0.6) compared to group I (Area 0.5¡_0.2, Bud 1.8¡_0.4)($p=0.06$).

CONCLUSIONS:
This study demonstrates for the first time that the NO-donor, DETA/NO promotes growth of the nitrofen-induced hypoplastic fetal lung explant. These data suggests that NO may modulate the development of the nitrofen-induced hypoplastic lung.

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P29 POSTNATAL LUNG MECHANICS AFTER TRACHEAL OCCLUSION AND PRENATAL PERFLUOROCARBON-INSTILLATION IN THE FETAL RABBIT LUNG

Oliver J. Muensterer, M.D.; Andreas Flemmer, M.D.; Florian Bergmann, MS; Verena J. Klis, M.D.; Georg Simbruner, M.D.; Dietrich von Schweinitz, M.D.; Holger Till, M.D.*

University of Munich, Department of Pediatric Surgery, Munich, Germany

** Dr. Muensterer received a grant from the Support Program for Research and Teaching, University of Munich.*

PURPOSE:

We have previously shown that instillation of perfluorooctylbromide (PFOB, a perfluorocarbon) into fetal rabbit lungs leads to lung growth similar to tracheal occlusion (TO), as determined by fetal lung to body weight (FLBW) and lung dry tissue weight (LDTW). However, lung mechanics have so far not been evaluated experimentally for these interventions. This study compares the postnatal changes in lung mechanics after prenatal intrapulmonary PFOB instillation and TO.

METHODS:

In each of 12 pregnant NZW rabbits on gestational day 27, sets of four fetuses were randomized to undergo either 1) intrapulmonary instillation of 1 ml PFOB , 2) TO, 3) intrapulmonary instillation of 1 ml 0.9 percentNaCl (Saline), and 4) hysteroamniotomy without fetal manipulation (Control). Fetuses were born by C-section after 48 hours and average FLBW and LDTW were calculated for each group. The last four sets of fetuses underwent postnatal mechanical ventilation via tracheostomy for 15 minutes to assess lung mechanics including compliance and airway resistance (Flexivent, Scireq Inc. Montreal, Canada).

RESULTS:

Confirming our previous findings, mean FLBW was higher in the TO (0.049+/-0.006;$p<0.05$) and PFOB (0.036+/-0.007; $p<0.05$) groups compared to Saline (0.029+/-0.007) and Control (0.030+/-0.007). Correspondingly, left LDTW (grams) was higher in TO (0.064+/-0.029) and PFOB (0.062+/-0.016) than in Saline (0.054+/-0.017) or Control (0.043+/-0.012). In the first 15 minutes after birth, mean lung compliance was consistently lower in the TO-treated fetuses compared to all other groups (Figure 1). Airway resistance was highest after instillation of PFOB (Figure 2). Over time, lung compliance had a tendency to increase, while airway resistance decreased.

CONCLUSIONS:

Prenatal intrapulmonary instillation of PFOB and TO leads to lung growth, but TO is associated with decreased postnatal lung compliance. These changes may be secondary to the decrease in alveocyte-II density and surfactant production previously described after TO. Conversely, airway resistance increases after intrapulmonary PFOB instillation, while compliance remains adequate.

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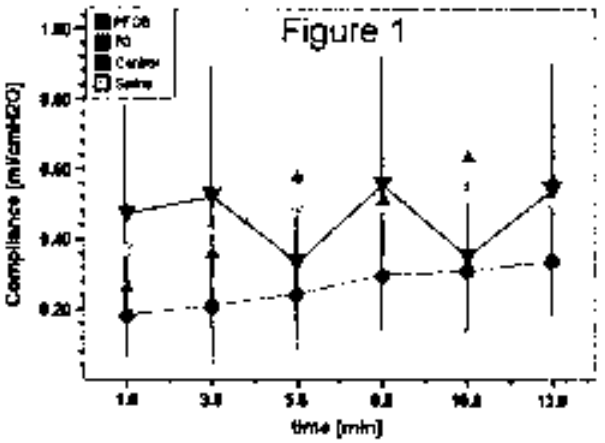
Figure 1
Compliance [ml/cmH2O]
time [min]

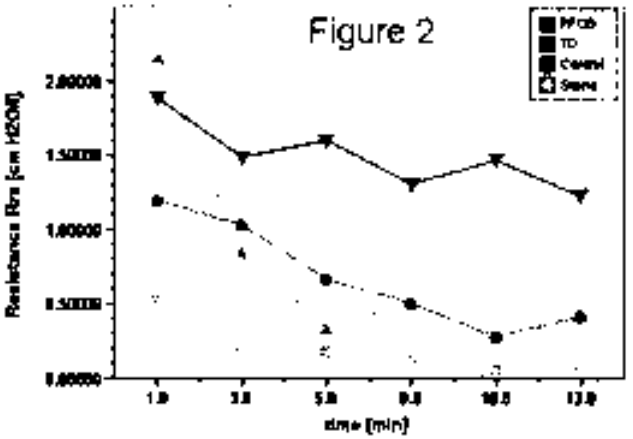
Figure 2
Resistance Rrs [cm H2O/l]
time [min]

P30 SEROTONIN TRANSPORTER OVEREXPRESSION IN PERSISTENT PULMONARY HYPERTENSION COMPLICATING CONGENITAL DIAPHRAGMATIC HERNIA (CDH) IN NEWBORNS

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PURPOSE:
The serotonin (5-HT) is the most potent pulmonary vasoconstrictor identified todate in humans and has been reported to play a major role in the development of pulmonary hypertension. The mitogenic effect of serotonin on pulmonary vascular smooth cells is mediated by the serotonin transporter (5-HHT), whereas its constricting effect is mediated by the 5-HT2A receptor. The aim of this study was to test the hypothesis that 5-HHT is involved in the development of persistent pulmonary hypertension (PPH) complicating CDH in newborns.

METHODS:
Genomic DNA was extracted from archival paraffin embedded lung tissue from 13 newborns with CDH complicated by PPH and from nine controls. A polymerase chain reaction-restriction fragment polymorphism (PCR-RFLP) method was devised for genotyping the 5-HHT (I/D) and the 5-HT2A receptor (T102C) gene polymorphisms. Gene expression was analysed by reverse transcription PCR (RT-PCR) using primers specific to the human 5-HTT and 5-HT2A genes.

RESULTS:
The 5-HHT LL genotype was present in a significantly higher frequency in CDH patients (54 percent) when compared to controls (22 percent), ($p< 0.05$). 5-HHT mRNA expression was significantly increased in CDH lung compared to controls ($p< 0.05$).
There were no significant differences in the genotype distribution and mRNA expressions of the 5-HT2A receptor between CDH patients and controls ($p> 0.05$).

CONCLUSIONS:
The CDH patients with LL genotype of the 5-HHT gene polymorphism are more susceptible to develop PPH.

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P31 NITROFEN INDUCED APOPTOSIS IS CALCIUM DEPENDENT: INSIGHTS INTO THE PATHOGENESIS OF CONGENITAL DIAPHRAGMATIC HERNIA

Pradeep P. Nazarey, M.D.; David E. Kling, Ph.D.; Trejeve Martyn; Jeremy T. Aidlen, M.D.; T. Bernard Kinane, M.D.; Patricia K. Donahoe, M.D.; Jay J. Schnitzer, M.D., Ph.D.
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PURPOSE:
The mechanism by which nitrofen administration to pregnant rodents induces fetal congenital diaphragmatic hernia (CDH)-associated pulmonary hypoplasia is poorly understood. We hypothesize that nitrofen requires cytosolic calcium in undifferentiated, pluripotent cells resulting to induce apoptosis.

METHODS:
P19 murine embryonal carcinoma cells were grown in culture for 24 hours and then treated with three different concentrations (3 µM, 6 µM, or 12 µM) of a cell permeable intracellular calcium chelator, BAPTA-AM, for 24 hours, followed by exposure to nitrofen for 4 hours. Cell lysates were harvested and apoptosis measured by Western blot analysis for caspase-3 cleavage and terminal deoxynucleotidyl transferase dUTP nick end label (TUNEL) assay. Blots were quantified by densitometry; results were calculated as mean ± SD, and statistical analysis was performed by ANOVA with $p<0.05$ considered significant.

RESULTS:
In untreated controls, nitrofen induced a dramatic increase in TUNEL positive P19 cells and caspase-3 cleavage, indicating that nitrofen induces apoptosis in these cells. P19 cells pretreated with BAPTA-AM showed decreased amounts of TUNEL positive cells in a dose dependent manner with those cells treated with 12microM BAPTA-AM showing the lowest amount of TUNEL positive cells compared to controls. Furthermore, a similar dose dependent decrease in caspase-3 cleavage was observed on Western analysis (Figure 1). The relative measured caspase cleavage values were 0.33 ± 0.26 for 12 µM BAPTA-AM, 0.34 ± 0.17 for 6 µM BAPTA-AM, and 1.03 ± 0.15 for DMSO control; the differences between these 2 higher BAPTA-AM doses and control were statistically significant ($p<0.004$).

CONCLUSIONS:
Nitrofen induces apoptosis in undifferentiated, pluripotent P19 embryonal carcinoma cells via a calcium dependent mechanism. Protection from apoptosis is offered by intracellular calcium chelation. These data may contribute towards understanding the pathogenesis of CDH-associated pulmonary hypoplasia and recognizing pathways for which therapeutic strategies may be designed.

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P32 INFLAMMATORY MYOFIBROBLASTIC TUMOR IN CHILDREN: CLINICAL REVIEW WITH ALK, EBV AND HHV-8 DETECTION ANALYSIS

Frederic Mergan, M.D.; Francis Jaubert, M.D.; Frederique Sauvat, M.D.; Olivier Hartmann, M.D., Ph.D.; Stephen Lortat-Jacob, M.D.; Yann Revillon, M.D.; Claire Nihoul-Fekete, M.D.; Sabine Sarnacki, M.D., Ph.D.
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PURPOSE:
Inflammatory myofibroblastic tumor (IMT) is considered as a benign neoplasm although it may present malignant features. The differential diagnosis with other tumor processes is sometimes difficult. Similar anaplastic lymphoma kinase (ALK) gene abnormalities than in anaplastic large cell lymphoma (ALCL) have been reported. The presence of Human Herpesvirus-8 (HHV-8) DNA sequences has been described in adult pulmonary IMT as well as Epstein-Barr virus (EBV) in splenic and hepatic IMT, suggesting a role of both viruses in IMT development. The purpose was to evaluate ALK, EBV and HHV-8 expression in children with IMT and to correlate findings with clinical features.

METHODS:
Sixteen children (range, 1-15 years) who had surgery for IMT between 1978 and 2003 were evaluated retrospectively. Formalin-fixed, paraffin-embedded archival tissues were stained for HHV-8 and ALK with immunohistochemistry. EBV was detected with in situ hybridization (EBER probes).

RESULTS:
Tumors were located in the pulmonary lobe (n=4), urinary tract (n=4), mesentery or bowel (n=4), hepatic lobe (n=1), vena cava (n=1), spinal cord (n=1) and soft tissue (n=1). IMT was excised totally in all but two cases. Four patients presented aggressive IMT with recurrence or metastasis requiring surgery. ALK was positive in three cases (18.8 percent) and EBV in one pulmonary and one bladder tumor, all of them without recurrence or metastasis. None of the cases were positive for HHV-8. All patients are disease-free with a mean follow-up of 4.2 years.

CONCLUSIONS:
Surgery should be considered as the mainstay therapy in IMT even with recurrence or metastases. Expression of ALK and EBV were found in this pediatric IMT series and were associated with a good prognosis. Larger multicentric studies are required to understand the significance of these markers and their relationships with the genesis of the tumor.

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P33 INFLUENCE OF HEPATOCYTE GROWTH FACTOR(HGF) ON THE GENE CONTROL OF INTESTINAL ADAPTATION

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PURPOSE:
HGF has been shown to augment mucosal mass and nutrient absorption in small bowel undergoing intestinal adaptation. It has been hypothesized that these changes are gene mediated. Our laboratory has previously shown that two genes, SGLT-1 and GLUT-5, are up-regulated following massive small bowel resection (MSBR) and further enhanced following exposure to HGF. This study was designed to investigate the more global gene alterations associated with intestinal adaptation and the influence of HGF using microarray analysis.

METHODS:
Adult male Sprague-Dawley rats were randomized to one of four groups: Sham control, Sham-HGF, MSBR (70 percent) control, or MSBR (70 percent)-HGF. Seven days after surgery HGF was administered to its respective groups at 150ug/Kg/day for 14 days. At day 21 ileal mucosa was harvested to measure mucosal DNA and protein content. For RNA microarray analysis, the RAE 230A GeneChip and MAS5 software from Affymetrix were used. Statistical Analysis of Microarrays (SAM) and Expression Analysis Systematic Explorer V2.2 (EASE) were used to define alterations in genes associated with specific physiologic functions among all four groups.

RESULTS:
HGF statistically significantly increased protein and DNA content in the ileal mucosa ($p < 0.05$) compared to respective controls. SAM identified 1110 probe sets that were altered among all four groups (based on a 10 percent false discovery rate). Using EASE analysis, genes related to carbohydrate metabolism, protein synthesis, ribosomal proteins and electron transport were significantly altered and significantly different between adapted bowel and adapted bowel following HGF exposure.

CONCLUSIONS:
In prior studies our laboratory has demonstrated that HGF increases mucosal mass, carbohydrate and protein absorption in normal intestine and during intestinal adaptation. Microarray analysis has correlated these changes with alterations in the gene expression of protein synthesis, carbohydrate metabolism, ribosomal proteins and electron transport in the ileum. This report represents the first data on the effect of hepatocyte growth factor on gene control of intestinal adaptation.

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P34 ALTERATIONS IN SMALL INTESTINAL SECRETORY LINEAGE AFTER SMALL BOWEL RESECTION

Marcus D. Jarboe, M.D.; Russell J. Juno, M.D.; Wolfgang Stehr, M.D.; Andrew W. Knott, M.D.; Nicole P. Bernal, M.D.; Sherri A. Profitt; Chris R. Erwin, Ph.D.; Brad W. Warner, M.D.

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PURPOSE:

Intestinal adaptation is a compensatory response to massive small bowel loss resulting in proliferation of absorptive enterocytes. However, the effect of resection on expansion of other crypt cell-derived secretory lineages (goblet, enteroendocrine, and Paneth cells) is presently not known. The purpose of this study was to determine the effect of intestinal resection on proliferation of secretory epithelial cells.

METHODS:

A 75 percent mid- small bowel resection (SBR) or sham operation (bowel transaction/reanastomosis) was performed in male Sprague-Dawley rats. After seven days, the remnant ileum was harvested and parameters of adaptation were verified as increases in villus height and crypt depth. Immunostaining for goblet cells, Paneth cells, and enteroendocrine cells was then performed. Cell subtypes were analyzed and an index recorded as # of cells per micrometer of villus length. Results (mean Ã‚Â± SEM) were evaluated using ANOVA and a p value of <0.05 was considered significant.

RESULTS:

Following SBR, the expected increase in villus height, crypt depth occurred. A significant increase in goblet cell index was also observed (0.041 Ã‚Â± 0.003 sham versus 0.053 Ã‚Â± 0.005 SBR, p = 0.005), but without changes in Paneth or enteroendocrine cell numbers. Since epidermal growth factor receptor (EGFR) signaling is known to affect goblet cell lineages in other tissues as well as the magnitude of intestinal adaptation, SBR procedures were performed in mutant mice with known defective EGFR signaling (waved-2). In contrast with control mice and rats, waved-2 mice did not demonstrate increased goblet cell production during adaptation.

CONCLUSIONS:

Following massive small bowel resection, increased goblet cell production accompanies proliferation of absorptive enterocytes. The selective expansion of this secretory lineage appears to be dependent upon robust EGFR signaling. These results strengthen the position of the intestinal EGFR as a critical regulator of post-resection intestinal adaptation.

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P35 INFLAMMATORY CYTOKINES INHIBIT ENTEROCYTE MIGRATION BY ACTIVATING RHO-GTPASE IN A NITRIC OXIDE DEPENDENT MANNER

Selma Cetin, M.D.; Faisal G .Qureshi, M.D.; Jun Li, MS; Orkan Ergun, M.D.; Laura Sysko, MS; Ruben Zamora, Ph.D.; Henri R. Ford, M.D.; David J. Hackam, M.D., Ph.D.
Children's Hospital of Pittsburgh, Pittsburgh, PA, USA

PURPOSE:
Necrotizing enterocolitis (NEC) is characterized by disrupted intestinal mucosal integrity and increased circulating cytokines (TNF- , IL-1 , IFN-) and nitric oxide (NO). Mucosal integrity is normally maintained by enterocyte migration along the crypt-villus axis, which is negatively regulated by activating Rho-GTPase. We have previously shown that in response to cytokines, enterocytes release NO which injures the mucosa through incompletely defined mechanisms. Furthermore, enterocyte migration is impaired in experimental NEC. We therefore hypothesize that cytokines directly inhibit enterocyte migration by activation of Rho-GTPase in an NO-dependent manner.

METHODS:
Enterocyte migration was measured using time lapsed video microscopy of IEC-6 cells moving across a wound edge over 24hours, in the presence of cytokines (TNF- b1 10uM, IL-1 b2 1uM, IFN- 1uM,) or the NO donor DETA-NONOate. Nitrate levels of cytokine-treated enterocytes were measured using the Griess reaction. Rho activation in IEC-6 cell lysates was assessed by determining the proportion of Rho that binds to the effector Rhotekin coupled to glutathione beads in a pull-down assay, in the presence of cytokines or DETA-NONOate (100 µM). NO was inhibited using L-NIL (50uM). Comparisons by ANOVA.

RESULTS:
Migration was significantly impaired in cytokine-treated IEC-6 cells compared with controls (Table). Cytokine treatment of IEC-6 cells induced NO release and resulted in a 3-fold increase in Rho-GTPase activation compared to controls (Table). The NO donor DETA-NONOate significantly impaired enterocyte migration (Table), and caused a 2.5-fold activation of RhoA, thus suggesting a putative mechanism for the effect of cytokines. Strikingly, the nitric oxide inhibitor L-NIL attenuated the effects of cytokines on enterocyte migration (Table) and Rho activation.

CONCLUSIONS:
Consistent with our hypothesis, the cytokines TNF- , IL-1 , IFN- , inhibit enterocyte migration. This occurs through activation of Rho in a NO-dependent manner. Modulation of Rho by NO, by enhancing enterocyte migration, could provide a novel approach in the prevention and treatment of NEC.

Notes

Enterocyte Condition	Migration Speed (µm/h)	Nitrate Level (µM)	Significance (vs. ctrl)
Control	7±2	1±1	
TNFα+IFNγ+IL-1β	1.2±0.5	13.2±3	P<0.01
DEA-NONOate	2.4±2	25±5	P<0.05
Cytokines+L-NIL	5±2	4±2	P<0.05

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P36 EARLY LINEAGE ALLOCATION FOLLOWING A MASSIVE SMALL BOWEL RESECTION IN MICE

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PURPOSE:
The mechanism by which sustained increases in proliferation of intestinal stem cells occur following a massive resection is not understood. How the new set-point of proliferation is determined after resection may involve changes in the percentage of secretory lineages (Paneth, goblet, and enteroendocrine cells) within the epithelium that locally regulate the adaptive process. The purpose of this study was to determine if early changes in intestinal epithelial lineage allocation occur following massive intestinal resection.

METHODS:
Male mice (C57/BL6J,22-25gm)were randomized to either a sham operation (transection and reanastomosis) or 50 percent small bowel resection (mid-jejunum-to-proximal-ileum). All animals (n=5 per group) were maintained on a liquid diet and daily weight recorded. Intestine was harvested at 12hrs, 36hrs, and 7days following surgery for histology. Total cell number and crypt depth/villus height were determined. Percent of goblet (Alcian Blue) and enteroendocrine cells(chromogranin) within 25 consecutive crypt-villi units, and Paneth cells (lysozyme) within 25 consecutive crypts were determined at each time point. Statistical analaysis by one-way ANOVA ($p<.05$).

RESULTS:
Intestinal adaptation occured by 36hrs as determined by significant increases in crypt depth and total cell number. Within 12hrs of resection significant increases in both the percent of goblet (13.5±1.3 vs 21.5±1.0) and Paneth cells (8.9±0.6 vs 13.8±0.9)occured in the ileum which further increased at 36hrs (goblet;15.1±0.4 vs 22.6±1.5, Paneth;11.2±0.8 vs 18.6±1.0). By 7days significant increases in total cell number resulted in an overall similar percent of goblet cells (15.7±0.8 vs 16.4±1.1), yet continued increases in the percent of Paneth cells (11.9±1.1 vs 16.8±1.3) were observed. Similar sustained increases in enteroendocrine cells were seen, yet the overall small percentage of the lineage (0.1-0.2 percent) made analysis difficult.

CONCLUSIONS:
Massive intestinal resection results in the early increased allocation of intestinal secretory lineages. Local epithelial changes within the crypt-villus may help reset sustained increases in intestinal stem cell proliferation following massive intestinal resection.

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P37 HUMAN HEPATOCYTES MAINTAIN PROTEIN SYNTHESIS AND CYTOCHROME P450 FUNCTION IN MICROFABRICATED DEVICE WITH A VASCULAR NETWORK OF CHANNELS

*Wing S. Cheung, M.D.; Jeffrey Borenstein**, Ph.D.;*
Mohammad R. Kaazempur-Mofrad, Ph.D.; Michael Shin, Ph.D.; Alexander Sevy, B.S.;*
Katherine Kulig, B.A.; Joseph P. Vacanti, M.D.
Massachusetts General Hospital, Boston, MA, USA
** Massachusetts Institute of Technology*
*** Charles Draper Laboratory, Cambridge, MA, USA*

PURPOSE:
The ultimate goal of liver tissue engineering is to develop implantable liver devices for organ replacement in an effort to address the worsening problem of donor organ shortage, especially for the pediatric population. Our group has previously demonstrated survival of human hepatocytes Hep G2/C3a in a microfabricated device, with an engineered microvascular circulation mimicking a hepatic capillary bed. Here we demonstrate specific hepatocyte protein synthesis and cytochrome P450 function in these devices.

METHODS:
Liver devices with vascular beds, designed using a fractal computational modeling, were microfabricated using silicon photolithography and etching followed by poly(dimethylsiloxane) (PDMS) replica molding. A nanoporous polycarbonate membrane allows mass transport between the vascular and the hepatocyte compartments. Serum-free media was perfused through the vascular compartment at a rate of 0.5 ml/hr using a syringe pump. The media effluent was tested for human albumin, ferritin, and alphafetoprotein by enzyme-linked immunosorbent assay (ELISA). Cytochrome P450 function was assessed by analyzing the metabolism of 7-Ethoxycoumarin (ECOD) into its metabolites by high performance liquid chromatography (HPLC).

RESULTS:
Human hepatocytes seeded in our microfabricated devices remained viable for 10 days, the duration of the experiment. Hepatocytes cultured in these devices also demonstrated albumin, ferritin, and alphafetoprotein synthesis correlated to the number of cells within each device for the duration of the experiment. These cells also maintained P450 function by elaborating both phase 1 and phase 2 ECOD metabolites.

CONCLUSIONS:
Our microfabricated devices with a fractal microvascular network efficiently supply nutrients to sustain hepatocyte viability and function. An implantable liver device must be able to perform important protein synthesis function to maintain homeostasis and to perform xenobiotic metabolism. Having demonstrated these important functions for our microfabricated liver devices, we are working towards the development of a tissue-engineered liver replacement device.

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Underlining denotes the author scheduled to present at the meeting.

P38 ABNORMAL DEVELOPMENT OF THE HEPATOBILIARY SYSTEM IN NITROFEN-EXPOSED MICE

Alexander L. Shifrin, M.D.; Mala R. Chinoy, Ph.D.; Peter W. Dillon, M.D.
Pennsylvania State University, Department of Surgery, Division of Pediatric Surgery, Hershey, PA, USA

PURPOSE:
A number of genes such as Jagged-1, the Forkhead family and matrix metalloproteinases (MMPs) have been implicated in the normal development of murine hepatobiliary system. Nitrofen has been recognized as an agent that affects embryological development of a number of organ systems. However, its effect on hepatobiliary organogenesis is unknown. We hypothesized that nitrofen exposure would disrupt murine fetal hepatic and biliary ductular development and might lead to potential clues regarding the etiology of such disease processes as biliary atresia and hypoplasia.

METHODS:
Livers were harvested from 3-6 litters at gestational days 13.5,16,19, and newborns. Twenty liver specimens at each time-point were evaluated. Histology was evaluated with H & E staining and ductal structures were determined with tenascin-C (TN-C) as well as biliary epithelial cell (BEC) specific cytokeratin. Western blotting was performed for Jagged-1 and vascular proteins. Differential gene expression was determined by microarray analysis and analyzed using GeneSpringâ software. Zymography / reverse zymography were performed to assess the activities of MMPs and their inhibitors (TIMPs).

RESULTS:
Histological analysis showed that nitrofen-exposed livers at all stages of development were poorly differentiated with reduced formation of interlobar and interlobular bile duct structures. Genes that were up-regulated included Na+/K+ exchanger; cytochrome P450; Kallikerin-like protein 3; syntaxin 18; selenoprotein P. Genes that were down-regulated included nuclear receptor superfamily 2, Forkhead box F2, insulin like growth factor binding protein 1. Jagged-1 protein expression was increased in nitrofen-exposed livers. Activity of MMP-9 protein was increased while no change was noted in the activity of TIMPs.

CONCLUSIONS:
Nitrofen exposure resulted in altered expression of a number of genes and their products with regulatory roles in hepatobiliary development including Forkhead box F2, Jagged-1, and MMP-9. Nitrofen-exposed developing mice may serve as a good model for identifying the genes and the signal transduction pathways involved in abnormal development of hepatobiliary system.

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P39 THE ROLE OF OXYGEN TENSION IN THE REGULATION OF EMBRYONIC DEVELOPMENT

Toko Shinkai, Ph.D.; Masato Shinkai, M.D.; Martina Pirker; Prem Puri, M.D., FRCS
Children's Research Centre, Our Lady's Hospital for Sick Children, Dublin, Ireland

PURPOSE:
Oxygen tension is an important physiological mediator of embryonic and fetal development. In vitro studies have demonstrated that the proper embryonic development is dependent upon low oxygen tension and even short exposure to normoxic environments (21%) can be detrimental to embryonic development. We hypothesized that oxygen toxicity results in lung growth retardation in embryonic organ culture and therefore designed this study to investigate embryonic lung growth in normoxic and hypoxic conditions.

METHODS:
Fetal rat lungs were harvested on day 13.5 and placed in organ culture containing serum-free DMEM medium with antibiotics. The lung cultures were divided into normoxic group, 21 percent oxygen concentration (n=10) and hypoxic group (n=10). Hypoxic condition (6 percent oxygen) was achieved using Oxoid Campygen¢â in a closed chamber. The lungs were placed in 5 percent CO2, 37¡É incubator for 48 hours. Media were not changed during the incubation period. The morphometric analysis was measured at 0 hour and at 48 hours by counting total terminal buds and entire epithelial contour using Image J soft ware. The fold increase in branching was calculated as the ratio of buds present at 48 hours minus the buds present at o hour divided by the number of buds at 0 hour. The increase in entire epithelial contour over 48 hours was calculated in exactly the same way as described above.

RESULTS:
There was no significant difference in the increase in total terminal buds count in hypoxic group (1.77¡_0.33) compared to normoxic group (2.36¡_1.35), and no significant difference in the increase in entire epithelial contour in hypoxic group (1.73¡_0.39) compared to normoxic group (1.85¡_0.71).

CONCLUSIONS:
Although hypoxia has been reported to be an important regulator of murine vascular development, our data show that hypoxia dose not affect the embryonic lung growth in whole lung organ culture.

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P40 ASSESSMENT OF CYSTEINE SYNTHESIS IN VERY-LOW-BIRTH-WEIGHT NEONATES USING A [$^{13}C_6$] GLUCOSE TRACER*

Stephen B. Shew, M.D.; Tamir H. Keshen, M.D.; Farook Jahoor, Ph.D.; Tom Jaksic, M.D., Ph.D.
Children's Mercy Hospital and Clinics, Kansas City, MO, USA
** Grant/reseach support from the USDA/ARS Cooperative Agreement #6250-5100-600*

PURPOSE:
Cysteine is an amino acid necessary for the synthesis of all proteins, the anti-oxidant glutathione, and the neuro-modulator taurine. Whether cysteine is an essential amino acid for premature neonates remains controversial. Utilizing a [$^{13}C_6$] glucose precursor in very-low-birth-weight (VLBW) premature neonates, we measured the 13C content of cysteine in hepatically derived apo B-100 and in the plasma to determine if cysteine synthesis occurs and to relate minimum synthetic capacity to neonatal maturity.

METHODS:
Twelve VLBW premature neonates (BW: 907 ± 274 (SD)g; GA: 26.8 ± 2.4 wk) were studied on day of life 7.8 ± 4.2, while on TPN for 5.6 ± 4.5 days. A 4-hr IV infusion of [$^{13}C_6$] glucose was administered. Blood samples were obtained immediately prior and at the end of the infusion. Isotopic enrichment of cysteine was determined by gas chromatography/mass spectrometry. ANOVA, student t-test, and linear regression were used for comparisons.

RESULTS:
The 13C isotope ratio of apo B-100 derived cysteine after the [$^{13}C_6$] glucose infusion was significantly greater than baseline (18.57 ± 0.38 (SEM) mol percent vs. 17.54 ± 0.25 mol percent, $P < 0.05$). The 13C isotope ratio of plasma cysteine was also significantly greater than baseline (17.36 ± 0.25 mol percent vs. 16.91 ± 0.16 mol percent, $P < 0.05$). When expressed as a product:precursor ratio, the mol percent above baseline of [13C]apo B-100 cysteine/[$^{13}C_6$] glucose correlated with birth-weight ($r = 0.74$, $P < 0.01$), and similar correlation trends were apparent with gestational age and adjusted postnatal age.

CONCLUSIONS:
VLBW neonates are capable of cysteine synthesis as evidenced by incorporation of 13C label into hepatically derived apo B-100 cysteine and plasma cysteine from a glucose precursor. The minimum capacity for intrahepatic cysteine synthesis appears to be directly proportional to the maturity of the neonate and may impact the capabilities of VLBW neonates to counteract oxidative stresses such as bronchopulmonary dysplasia and necrotizing enterocolitis.

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Session I: Gastrointestinal Tract

8 a.m. – 10 a.m.

1 THE FIRST DECADES EXPERIENCE WITH LAPAROSCPIC NISSEN FUNDOPLICATION INFANTS AND CHILDREN (6 MINUTES)

Steven S. Rothenberg, M.D.*
The Mother and Child Hospital at Presbyterian-Saint Lukes, Denver, CO, USA
** Dr. Rothenberg is a consultant for Storz, Intuitive and Valleylab.*

PURPOSE:
To evaluate the safety, efficacy and long-term results of laparoscopic fundoplication in infants and children.

METHODS:
With IRB approval the results of 10 years of laparoscopic fundoplications between November 1992 and August 2003 were reviewed. 1048 laparoscopic Nissen fundoplications were performed by or under the guidance of a single surgeon. All data was kept prospectively. Ages ranged from 5 days to 18 years and weight from 1.2 to 120 Kg. Indications for surgery were medically refractory GERD (72 percent), significant failure to thrive (28 percent), and severe respiratory compromise or reactive airway disease (26 percent). Nine percent (95) of the procedures were redo fundoplications of failed previous open and laparoscopic procedures.

RESULTS:
The operative time for the procedure ranged from 20 to 240 minutes. The average operative time was 46 minutes. The average operative time for the first 30 cases was 109 minutes, and was 38 minutes for the last 30. 209 patients (20 percent) also received gastrostomy buttons. The intra-operative complication rate was 0.26 percent and post-operative rate was 3.8 percent. The average hospital stay for patients admitted for surgery was 1.1 days. The incidence of dysphagia was 0.8 percent and symptoms in all of these patients resolved with a single dilatation and time. There was a single post-operative pneumonia and almost no other respiratory problems despite the significant respiratory compromise of many of the patients. The wrap failure rate has been 4.2 percent and all but two of these patients have been revised laparoscopically.

CONCLUSIONS:
Laparoscopic fundoplication has proven to be a safe and effective procedure. Initial long term follow suggests the procedure is associated less morbidity and better long term success as compared to the open technique.

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2 ABNORMAL GASTRIC MYOELECTRICAL ACTIVITY IN PATIENTS WITH EMESIS OR RETCHING AFTER FUNDOPLICATION OR GASTROSTOMY TUBE INSERTION
(3 MINUTES)

Cynthia Reyes, M.D.; Ryan Krasnosky, PA-C; Iris Bain, R.N.
Nemours Children's Clinic, Pensacola, FL, USA

PURPOSE:
Pediatric patients with retching or emesis after fundoplication or gastrostomy tube insertion may have gastric motility disorders detectable with electrogastrography. The purpose of this study was to determine the significance of gastric myoelectric dysfunction using electrogastrography in patients with vomiting or retching after fundoplication or gastrostomy tube insertion.

METHODS:
A single institution retrospective chart review (March 2000 – June 2003) was performed to identify patients who had electrogastrogram (EGG) tests during surgical evaluation of emesis or retching after fundoplication or gastrostomy tube insertion. The EGGs were recorded for 20 min using cutaneous electrodes and a standard device (3CPM Co, Crystal Lake, NV). A normal EGG contains signals from 2.5-3.7 cycles per min (cpm); bradygastria from 0.0 -2.5 cpm and tachygastria from 3.7-10.0 cpm.

RESULTS:
Eight children, ages 2 months to 11 years, were studied for emesis or retching after fundoplication (n=6) or gastrostomy tube insertion (n=2). Evaluation for gastroesophageal reflux was performed with a combination of pH probe, endoscopy, flouroscopic or nuclear medicine studies. Only one patient had mild gastroesophageal reflux. All eight children (100 percent) had an abnormal EGG test. Four children had bradygastria. Three patients responded to metoclopramide. The fourth patient failed prokinetic drug therapy but improved after a pyloroplasty performed for delayed gastric emptying. Two patients with tachygastria responded to medication and dietary changes. Two patients with delayed gastric emptying had high amplitude and persistent 3 cpm waves in the "obstructive pattern". Both patients improved after a pyloroplasty.

CONCLUSIONS:
Abnormal electrogastrograms were recorded in eight patients with emesis or retching after fundoplication or gastrostomy tube insertion. Gastric motility disorders of different causes were associated with emesis or retching in these post-surgical patients. Identification of abnormal gastric motility with electrogastrogram recordings led to successful medical and surgical treatments in these patients with post-operative retching and vomiting.

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3 STRETTA AS THE INITIAL ANTI-REFLUX PROCEDURE IN CHILDREN: HOLY GRAIL OR HOLY WATER? (3 MINUTES)

C-C A. Jackson, M.D.; Stig Somme, M.D.; Peter G. Mavrelis, M.D.; Daniel Hurwich, M.D.; Mindy B. Statter, M.D.; Daniel H. Teitelbaum, M.D.; B. A. Zimmerman, ARNP; Donald C. Liu, M.D.
University of Chicago Children's Hospital, Chicago, IL, USA

PURPOSE:
The Stretta procedure is an endoluminal anti-reflux procedure utilizing radiofrequency to induce collagen tissue contraction, remodeling, and modulation of LES physiology in an effort to treat gastroesophageal reflux disease (GERD). Although Stretta has been widely reported in the adult GERD literature as a viable initial surgical option, similar use in children has not been reported. The authors present the first report of Stretta as the initial anti-reflux procedure in children with GERD evaluating indications, safety, and efficacy.

METHODS:
The charts of seven children (ages: 11-16y.) who received Stretta between January 2003 and August 2003 were retrospectively reviewed under an IRB protocol. All patients had documented GERD pre-operatively. Three children required concomitant feeding tube placement (PEG) (group A). Four children with isolated severe GERD refractory to aggressive medical therapy received Stretta only.

RESULTS:
Stretta was successfully completed in all seven children. In Group A, one child developed a post-operative aspiration, which was successfully treated. All three children had resolution of their GERD symptoms (i.e. emesis) and were able to tolerate full enteral nutrition post-Stretta. In Group B, two of four children are currently off medications and asymptomatic on short-term follow-up (<6 months). Of the remaining two, one experienced symptomatic relief immediately post-procedure, but symptoms recurred off medications. Stretta was unsuccessful in the remaining patient and Nissen fundoplication was subsequently performed without difficulty.

CONCLUSIONS:
Stretta can be safely and successfully employed as the initial anti-reflux procedure for children with GERD. Concomitant Stretta with PEG is an attractive option in children with pre-existing GERD who require long term feeding access. Longer follow up and a larger patient population are needed to better confirm the safety and efficacy of Stretta presented in this report.

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4 HIRSCHSPRUNG'S DISEASE IN JAPAN -ANALYSIS OF 3784 PATIENTS BASED ON NATION WIDE SURVEY IN 30 YEARS (6 MINUTES)

Sachiyo Suita, Professor; Tomoaki Taguchi, M.D.; Satoshi Ieiri, M.D.; Takanori Nakatsuji, M.D.
Kyushu University, Fukuoka, Japan

PURPOSE:
Introductions of laparoscope and transanal endorectal pull-through (TAEPT) have made revolution of the operative procedure in Hirschsprung's disease. In order to study the changing profile of Hirschsprung's disease in Japan, we have done national survey.

METHODS:
Data of patients were collected in 3 phases, Group 1: 1628 patients between 1978 and 1982, Group 2: 1121 patients between 1988 and 1992, and Group 3: 1035 patients between 1998 and 2002, respectively.

RESULTS:
Incidence was 1:4697, 1:5544, and 1:5696, and the male to female ratio was 3.0:1, 3.4:1, and 3.0:1 in each group, respectively. The extent of aganglionosis was almost same in each group. The patients less than 2500g at birth increased to 10.4 percent in Group 3, while 6.5 percent in Group 2 and 5.5 percent in Group 1. The patients with family history also increased to 6.4 percent in Group 3, compared with 2.8 percent in Group 2, and 3.0 percent in Group 1. Incidence of associated anomalies increased as time, 11.8 percent in Group 1, 16.3 percent in Group 2, and 21.7 percent in Group 3. Mutations of genes were found in 4 out of 23 patients examined. As for definitive operation, procedures without laparotomy, including TAEPT, increased up to 41 percent in Group 3, while 0 percent in Group 1 or 2. Primary operation without stoma was also increased. Average age at operation in Group 3 was 63 days earlier than that in Group 2. Postoperative enterocolitis was decreased to 8.8 percent in Group 3, while 20.3 percent in Group 2 and 17.9 percent in Group 1. Mortality was decreased as time, 7.1 percent, 4.9 percent, and 3.0 percent, respectively.

CONCLUSIONS:
We analyzed 3784 Japanese patients in three decades. Ratio of patients with low birth weight infant, associated anomaly, or family history was increased in last 10 years. Primary operation without laparotomy has become mainstreams for definitive operation.

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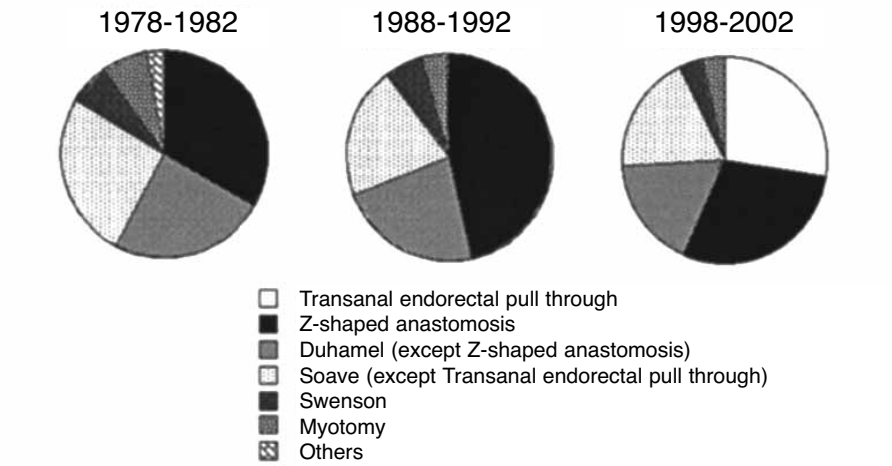
Operative procedures in 3 decades



5 TOTAL COLONIC HIRSCHSPRUNG'S DISEASE: A 28-YEAR EXPERIENCE (6 MINUTES)

Barbara E. Wildhaber, M.D.; Daniel H. Teitelbaum, M.D.; Arnold G. Coran, M.D.
University of Michigan, Section of Pediatric Surgery, Ann Arbor, MI, USA

PURPOSE:
To review outcomes following surgical treatment of Total Colonic Hirschsprung's disease (TCH).

METHODS:
Twenty-five records of patients treated for TCH (1974–2002) were reviewed. Follow-up data were collected using a standardized questionnaire. Objective functional outcome was assessed using a scoring system; included factors were recurrent abdominal distension, frequency of defecation, stool consistency, soiling, urgency period, diapers required, chronic use of medication, diet. Statistics used multivariate linear regression analysis.

RESULTS:
Twenty patients had aganglionosis of the colon and distal ileum (TCH), five had more extensive aganglionosis; one of these latter 5 underwent an endorectal pull-through (ERPT) (distal jejunum), none of the remaining four underwent an ERPT (one intestinal transplation, three deaths). Of the remaining 20, four patients underwent an ERPT as neonates, 16 received a stoma as neonates, followed by ERPT in 12 patients and a Martin-, Duhamel- or Swenson-procedure in three (median age 10.5 months); one patient remains with an ostomy. Significant postoperative complications included enterocolitis (55 percent), anal stricture (25 percent), and perineal excoriation (20 percent); all complications were unrelated to type of pull-through (P=0.53, P=0.99, and P=0.18 respectively). Mean follow up was 17.5 years (±11.1 years, range 14 months – 30 years); 89 percent are free of recurrent enterocolitis. Frequency of bowel movements (BM) is 1-5/day in 82 percent; 3/17 patients have >6 BM/day; mean number of BM/day is 4±2. Occasional soiling is noted in 40 percent (1/3 of those requiring nighttime-diapers). Metronidazole and/or attapulgite/loperamide are needed in three patients. Overall functional outcome was good in 83 percent, and those patients with the longest follow-up periods had the best stooling scores (P=0.04). Type of pull-through had no correlation with the overall functional outcome (P=0.26).

CONCLUSIONS:
Surgical treatment of TCH is associated with a number of complications including recurrent enterocolitis and anal strictures. However, type of pullthrough did not influence the incidence of complications, and long-term outcome is quite favorable.

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6 PEDIATRIC LAPAROSCOPIC-ASSISTED COLECTOMY WITH ILEAL-POUCH-ANAL ANASTOMOSIS: SURGICAL AND FUNCTIONAL OUTCOMES (3 MINUTES)

Abdalla E. Zarroug, M.D.; Penny Stavlo, FNP-G.; David A. Rodeberg, M.D.; Christopher R. Moir, M.D.
Mayo Clinic, Rochester, MN, USA

PURPOSE:
To evaluate the efficacy of laparoscopic-assisted colectomy (LAC) with ileal pouch-anal anastomosis (IPAA) for ulcerative colitis (UC) and polyposis syndromes in pediatric patients.

METHODS:
IRB approved retrospective review of 27 consecutive patients 19 yo undergoing LAC/IPAA between 1998-2003. Functional outcomes were determined by questionnaire and telephone interview.

RESULTS:
Mean age at operation was 14 years (range 4-19), with 15 males and 12 females. Diagnosis included UC (n=16), familial adenomatous polyposis (n=6), Gardner's syndrome (n=1), juvenile polyposis (n=2), and indeterminate colitis (n=2). All colitis patients were symptomatic with diarrhea, hematochezia, or abdominal pain. Indications for operation included intractable disease or medication toxicity (n=21), and cancer prevention (n=6). LAC/IPAA were performed without diverting ileostomy (n=14), with diverting ileostomy (n=11), or LAC and ileostomy with subsequent IPAA (n=2). All patients had a stapled ileal J-pouch, rectal mucosectomy, and hand-sewn ileoanal anastomosis. One LAC/IPAA was converted to an open procedure but no other laparoscopic-related or intraoperative complications occurred. Mean operative time was 423 min (range 195-620). Average time to a clear liquid diet was 4 days. Average hospitalization was 9 days. At mean follow-up of 25 months (range 3-48), short-term complications (within 90 days) occurred in 7 patients (26 percent), including stomal revision (n=3), anastomotic leak (n=3), small bowel obstruction (n=2), wound infection (n=2), and portal vein thrombosis (n=1). Long-term complications occurred in 11 patients (41 percent), including chronic pouchitis (n=8), mild pouchitis (n=4), anal stricture (n=7), small bowel obstruction (n=6), and pouch abscess (n=1). There were no deaths. Average number of stools per 24 hours was 4.9 (range 0-10). Overall, no incontinence or pouch-related handicap was reported.

CONCLUSIONS:
Laparoscopic-assisted colectomy with ileal-pouch-anal anastomosis for ulcerative colitis and familial polyposis syndromes can be performed in pediatric patients with low morbidity, low conversion rates, and good functional outcomes. See Figure 1.

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Functional Outcome Questionnaire Results

Functional Outcome Variable[1]	Mean ± SEM[2,3,4]
Bowel movements in daytime	0.57 ± 0.22
Bowel movements at night	1.20 ± 0.41
Time spent in toilet	0.37 ± 0.21
Incontinence in daytime	0.40 ± 0.31
Incontinence at night	0.36 ± 0.22
Ability to control defecation	0.40 ± 0.21
Perianal irritation	0.14 ± 0.1[illegible]
Dietary restrictions	0.30 ± 0.20
Pouch-related medication	0.43 ± 0.20
Pouchitis	1.01 ± 0.34
Pouch-related social handicap	0.21 ± 0.14

1. Functional Outcome is a measure of the pattern of postoperative bowel movements and fecal continence
2. Functional outcome results were rated on a 5-point Likert scale according to the quality of the surgical results: 0, excellent; 1, good; 2, acceptable; 3, unacceptable; 4, poor
3. Median values were 0.00 for all variables listed
4. SEM: Standard Error of the Mean

7 LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING FOR THE TREATMENT OF ADOLESCENT MORBID OBESITY IN THE U.S.: A SAFE ALTERNATIVE TO GASTRIC BYPASS (3 MINUTES)

Ai-Xuan Le Holterman, M.D.; Mark Holterman, M.D., Ph.D.; Garth Jacobsen, M.D.; Robert Berger, M.D.; Santiago Horgan, M.D.
University of Illinois at Chicago, Chicago, IL, USA

PURPOSE:
Morbid obesity (MO) has reached epidemic proportions and has become a major public health problem in developed nations. In the adolescent with MO, early intervention can minimize obesity-related comorbidities, avoid premature mortality, improve quality of life and prevent obesity-related diseases as these patients mature into adulthood. In the U.S, the surgical management of adolescent patients meeting NIH criteria for bariatric surgery involves open or laparoscopic gastric bypass. Although these procedures have led to weight loss and improvement of comorbid conditions, justifiable concerns remain over the high incidence of post operative complications, the life-altering surgical reconstruction and long-term irreversible sequelae to the gastrointestinal tract. Based on the excellent results from large international adult series as well as the experience from our own institution with more than 300 adult patients, we offered laparoscopic adjustable gastric banding (LAGB) as an alternative to gastric bypass to eligible adolescents.

METHODS:
After medical, psychological and nutritional screening, three patients (17 to18 years of age) with a body mass index (BMI) above 40, who failed medical attempts at weight loss were selected for LAGB using the Bioenterics LAP-BAND device.

RESULTS:
The operative time was 40-90 minutes. All patients were discharged on the same day of surgery. There were no early or late complications. Two patients with follow up of at least 2 months lost 62 percent and 38 percent of their extra weight at 30 months and 3 months respectively.

CONCLUSIONS:
In this preliminary series of the U.S experience in the use of LAGB for the management of MO adolescent, the lack of operative morbidity, reduced operative time/hospital stay and encouraging initial weight loss mirror the adult experience and illustrate that LAGB can be a safe and effective alternative to gastric bypass. These encouraging results support further evaluation of LAGB as a surgical option in a comprehensive adolescent weight loss program.

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8 ERRORS IN THE MANAGEMENT OF NEWBORN CLOACAS (6 MINUTES)

Marc A. Levitt, M.D.; Alberto Pena, M.D,
Schneider Children's Hospital, North Shore - Long Island Jewish Health System, New Hyde Park, New York, NY, USA

PURPOSE:

Clinicians caring for newborns with persistent cloaca face significant challenges in the newborn period and errors in their management have dramatic implications.

METHODS:

We reviewed the medical records of 361 patients with cloaca operated on at our institution specifically focusing on sequelae resulting from incorrect management in the newborn period.

RESULTS:

Of 361 patients, 282 underwent primary operations at our institution and 79 patients were referred to us after a failed repair at other institutions. Errors in management during the newborn period included: (1) Failure to recognize and manage hydrocolpos (46 patients.) Of these, three developed pyocolpos, (2 progressed to vaginal perforation). Forty-three patients suffered from persistent bilateral hydronephrosis, megaureters, recurrent urinary tract infections, persistent acidosis, or failure to thrive due to undrained hydrocolpos, and underwent unecessary urinary drainage procedures (nephrostomy, ureterostomy, cystostomy or vesicostomy) in the newborn period. When the vagina was finally decompressed, all of these symptoms disappeared. (2) Colostomy errors occurred in 47 patients, including incorrect placement of the colostomy (too distal which interfered with the pull-through) in 24, and colostomy prolapse in 23. All of these patients required a colostomy revision prior to the main repair. (3) Clinical misdiagnoses in 42 patients including the misdiagnosis of 'intersex' in six, and misdiagnosis of a 'rectovaginal fistula' in 36 patients. In this group only the rectum was repaired and the patients were left with a urogenital sinus requiring a reoperation.

CONCLUSIONS:

Proper management of a newborn cloaca includes drainage of a hydrocolpos which avoids pyocolpos and unnecessary urinary diversions. The preferred colostomy is one with separated stomas, with adequate distal bowel for the pull through, and proper technique to avoid prolapse. Correct clinical diagnosis of cloaca avoids errors during the definitive repair.

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9 RECTAL PROLAPSE FOLLOWING PSARP FOR ANORECTAL MALFORMATIONS
(3 MINUTES)

Avraham Belizon, M.D.; Marc A. Levitt, M.D.; Gideon Shoshany, M.D.; Alberto Pena, M.D.
Schneider Children's Hospital, North Shore - Long Island Jewish Medical Center, Pediatric Surgery, New Hyde Park, NY, USA

PURPOSE:
Rectal prolapse is a known postoperative problem in children with anorectal malformations. The aim of this study was to determine the incidence of significant rectal prolapse (>5mm), objectively quantify its predisposing factors, and to offer recommendations as to its prevention and surgical treatment.

METHODS:
We reviewed our series of 1619 patients with anorectal malformations. 1169 underwent primary PSARP at our institution between 1980 and 2002, and complete records were available for 833. The series was analyzed for incidence of prolapse, type of anorectal malformation, status of the sacrum, muscle quality, associated vertebral and spinal anomalies, and postoperative constipation. A specific technique for prolapse repair was utilized.

RESULTS:
Of 833 patients, 45 developed significant rectal prolapse (3.8 percent). The mean age at the time of PSARP was 0.73 years. (range 0.19-5y). The average time to recognition of prolapse following PSARP was 13.1 months. Of these 45 patients, 32 required surgical repair and of those, 3 required a second surgical repair. The incidence of prolapse varied by complexity of anorectal defect: cloaca (6.2 percent), recto-bladderneck fistula (6.8 percent), rectourethral fistula (5.4 percent), rectovestibular fistula (1.2 percent), rectal atresia (0 percent), and rectoperineal fistula (0 percent). There was a significantly increased incidence of prolapse in patients with a low muscle quality score and in patients with vertebral anomalies (20 percent vs. 3.2 percent). The presence of a tethered cord, postoperative constipation, or the sacral ratio did not correlate with an increased incidence of prolapse.

CONCLUSIONS:
The overall incidence of significant rectal prolapse following PSARP is low. Prevention of prolapse with the PSARP technique may be due to key technical steps. Patients with higher anorectal malformations, poorer muscle quality, and vertebral anomalies had a greater risk of developing postoperative rectal prolapse. The severity of postoperative constipation and the quality of the sacrum were not predictive of postoperative prolapse.

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10 USE OF CHOLECYSTOKININ-OCTAPEPTIDE TO PREVENT TPN-ASSOCIATED GALLSTONE DISEASE* (3 MINUTES)

Susan Tsai, M.D.; Strouse J. Peter, M.D.; Robert A. Drongowski, MA; Saleem Islam, M.D.; Daniel H. Teitelbaum, M.D.
University of Michigan, Section of Pediatric Surgery, Ann Arbor, MI, USA
** Grant/research support from the Food and Drug Administration*

PURPOSE:
Gallstone formation is a common problem in neonates on prolonged courses of total parenteral nutrition (TPN). We hypothesized that the use of cholecystokinin-octapeptide (CCK), given at the time of TPN administration would prevent gallstone formation in a high-risk group of TPN patients.

METHODS:
A prospective, randomized, blinded, controlled trial of neonates who were on a prolonged course of TPN for prematurity (25 infants), necrotizing enterocolitis (8) or abdominal surgery (5) were randomized to receive CCK vs. placebo. Patients remained on study drug until taking >50 percent of calories enterally. Although primary outcome measure was TPN-cholestasis (data to be presented seperately), a secondary outcome measure was gallstone formation. Children were recalled between 2 and 4 years after completing TPN for ultrasonographic examination of their hepatobiliary tree. Statistical analysis included Chi square and logistic regression with $P<0.05$ being significant.

RESULTS:
Neonates (39 studied) required a mean of 33±16 days of TPN (mean±SD). Cholelithiasis was detected in 4 infants (10 percent). CCK was not effective in preventing formation of gallstones (3 stones in infants receiving CCK, $P=0.51$). Diagnosis ($P=0.56$), birthweight ($P=0.54$), gestational age ($P=0.18$), and duration of TPN ($P=0.53$) did not correlate with gallstone formation. To address the management of these stones, all four were placed on a prolonged course of ursodeoxycholic acid (mean duration 11.6±5.4 months). Two additional infants (not in original study) had TPN-associated gallstone disease and were also given a trial of ursodiol. Serial ultrasounds were performed every six months. No patient achieved any degree of stone dissolution. One patient underwent cholecystectomy for symptomatology.

CONCLUSIONS:
TPN-associated gallstones were detected in 10 percent of children, and most are non-symptomatic. CCK prophylaxis was not effective in preventing TPN-associated gallstones. Additionally, use of ursodeoxycholic acid did not dissolve gallstones, once identified. Future methods will be needed to address the prevention and treatment of these stones.

Notes

Underlining denotes the author scheduled to present at the meeting.

11 GROWTH HORMONE ADMINISTRATION IMPAIRS THE BILE DUCT CELL PROLIFERATIVE RESPONSE TO BILE DUCT INJURY IN MICE (3 MINUTES)

Minhua Wang, Ph.D.; Ai-Xuan Holterman, M.D.
University of Illinois at Chicago, Chicago, IL, USA

PURPOSE:
The bile duct epithelial cell (BEC) response to biliary obstruction is proliferation. Adenovirus mediated overexpression of HNF-6 (a hepatocyte transcription factor which regulates biliary development and the expression of hepatic genes essential to liver function) has been shown to attenuate this response. In vivo, HNF-6 is transcriptionally regulated by growth hormone (GH). We test the hypothesis that GH has similar antiproliferative effect on BEC activity during biliary obstruction.

METHODS:
GH or PBS was injected I.P into CD1 mice for 24 hours after sham surgery (Sh) or bile duct ligation (BDL) (PBS/Sh or BDL (n=4) and GH/Sh or BDL (n=6)). HNF-6 immunostaining, BrdU labeling and liver IGF-1 and HNF-6 mRNA were evaluated. BEC were counted and proliferative activity was derived from the ratio of BrdU positive BEC cells over total BEC count (300-500 cells/mouse).

RESULTS:
GH administration upregulates liver IGF-1 mRNA (confirming the efficacy of GH treatment), as well as HNF-6 mRNA and nuclear protein expression in hepatocytes and BEC. After BDL, HNF-6 mRNA expression declines by 5 fold relative to Sh mice. This is associated with BEC proliferative rate of 14 percent+/- 6 percent. GH mediated overexpression of HNF-6 in GH/BDL mice (increase of 3 fold over PBS/BDL) was associated with diminished BEC proliferation to 5 percent +/- 1 percent (p=0.01).

CONCLUSIONS:
In this model of acute biliary injury, GH-mediated HNF-6 overexpression attenuates the biliary cell proliferative response to bile duct obstruction, suggesting that GH antiproliferative effect may be in part mediated by HNF-6. Since activated BEC can mediate fibrosis by producing extracellular matrix proteins or recruiting profibrotic proinflammatory cellular mediators and cytokines, GH treatment during biliary injury may potentially attenuate or delay the development of biliary cirrhosis by inhibition of BEC activation. The effects of GH on biliary cell function in chronic biliary obstruction model is currently investigated for its potential role in antifibrotic strategies.

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12 CT SCAN IS ACCURATE IN THE DIAGNOSIS OF BOWEL OBSTRUCTION IN CHILDREN (3 MINUTES)

Jennifer L. Bruny, M.D.; David A. Partrick, M.D.; Richard J. Hendrickson, M.D.; Fredrick M. Karrer, M.D.; John D. Strain, M.D.; Denis D. Bensard, M.D.
The Children's Hospital, University of Colorado, Denver, CO, USA

PURPOSE:
Clinical parameters of small bowel obstruction (SBO) are unreliable in children. Early use of contrast radiography has been shown to reduce the complications associated with delayed diagnosis of SBO. The use of computed tomography (CT) in the assessment of SBO has been investigated in adults, but its utility as a diagnostic modality in children is unclear. The purpose of this study is to evaluate the accuracy of CT scan in children with suspected SBO.

METHODS:
Data was collected from 42 children over a two-year period who received a CT as part of their diagnostic work up. Clinical course and operative findings were used as standards to evaluate the CT-based diagnosis.

RESULTS:
Twenty-one CT scans were positive for SBO. Sixteen (76 percent) were confirmed by laparotomy and eleven CTs revealed accurate descriptions for the cause and location of obstruction. Operative findings included one intussusception (Meckel's diverticulum), one peristomal hernia, one malrotation with volvulus, three internal hernias, and 10 with adhesive obstruction. Five children with positive CTs were managed nonoperatively; two cystic fibrosis patients with distal intestinal obstructive syndrome, one with SMA syndrome, and two with pseudo-obstruction. Twenty CT scans were negative for SBO. Laparotomy identified SBO in three of these patients; two from adhesions and one with cecal volvulus.

CONCLUSIONS:
The overall accuracy of CT for diagnosis of SBO in children was 93 percent with a sensitivity of 88 percent and specificity of 100 percent. This compares favorably with the reported 95 percent sensitivity and 75 percent specificity of contrast radiographic studies. Further benefits of CT include the ability to reveal the location and etiology of the intestinal obstruction. CT is also readily available and a more expedient method then standard intestinal contrast studies. These data support CT as an effective diagnostic modality for SBO in children.

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Session II: Congenital Diaphragmatic Hernia and Thoracic Diseases

10:30 a.m. – Noon

13 SURVIVAL OF SEVERE CONGENITAL DIAPHRAGMATIC HERNIA HAS MORBID CONSEQUENCES (6 MINUTES)

Raul A. Cortes, M.D.; Roberta L. Keller, M.D.; Tiffany Townsend, M.D.; Michael R. Harrison, M.D.; Diana L. Farmer, M.D.; Hanmin Lee, M.D.; Robert Piecuch, M.D.; Maria Hetherton, CS; Carol Leonard, Ph.D.; Robin Bisgaard, R.N.; Kerilyn K. Nobuhara, M.D.
University of California San Francisco, San Francisco, CA, USA

PURPOSE:
A recent randomized NIH-sponsored trial comparing optimal perinatal care to fetal tracheal occlusion for the most severe left sided hernias showed no difference in early mortality. We studied the survivors to determine long term morbidity. We report 1- and 2-year assessments of growth and nutrition, neurodevelopmental outcome, respiratory status, rehospitalizations and additional operations.

METHODS:
16 of 24 infants randomized to either fetal tracheal occlusion (7) or standard care (9) survived. All returned to our institution for neurodevelopmental evaluation and testing (Bayley Scales), anthropometric/nutritional assessment, medical/surgical evaluation with CXR and echocardiography at one and two years. Data were analyzed by logistic regression, the Mann-Whitney rank-sum test, Fisher's exact test, and t-test.

RESULTS:
There was striking morbidity in all patients, but no significant differences between groups in rehospitalization rates, hernia recurrences, oxygen requirements, neurodevelopmental delay, growth characteristics, suspected or affirmed hearing loss, or in CXR and echocardiography abnormalities ($p>0.5$.) Both groups demonstrated severe growth delay at 1 and 2 yr (mean z score for weight [kg]: -2.56, -1.00.) Suspected or affirmed hearing loss was found in 38 percent of the population. 50-65 percent were characterized as suspect or abnormal for cognitive or neuromotor outcome at 1yr and for neuromotor outcome at 2yrs.
Neurodevelopmental abnormalities were most strongly associated with the need for oxygen support at neonatal discharge ($p<.05$) or the presence of oxygen support at either followup appointment ($p<.02$ and $p<.05$.)

CONCLUSIONS:
As previously described, a number of comorbidities have been identified in patients with severe CDH. While gestational age and birth weight differed as a consequence of fetal intervention, no significant differences were found between the groups. Both populations demonstrate severe failure to thrive and significant neurodevelopmental delay and hearing loss. These long-term effects reaffirm the true morbidity of severe congenital diaphragmatic hernia.

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14 ECMO IS UNLIKELY TO SALVAGE CDH NEONATES REFRACTORY TO PERMISSIVE HYPERCAPNEA/SPONTANEOUS RESPIRATION AND DELAYED SURGERY

(3 MINUTES)

Jae-O Bae, M.D.; Jen-Tien Wung, M.D.; Eric L. Lazar, M.D.; Charles J. Stolar, M.D.
Children's Hospital of New York, New York, NY, USA

PURPOSE:
Neonates with Congenital Diaphragmatic Hernia (CDH) and pulmonary hypertensive respiratory failure refractory to "conventional" respiratory care have benefited from extracorporeal membrane oxygenation (ECMO). Improving respiratory care has decreased the pool of potential ECMO candidates, yielding a selected population of more challenging CDH patients. We asked if this population is so selected as to be refractory to ECMO.

METHODS:
A retrospective, non-selected, single institution population of in-born CDH neonates was reviewed. This is a contemporary series (1/1/00 to 10/31/03). Survival was defined as discharged to home with no cardio-respiratory support. ECMO was indicated by 90 percent mortality likelihood and evidence of potential adequate lung parenchyma (pre-ductal SaO2 >90 percent with conventional therapy). ECMO was not offered for pre-ductal SaO2 <90 percent. Conventional respiratory care was spontaneous respiration/permissive hypercapnea (gentle ventilation), with delayed surgery -- when pulmonary hypertension had maximally resolved with minimal ventilator, pharmacologic, or ECMO support. Survival with and without ECMO was analyzed using Fisher's Exact test. Record review was approved by the Institutional Review Board.

RESULTS:
50 consecutive in-born, CDH patients were identified (48/50 antenatally diagnosed). 44/50 (88 percent) were managed without ECMO, 37/44 (84 percent) survived. 7/44 (16 percent) died--5 (11 percent) with inadequate lung parenchyma, 1 genetic syndrome, 1 complex congenital heart disease. 6/50 (12 percent) were managed with ECMO, all with transient SaO2 > 90 percent before developing 90 percent mortality likelihood. All died - 5 during acute hospitalization; 1, 9 months later with cor pulmonale. Aggregate in-born survival was 38/50 (76 percent). Infants treated with ECMO have a significantly worse survival than those not so treated ($p<.0001$).

CONCLUSIONS:
In-born neonates with CDH refractory to stabilization by permissive hypercapnea/spontaneous respiration and delayed surgery are unlikely to be salvaged by ECMO. ECMO need may reflect iatrogenic/respiratory care issues rather than "patient's disease". Alternatively, this highly selected population constitutes a candidate pool for experimental therapies.

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15 MANAGEMENT AND LONG-TERM FOLLOW UP OF PATIENTS WITH TYPE III AND IV LARYNGOTRACHEOESOPHAGEAL CLEFT (6 MINUTES)

Akemi L. Kawaguchi, M.D.; Daniel P. Ryan, M.D.; Patricia K. Donahoe, M.D.
Massachusetts General Hospital for Children, Boston, MA, USA

PURPOSE:

Laryngotracheoesophageal cleft (LTEC) is a rare congenital anomaly that occurs when the trachea and esophagus fail to separate during fetal development. The two most severe forms of LTEC are type III, with extension of the cleft to the carina, and Type IV, with extension of the cleft into one or both mainstem bronchi.

METHODS:

Over the past 25 years, we have treated nine patients with severe LTEC, including six with type III and three with type IV. We studied the clinical management of these nine patients and surveyed the seven surviving patients for long-term follow up.

RESULTS:

The diagnosis of severe LTEC may be suspected in newborns with respiratory distress, cyanosis with feedings, and a unique hoarse cry. Initial intubation may be difficult as the endotracheal tube frequently slips posteriorly into the esophagus. Diagnosis is best made by rigid bronchoscopy, and designs of endotracheal and tracheostomy tubes must be individualized for each patient's unique anatomy. Since most deaths from severe LTEC result from aspiration and chronic lung disease, all measures to prevent aspiration must be employed. Patients with Type III (4/6) and IV (3/3) LTEC have an extremely high incidence of microgastria, which makes fundoplication an ineffective treatment for reflux. The use of gastric feeding often does not result in increased stomach volume and may cause severe aspiration. We suggest stomach division with later reconstruction of intestinal continuity with a modified Lawrence pouch in patients with microgastria. Recurrent fistulas occurred in eight of nine patients. Generous interposition of tissue with multiple-layer closure has helped to prevent further recurrences.

CONCLUSIONS:

Diagnostic techniques, individualized airway management with customized stents and endotracheal tubes, meticulous operative repair, postoperative management, and long-term follow up including respiratory and digestive function, school performance, and quality of life for the surviving patients will be described.

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16 THE MINIMALLY INVASIVE NUSS TECHNIQUE FOR RECURRENT OR FAILED PECTUS EXCAVATUM REPAIR IN 50 PATIENTS (3 MINUTES)

Daniel P. Croitoru, M.D.; Robert E. Kelly, Jr.*, M.D.; Michael Goretsky*, M.D.; Donald Nuss*, ChB*
Children's Hospital of The King's Daughters, Norfolk, VA, USA
** Drs. Croitoru, Kelly and Nuss are consultants for Walter Lorenz Surgical.*

PURPOSE:
To demonstrate the efficacy of the minimally invasive technique for recurrent pectus excavatum.

METHODS:
50 patients with recurrent pectus excavatum underwent repair using the minimally invasive technique. Data were reviewed for preoperative symptomatology, surgical data, and long-term results.

RESULTS:
Prior repairs included 28 open Ravitch procedures, 22 minimally invasive (Nuss) procedures and 2 Leonard procedures. The prior Leonard patients were also a previous Ravitch and a previous Nuss and are therefore counted only once in the analyses. The median age was 16.8 (age range 5 to 25 years). The median CT index was 5 (range 2.9 to 20). Presenting symptoms included shortness of breath (80 percent), chest pain (70 percent), asthma or asthma symptoms (26 percent), and frequent upper respiratory tract infections (14 percent). CT scans and cardiac evaluations confirmed cardiac compression (62 percent), cardiac displacement (70 percent), mitral valve prolapse (22 percent), murmurs (24 percent), and other cardiac abnormalities (30 percent). Preoperative pulmonary function tests demonstrated values below 80 percent normal in over 50 percent of patients. Pectus repair was done using either a single pectus bar (66 percent), two bars (32 percent), or 3 bars (2 percent). Stabilizers were utilized in 88 percent of the patients. Complications were higher than in primary repairs and included pneumothorax requiring chest tube (18 percent), hemothorax (8 percent), pleural effusion requiring drainage (6 percent), pericarditis (4 percent), pneumonia (2 percent), and wound infection (2 percent). There were no deaths or cardiac perforations. Initial post-operative results were excellent in 72 percent, good in 26 percent, and fair in 2 percent. Late complications of bar shift requiring revision occurred in 8 percent. Sixteen patients have had bar removals with 10 patients having greater than one year of followup. Excellent longterm results have been maintained in 50 percent, good in 31.2 percent, and fair in 6 percent. There have been no recurrences post-removal.

CONCLUSIONS:
Although failed or recurrent pectus excavatum repairs are technically more challenging, reoperative correction by the Nuss procedure has met with excellent success.

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17 THE OPERATIVE MANAGEMENT OF ASPHYXIATING THORACIC DYSTROPHY AFTER PECTUS REPAIR (3 MINUTES)

Thomas R. Weber, M.D.
St. Louis University, St. Louis, MO, USA

PURPOSE:
Asphyxiating thoracic dystrophy (ATD) can occur years after a "Ravitch" type repair of pectus excavatum, resulting in debilitating alteration in pulmonary function. An operation was devised to attempt repair of this deformity.

METHODS:
After IRB approval, the records of 10 children (ages 9-18 yr) with ATD that developed 4-12 years postpectus operation, who underwent attempted repair of ATD were reviewed. Data obtained before ATD operation and at 6,12, and 24 mos afterwards included chest CT, pulmonary functions (PFT), and a quality of life questionaire. The operation consisted of sternal split with rib graft placement to permanently hold the sternum apart.

RESULTS:
All children survived and healed the bone grafts solidly. CT showed a change from a flat to a round chest contour on crossection, with increased AP dimension. The results of the PFT's were:

	% Predicted			
	Pre-op (n=10)	6 mo (n=10)	12 mo (n=7)	24 mo (n=5)
FVC	52	54	65	68
FEV1	51	50	60	63
FEF	62	65	70	75
PEF	54	60	62	70

Two patients had no change in PFT at 24 mo. All patients reported improved exercise tolerance, and three began sports activities who were previously unable to do so. Two patients on oxygen, essentially bedridden are now active, breathing only room air. Seven of 10 patients continue to have cosmetic concerns.

CONCLUSIONS:
A small population of postoperative pectus repair patients develop severe, debilitating ATD. The repair described improves most patients, some dramatically, but does not significantly improve cosmetic appearance. The operation is undergoing further refinement to address these issues.

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18 IMPACT OF PECTUS EXCAVATUM ON PULMONARY FUNCTION BEFORE AND AFTER REPAIR WITH THE NUSS PROCEDURE (3 MINUTES)

Louise Lawson, Ph.D.; Robert Mellins, M.D.; Meredith Tabangin, MA; Robert Kelly†, M.D.; Michael Goretsky, M.D.; Daniel Croitoru, M.D.; Donald E. Nuss*, M.D.*
Children's Hospital of the King's Daughters, Norfolk, VA, USA
** Dr. Croitoru received material support from Walter-Lorenz Surgical.*
† Dr. Kelly received a grant from Walter-Lorenz Surgical.

PURPOSE:
Patient reports of pre-operative exercise intolerance and improvement following surgical repair of Pectus Excavatum (PEx) have been documented but not substantiated in laboratory studies. This may be due to the fact that no study has been large enough to determine if pulmonary function tests (PFT's) in the PEx population are significantly different from the normal population, and none has assessed improvement in pulmonary function following Nuss bar removal.

METHODS:
We studied PFT results in 408 PEx patients pre-repair and in a subset of 45 patients post-Nuss procedure and bar removal. Significance of differences in percent predicted (using Knudson's equations) was tested using t-tests (parametric) or Wilcoxon Signed Rank tests (non-parametric). Normal was defined as 100 percent of predicted for FVC, FEV1, and FEF25 percent-75 percent (FEF).

RESULTS:
Pre-operatively, FVC and FEV1 medians were lower than the normal by 13 percent, while the FEF median was lower than normal by 20 percent (all $p<0.01$). The post-operative group had statistically significant improvement following surgery for all parameters. Patients older than 11 years at the time of surgery had lower pre-operative values and larger mean post-bar removal improvement than the younger patients (Figure). An older patient with a pre-operative FEF score of 80 percent of normal would be predicted by these data to have a post-operative FEF of 101 percent, indicating complete normalization.

CONCLUSIONS:
These results are consistent with Pectus Excavatum patients having decreased pulmonary function relative to normal patients. Greater improvement following repair in the older patients is most likely due to greater pre-operative deterioration of lung function and more room for improvement. This improvement, while mild, is consistent with patient reports of post-operative increases in exercise tolerance and indicates the need for more in depth tests of pulmonary function during rest and exercise in the evaluation of Pectus Excavatum.

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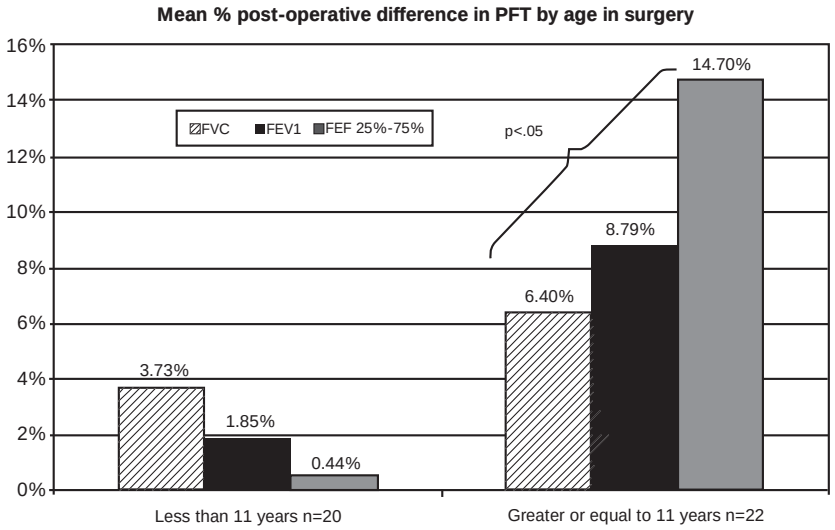

Figure: Pectus Excavatum Patients Post Nuss Bar Removal

19 PRIMARY VERSUS DELAYED SURGERY FOR SPONTANEOUS PNEUMOTHORAX IN CHILDREN: WHICH IS BETTER? (3 MINUTES)

Faisal G. Qureshi, M.D.; Vlad C. Sandulache, B.S.; Ward Richardson, B.S.; Orkan Ergun, M.D.; Henri R. Ford, M.D.; David J. Hackam, M.D., Ph.D.
Children's Hospital of Pittsburgh, Pittsburgh, PA, USA

PURPOSE:
Controversy exists regarding the timing of surgery for spontaneous pneumothorax (SP), which can be performed either at the first presentation or for recurrent episodes of SP. Delayed surgery is often performed based on the purported low recurrence rate of SP treated non-operatively, and the historical morbidity of open surgery. However, the effectiveness of VATS blebectomy/pleurodesis has raised the possibility of performing primary VATS in all patients. We therefore hypothesized that primary VATS is safe and effective for SP, and sought to perform a cost-benefit analysis of primary versus secondary VATS.

METHODS:
After IRB approval, consecutive patients with SP (1991-2003) and no co-morbidities were retrospectively divided into primary (PV) versus secondary VATS (SV). Demographics, recurrent pneumothorax after VATS, length of stay and costs were compared by Student t-test/chi-square. The predicted incremental cost of PV was: [cost of primary VATS] minus [cost of non-operative treatment (1-minus recurrence rate)+cost of secondary VATS (recurrence rate]. Data are MEAN±SEM.

RESULTS:
There were 54 spontaneous pneumothoraces in 43 patients (11 bilateral), of whom three were excluded due to open thoracotomy. Of 51 pneumothoraces, non-operative treatment was attempted in 37, of whom 20 recurred requiring secondary VATS. Primary VATS was performed in 14. Both groups had similar age, gender, weight, height, admission HR and room air oxygen saturation (Table). Total treatment length of stay was significantly shorter for PV versus SV. However, morbidity from recurrent pneumothorax after VATS occurred more frequently after PV (Table). Based on the observed recurrence rate of 62 percent, performing PV on all patients with SP would increase cost by $2,529 per patient, and require a recurrence rate of >72 percent to financially justify this approach.

CONCLUSIONS:
Contrary to our hypothesis, the increased morbidity and cost do not justify a strategy of primary VATS blebectomy/pleurodesis in children with spontaneous pneumothorax. Instead, secondary treatment is recommended.

Notes

Factor	Primary VATS	Secondary VATS	Significance
Age (yr)	14.9±0.39	16 [14 4	NS
Gender (M/F)	13/1	17/3	NS
Weight (Kg)	60.6±2.8	60.1±2.1	NS
Height (cm)	176 ±2.3	174 ±2.1	NS
Heart rate (bpm)	83 ±4.2	79 [4.8 2	NS
Oxygen Sat (room air (%)	98±1	98±1	NS
Length of stay after VATS (days)	5.4±1.1	4±0.4	NS
Overall treatment charges (±SD)	23713±2149	38736±5678	NS
Recurrence after VATS total pts	4/14	5/20	P=0.02
Total length of stay (days)	7.1±0.66	10.5±1.2	P=0.04

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20 A PROSPECTIVE COMPARISON OF THORACOSCOPIC VS. OPEN ANTERIOR INSTRUMENTATION AND SPINAL FUSION FOR IDIOPATHIC THORACIC SCOLIOSIS IN CHILDREN (3 MINUTES)

Harsh Grewal, M.D.; Randal R. Betz, M.D.; Linda P. D'Andrea, M.D.; David H. Clements, M.D.; Scott Porter, M.S.
Temple University Children's Hospital & Shriner's Hospital for Children, Philadelphia, PA, USA

PURPOSE:
The management of scoliosis in children has been evolving; anterior discectomy with anterior instrumentation and spinal fusion (AISF) may be of benefit compared to a combined anterior and posterior or a posterior-only approach. Since thoracoscopically assisted AISF (TAISF) has the advantage of muscle sparing, superior cosmesis and less pain, we prospectively compared TAISF with open AISF (OAISF) to evaluate whether they were equivalent.

METHODS:
All children undergoing AISF for idiopathic thoracic scoliosis were prospectively evaluated. Descriptive statistics are reported as means and standard deviations. Groups were compared using the independent samples T-test with Levene's test for equality of variances; a two-tailed p 0.05 was considered significant.

RESULTS:
155 children with at least one-year follow-up were included. OAISF was performed in 114, TAISF in 41. There were 126 females and 29 males. Mean age was similar (years-14±3 vs. 14.3±1.5, p=0.5), as was weight (kg-54.2±19 vs. 54.6±23, p=0.9). There were no differences in pre-operative thoracic curves (degrees-48.5±14; vs. 49.8± p=0.6); or the number of vertebral levels instrumented (7.7±1.3 vs. 7.6±0.7, p=0.7). Pre-operative lung function (FEV,FVC,TLC) were similar in the groups. Operative time was shorter with OAISF (minutes-383±65 vs. 508±98, p<0.01); and there was less estimated blood loss (ml-924±724 vs. 1218±747, p=0.03). The OAISF group took longer to extubate (days-1.4±1.2 vs. 1±0.3, p=0.03); and had slightly greater chest tube drainage (ml-1710±730 vs. 1639±5151, p=0.5). There was no difference in length of hospitalization (days-10.5±5.6 vs. 11.3±6.3, p=0.4). Post-operative follow-up was similar in the groups (years-1.8±1.4 vs. 1.5±1.2, p=0.2). At one-year follow-up, thoracic curves were similar (degrees-17.5±8 vs. 15.2±7.5, p=0.1)and percentage correction of thoracic curve was similar (64 percent vs. 69 percent).

CONCLUSIONS:
A single stage thoracoscopic AISF is safe and effective in correcting idiopathic thoracic scoliosis with results (correction of deformity) equivalent to open AISF. Although TAISF takes longer and has more blood loss, it spares cutting muscle, reduces ventilator hours and has superior cosmesis.

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21 PROSPECTIVE DETERMINATION OF THE INCIDENCE OF VOCAL CORD PARALYSIS AFTER PATENT DUCTUS ARTERIOSUS LIGATION (3 MINUTES)

Martin L. Blakely, M.D.; Kevin D. Pereira, M.D.; Charles S. Cox, Jr., M.D.; Sheela Matthews, R.N.; Kevin P. Lally, M.D.*
University of Texas, Houston, TX, USA
** Dr. Blakely receives grant/research support from the NIH.*

PURPOSE:
Prior retrospective studies have reported an incidence of left vocal cord (VC) paralysis after PDA ligation of >20 percent in extremely low birth weight infants. These studies were limited to symptomatic patients only, indicating that the true incidence may be higher. The purpose of this study was to prospectively document the true incidence of left VC paralysis, from presumed recurrent laryngeal nerve injury, after PDA ligation in unselected patients.

METHODS:
A prospective cohort study of all premature infants undergoing PDA ligation over a 3-year period. Flexible laryngoscopy was performed after extubation to assess VC status. Data regarding preoperative patient characteristics, operative details, and postoperative outcome were collected.

RESULTS:
100 patients were enrolled (106 eligible). Median birth weight was 740 grams; gestational age 25 weeks; age at operation 23 days; and weight at operation 914 grams. Laryngoscopy was done on average 8 days post-extubation. Among 61 infants undergoing laryngoscopy, seven cases of left VC paralysis were identified; incidence of 11.5 percent. 15 patients died prior to extubation, 16 currently await extubation, and four underwent tracheostomy due to tracheomalacia, and did not undergo laryngoscopy. Patients with VC paralysis had a longer duration of mechanical ventilation post-PDA ligation (49 versus 27 days, $p = .05$). Other preoperative patient characteristics and outcome measures were similar between those with or without VC paralysis. Two patients with VC paralysis were symptomatic with either stridor, weak cry, or feeding difficulty.

CONCLUSIONS:
The incidence of VC paralysis (11.5 percent) is lower than previously reported. The majority of patients with unilateral VC paralysis are asymptomatic. Post-operative duration of ventilation is prolonged in these patients, however, the long-term impact remains ill defined. This incidence rate indicates that further refinements in the operative approach are needed.

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8 a.m. – 10 a.m.

22 QUALITY ASSESSMENT OF SURGERY FOR WILMS TUMOR: REPORT OF NWTS-5
(6 MINUTES)

Peter F. Ehrlich, M.D.; Robert C. Shamberger, M.D.; Michael L. Ritchey, M.D.; Tomas E. Hamilton, M.D.; Gerald M. Haase, M.D.; Paul Grundy, M.D.; Daniel Green, M.D.; Patricia Norkool; Jennifer Becker
CS Mott Children's Hospital, University of Michigan, Ann Arbor, MI, USA

PURPOSE:
Surgical technique impacts both local tumor stage and risk of local recurrence in Wilms tumor. A surgical quality assurance program was part of National Wilms Tumor Study–5 to assess protocol compliance.

METHODS:
Surgical checklists, operative and pathology reports were reviewed concurrently to arrive at the final local tumor stage. If a protocol violation occurred a letter was sent to the responsible surgeon. Tumor laterality, extent, type of resection, contralateral exploration, node involvement, spills and local recurrence were reviewed. Relative risk and logistic regression analyses were performed.

RESULTS:
There were 1305 nephrectomies (table 1). Lymph node sampling was not performed in 117 (9 percent) patients: stage I 41 (11.5 percent), stage II 57 (12 percent) and stage III 19(4 percent). Of importance, 41 percent (187/457) of stage III cases were designated stage III solely based on positive lymph nodes. Tumor spill occurred in 19.3 percent (253/1305) children. 54 local spills were in stage II tumors and 97 in stage III. Diffuse spill occurred in 102 patients with stage III tumors. Seventeen preoperative and 13 intraoperative biopsies were performed. Intraoperative tumor rupture was the most common cause of tumor spill accounting for 139 (55 percent) spills. Nineteen (7.5 percent) children were upstaged receiving more intensive therapy due to spill. Included in the group were 3/17 preoperative biopsies and 5/13 intraoperative biopsies. Thirteen of 253 spills were determined to be avoidable. Eight were biopsies, 5 because tumor was transected in the renal vein (4) or ureter (1). In Stage II patients where lymph nodes were not sampled there is an increase in local relapse rate that did not achieve statistical significance due to the small number of events.

CONCLUSIONS:
Although most surgeons complied with the surgical guidelines, numerous deviations were identified including failure to sample lymph nodes (117cases) and unnecessary biopsies leading to tumor spill (30cases). Protocol violations have an adverse impact on tumor staging, potentially increasing the risk for local tumor recurrence or intensity and toxicity of therapy.

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Nephrectomy (1305)	
	N (%)
Right	515 (47%)
Left	553 (53%)
Extent of Tumor	
Confined to Kidney	1247 (90%)
Extended to Renal Vein	52 (4%)
Extended to IVC	23 (1.6%)
Ruptured Before Surgery	1 (0.07%)
Not Defined	182 (7.4%)

Table 1: NWTS-5 Tumor Demograhics

23 OPEN BIOPSY IS SUPERIOR TO NEEDLE FOR DETECTION OF ANAPLASIA IN PATIENTS WITH BILATERAL WILMS' TUMOR (3 MINUTES)

Thomas E. Hamilton, M.D.; Daniel Green, M.D.; Elizabeth Perlman, M.D.; Paul Grundy, M.D.; Michael L. Ritchey, M.D.; Robert C. Shamberger, M.D.
Maine Children's Cancer Program, Portland, ME, USA

PURPOSE:
To determine if biopsy technique influences the ability to identify anaplastic histology in bilateral Wilms' tumor.

METHODS:
The authors reviewed the charts of 27 children enrolled in the fourth National Wilms Tumor Study Group (NWTSG -4) with bilateral tumors and anaplastic histology. Biopsy technique and time interval to diagnosis of anaplasia was determined.

RESULTS:
Tissue for initial diagnosis was obtained by needle technique in seven patients (percutaneous 3, CT guided 2, laparascopic 1, open 1). Open bilateral biopsies were obtained in nine patients. Partial/complete nephrectomy was performed in eight patients. Three children received chemotherapy before obtaining tissue. No patients (0/7) had anaplasia detected by needle biopsy. For these seven patients the average duration of first regimen chemotherapy (DD or EE) was 29 weeks before subsequent partial or complete nephrectomy identified anaplasia. Open biopsy identified anaplasia in 3/9 patients. In the six patients found to have favorable histology on initial open biopsy, the time interval from initiation of chemotherapy to surgical resection was 24 weeks. For patients with partial/complete nephrectomy as the initial diagnostic method, anaplasia was identified in 7/8 patients. The remaining patient underwent a total left nephrectomy and partial right nephrectomy initially showing favorable histology. Three years later a completion right nephrectomy demonstrated anaplastic histology.

CONCLUSIONS:
The use of needle techniques for initial biopsy in patients with bilateral Wilms' tumor did not identify anaplasia. Open biopsy and partial/complete nephrectomy identified anaplasia at initial diagnostic procedure in 10/17 patients. Earlier nephron-sparing surgery will identify anaplastic histology and limit duration of chemotherapy targeted to favorable histology for patients with bilateral Wilms' tumor and anaplasia.

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24 PRE-OPERATIVE CHEMOTHERAPY FOR TREATMENT OF WILMS TUMOUR REDUCES TUMOUR RUPTURE RATES AND OVERALL BURDEN OF THERAPY: RESULTS FROM THE UNITED KINGDOM CHILDRENÍS CANCER STUDY GROUP (UKCCSG) Third Wilms Tumour Trial (UKW3) (6 minutes)

Jenny Walker; Boo Messahel***; Carolyn Hutton**; John Imeson**; Chris Mitchell†; Rosemary Shannon††; Kathy Pritchard-Jones***; Peter Gornall†††*

** Sheffield Children's Hospital, Sheffield, United Kingdom*

*** UKCSG Data Centre*

**** Royal Marsden Hospital*

† John Radcliffe, Oxford

†† Leicester Royal Infirmary

††† Birmingham Children's Hospital

PURPOSE:

To address a major question in the management of Wilms tumour (WT): Does pre-operative chemotherapy result in fewer surgical complications and less overall burden of therapy?

METHODS:

Data on all patients entered into the UKW3 trial was obtained from the UKCCSG Data Centre, including review of individual surgical records. UKW3 (1991–2001) was a randomised comparison of two surgical approaches in the management of localized Wilms tumour: immediate nephrectomy or percutaneous biopsy, 6 weeks pre-operative chemotherapy with vincristine and actinomycin D followed by delayed nephrectomy at week 7. Eligibility criteria were: age 0.5-16yrs, clinical and imaging features compatible with unilateral, non-metastatic WT and tumour considered 'operable' by the surgeon ('inoperable'=IVC extension or large tumour obscuring hilar access). In total, UKW3 registered 843 patients with a newly diagnosed intrarenal tumour, representing >95 percent of all such cases in the UK. Post-operative therapy depended on tumour stage (NWTSG 4 definitions) determined following nephrectomy.

RESULTS:

205/525 eligible patients were randomly assigned to either immediate nephrectomy (n=103) or delayed nephrectomy after preoperative chemotherapy (n=102). Reasons for non-randomisation included parental refusal (102) or surgical preference for operative approach (immediate nephrectomy=104, pre-op chemo=99). The UKW3 trial achieved its two main aims: there was a more favourable stage distribution after pre-op chemotherapy among randomised patients: stage I (66.7 percent v 55.3 percent), stage II (23.3 percent v 14.9 percent), stage III (10.0 percent v 29.8 percent) (Chi-squared, p=0.004). There was also a significant reduction in surgical complications, particularly tumour rupture. Surgical complications were still less in the eligible but non-randomised patients treated with pre-op chemo, in spite of the probable selection bias of larger tumours for this approach.

CONCLUSIONS:

Nephrectomy for Wilms tumour is facilitated by pre-operative chemotherapy. The results of UKW3 have led the UKCCSG to adopt this approach to the management of Wilms tumour.

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	Randomized pts		P value	Non-randomized		P value
Surgical complication	Immediate Nephrectomy (n = 102)	Pre-op chemotherapy (n = 112)		Immediate nephrectomy (n = 180)	Pre-op chemotherapy (n = 103)	
Rupture	15 (14.6%)	5 (0%)	0.009662*	10 (5.5%)	6 (5.8%)	0.47*
Other surgical complications	6 (5.8%)	1 (1.0%)	0.12**	12 (6.6%)	7 (6.8%)	0.95*
Any surgical complication	21 (20.4%)	1 (1.0%)	0.0000032*	28 (14.9%)	13 (12.6%)	0.61*
Relative risk of any surgical complication	20.8 (CI 2.9 - 152)			1.17 (CI 0.66 - 2.17)		

*Chi-squared **Fisher's exact test

25 COX-2 INHIBITION IS ANTIANGIOGENIC IN EXPERIMENTAL WILMS TUMOR

(3 MINUTES)

Jason S. Frischer, M.D.; Jianzhong Huang, M.D.; Alice Lee, M.D.; Anna Serur, M.D.; Darrell Yamashiro, M.D., Ph.D.; Jessica J. Kandel, M.D.
Children's Hospital of New York-Presbyterian, New York, NY, USA

PURPOSE:
The inducible enzyme cyclooxygenase-2 (COX-2), initially implicated in inflammation, also functions in many human epithelial cancers. COX2 is a key regulator of the physiologic response to hypoxia, via antagonism of the Von-Hippel-Lindau tumor suppressor, which in turn regulates vascular endothelial growth factor (VEGF)expression. Given that Wilms tumors (WT) are cancers arising from errors in the mesenchymal-to-epithelial transition, and previous evidence that VEGF expression critically modulates growth of experimental WT, we hypothesized that (1) WT express COX-2, and (2) COX-2 blockade would suppress WT growth and angiogenesis.

METHODS:
10(6) cultured human WT cells (SK-NEP-1) were implanted intrarenally in athymic mice (N=40). At 7 days, treatment with vehicle or the COX-2 inhibitor SC-236 was begun (delivered in drinking water; N=20 each). Control/treated cohorts (N=10 each) were euthanized at 28 and 35 days. COX-2 was localized in tumors by immunohistochemistry. Vasculature was assessed by lectin perfusion, specific immunostaining for endothelium and vascular smooth muscle, and quantitated by mean vascular density (MVD). Endothelial apoptosis was determined by specific double-label immunostaining. VEGF was localized by in situ hybridization. Tumor weights and MVD were compared using Kruskal-Wallis analysis.

RESULTS:
COX-2 was highly expressed in WT xenografts. Tumor growth was significantly suppressed by COX-2 blockade at both 28 (78 percent, p=0.0004) and 35 days (55 percent, p=0.0007). Perfusion, immunostaining, and MVD analysis demonstrated significantly diminished vasculature in COX-2-inhibited tumors at both timepoints (Figure 1). Both endothelial and tumor cells displayed increased apoptosis in treated tumors compared to controls. Treated tumors also expressed higher levels of VEGF.

CONCLUSIONS:
There is much evidence that COX-2 functions to promote tumorigenesis in epithelial cancers. Consistent with this, COX-2 is expressed in Wilms tumor, and specific blockade results in endothelial apoptosis. Angiogenesis is consequently impaired, and tumor growth inhibited. These data suggest that targeting COX-2 may provide a novel therapeutic strategy for Wilms tumor patients.

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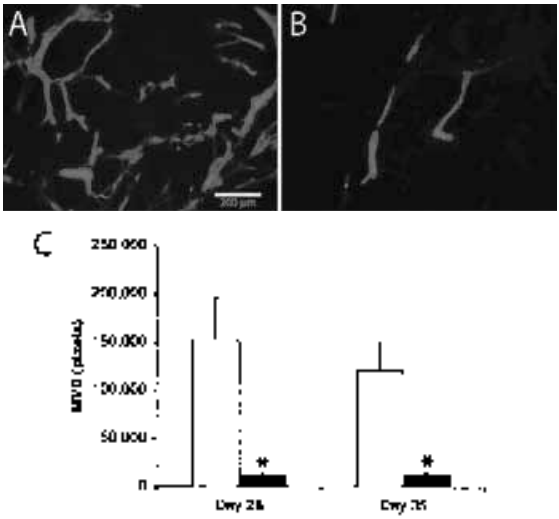

Figure 1:
Mean vascular density was determined from lectin perfused xenograft tumors and quantified by computer image analysis.

26 CHARACTERISTICS AND OUTCOMES OF RHABDOMYOSARCOMA PATIENTS WITH ISOLATED LUNG METASTASES FROM IRS-IV (3 MINUTES)

David A. Rodeberg, M.D.; Carola Arndt, M.D.; Sarah Donaldson; Charles N. Paidas, M.D.; Richard J. Andrassy, M.D.; William Meyer, M.D.; Eugene S. Wiener, M.D.
Mayo Clinic, Rochester, MN, USA

PURPOSE:
To better understand outcomes in children with rhabdomyosarcoma (RMS) and lung only metastatic disease we reviewed the experience from IRS-IV (1991-1997).

METHODS:
Patients with lung only (n=46) vs. other sites of metastatic disease (n=234) were reviewed using patient charts and COG database.

RESULTS:
16 percent of RMS patients with metastatic disease had isolated lung metastases. Patients with lung only metastatic disease had a mean age of 7 years and a male:female ratio of 2:1. Thirty-one (67 percent) had >5 metastatic lung lesions. These were bilateral in 34 (74 percent). 11 children (24 percent) underwent a lung biopsy, only six were performed at diagnosis. Lack of biopsy was not related to number of metastatic lesions or response to therapy. Patients received chemotherapy and radiation (XRT), however only 25 patients (54 percent) received lung XRT by protocol guidelines. This low rate was not influenced by response to therapy, age of the patient, nor results of previous biopsy. Compared to patients with other metastatic disease, lung only patients have a greater proportion of favorable histology (67 percent vs. 39 percent, p=0.0017), negative nodal involvement (67 percent vs. 32 percent, p=0.0013) parameningeal primaries (39 percent vs. 12 percent) and a smaller proportion of extremity primaries (20 percent vs 33 percent) (p=0.0005). Overall survival (OAS) at 4 years for lung only disease was slightly higher than another single site of metastatic involvement (42 percent vs 34 percent). Survival was not improved for unilateral disease or < 5 metastatic lesions. Factors associated with diminished OAS include unfavorable histology (p=0.0001) and age > 10 years (p=0.015).

CONCLUSIONS:
RMS children with lung only metastases present with extensive bilateral disease, that is frequently not biopsed nor given protocol recommended XRT. However, despite the above outcome is comparable to other single site metastatic patients. This study suggests the need for a prospective study to determine the value of biopsy of pulmonary metastatic lesions.

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27 RESULTS OF MULTIMODAL TREATMENT FOR DESMOPLASTIC SMALL ROUND CELL TUMORS (3 MINUTES)

Dave R. Lal, M.D.; Wendy T. Su, M.D.; Kenneth C. Loh, B.A.; Michael P. LaQuaglia, M.D.
Memorial Sloan-Kettering Cancer Center, Department of Surgery, New York, NY, USA

PURPOSE:
Desmoplastic small round cell tumors (DSRCT) are rare, aggressive neoplasms that frequently present with large symptomatic intraabdominal masses. We examined the effects of multimodal therapy including induction chemotherapy, aggressive surgical debulking and external beam radiotherapy on DSRCT patients.

METHODS:
Sixty-six patients were diagnosed by histology, immunohistochemistry, and or cytogenetics as having DSRCT at our institution from 7/1/72 to 7/1/03. Data was collected on patient demographics, presenting symptoms, tumor location and extent, treatment regime and overall survival.

RESULTS:
A majority of patients were male (91 percent), Caucasian (85 percent), with a median age of 20 (7-58) years old at diagnosis. The most common presenting complaint was intraabdominal mass (64 percent). In sixty-four patients (97 percent) the primary tumor was located in the abdomen or pelvis. Thirty-three (50 percent) presented with positive regional nodes and twenty-seven (41 percent) with distant metastasis. Overall three year survival was 45 percent and 16 percent at five years. Twenty eight patients (42 percent) underwent induction chemotherapy (P6), surgical debulking, and radiotherapy. Three year survival was 57 percent in the multimodal treatment group versus 27 percent in those not (P=.012). Gross tumor resection was highly significant in prolonging overall survival, three year survival was 61 percent in patients treated with gross tumor resection compared to no survivors past three years in the non resection cohort (p=.0000). Ten patients (15 percent) have no evidence of disease with a median follow up of 2.4±4.0 years.

CONCLUSIONS:
Multimodal therapy results in improved survival in patients with DSRCT. Aggressive surgical resection of these frequently extensive intraabdominal neoplasms correlates with improved patient outcome.

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28 PARTIAL SPLENECTOMY PRIOR TO HEMATOPOIETIC STEM CELL TRANSPLANTATION IN CHILDREN (3 MINUTES)

Jennifer G. Hall, M.D.; Joanne Kurtzberg, M.D.; Paul Szabolcs, M.D.; Michael A. Skinner, M.D.; Henry E. Rice, M.D.
Duke University Medical Center, Durham, NC, USA

PURPOSE:
Hematopoietic stem cell (HSC) engraftment may be markedly delayed in children with hypersplenism, and total splenectomy is used to improve HSC engraftment. However, the use of total splenectomy in children is limited because of concerns for postsplenectomy sepsis, particularly in children with malignancies and hematologic disorders. In this study, we sought to assess the role of partial splenectomy for children undergoing HSC transplantation.

METHODS:
Five children with a variety of hematologic conditions and hypersplenism underwent partial splenectomy (75 percent to 95 percent) prior to HSC transplantation at our institution between 2000 and 2003. Primary outcome measures included rate of engraftment as defined by time to an absolute neutrophil count (ANC) >500/uL for three consecutive days and a platelet count greater than 50,000/uL for three consecutive days without transfusion support. Secondary outcome measures included perioperative complications, splenic regrowth as measured by serial ultrasonography, graft versus host disease (GVHD), and infection rate. All outcomes were compared to stem cell recipients of both age-matched non-splenectomized children (n=497) and hypersplenic children who underwent total splenectomy (n=23) prior to stem cell transplantation. Outcomes were compared using the Wilicoxon two-sample test.

RESULTS:
The results are summarized in the table below.
Children undergoing partial splenectomy had equivalent engraftment compared to non-splenectomized children. There were no perioperative complications in children undergoing partial splenectomy. The mean percentage of splenic regrowth in the partial splenectomy group was 32 percent (median 28+/-24 percent) with a follow-up range of 3-15 months. One child in the partial splenectomy group died from a pre-existing fungal infection.

CONCLUSIONS:
Partial splenectomy may be safely performed when indicated prior to stem cell transplantation, and like total splenectomy, may improve the rate of HSC engraftment. Although this series has a limited number of patients, the use of partial splenectomy appears to be safe, and may allow for splenic salvage to minimize the risk of postsplenectomy sepsis.

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29 APPENDICITIS IN CHILDHOOD HEMATOLOGIC MALIGNANCIES: ANALYSIS AND COMPARISON WITH TYPHILITIS (6 MINUTES)

Joseph Hobson, B.A.; David E Carney, M.D.; Kimberly Molik, M.D.; Terry Vik, M.D.; L.R. (Tres) Scherer, III, M.D.; Thomas M. Rouse, M.D.; Karen W. West, M.D.; Jay L. Grosfeld, M.D.; Deborah F. Billmire, M.D.

J.W. Riley Hospital for Children, Indianapolis, IN, USA

PURPOSE:

Recognition of appendicitis in the child with hematologic malignancy may be difficult, often complicated by neutropenia and multiple medications which alter the inflammatory response. Typhilitis may produce a similar constellation of clinical findings causing further diagnostic confusion. This review was undertaken to compare the relative frequency of these two conditions in children with hematologic malignancy with attention to clinical presentation, distinguishing features, and outcome of surgical management for patients with appendicitis.

METHODS:

This IRB approved retrospective study evaluated 464 pediatric patients treated for hematological malignancy at our institution from 1997-2003. From this cohort, we identified all children with diagnosis of appendicitis or typhilitis. Data included demographics, clinical presentation, laboratory values, and CT scan results. Groups were compared using Fisher's Exact Test. Significance was defined as $p<0.05$.

RESULTS:

Eight (1.7 percent) of 464 children were diagnosed with typhlitis, seven (1.5 percent) with appendicitis. Distinguishing clinical features included presence of fever and diarrhea (Table 1). Children with appendicitis had atypical presentations in six of seven cases and only two had a correct preoperative diagnosis. CT scan was useful in defining typhilitis in all cases. Operative management was undertaken in six of seven children with appendicitis with no operative morbidity or mortality.

CONCLUSIONS:

Appendicitis and typhylitis occur with similar frequency in children with hematologic malignancy. Typhilitis is accurately diagnosed with clinical findings of fever, diarrhea, abdominal pain and typical CT findings. In this challenging population of children, appendicitis tends to present with atypical findings, yet standard surgical management can limit morbidity to that of the general population.

Notes

Parameter	Typhilitis	Appendicitis	p-value
Fever	8/8	1/7	0.0014
Diarrhea	8/8	0/7	0.0007
Peritonitis	0/8	2/7	0.1319
ANC < 1000	3/8	4/7	0.2435
CT scan	8/8	3/7	0.0021

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30 NEUROBLASTOMA-INDUCED INHIBITION OF DENDRITIC CELL INTERLEUKIN-12 (IL-12) PRODUCTION VIA ABROGATION OF CD40 EXPRESSION (6 MINUTES)

Sonya R. Walker, M.D.; Richard E. Redlinger Jr., B.S.; Edward M. Barksdale, Jr., M.D., FACS, FAAP

Division of Pediatric Surgery, Children's Hospital of Pittsburgh, University of Pittsburgh, Pittsburgh, PA, USA

PURPOSE:

The CD40 molecule expressed by dendritic cells (DC) critically regulates their maturation and antitumor activity. CD40-CD40 ligand (CD40L) signaling stimulates DC-mediated IL-12 production and cytotoxicity. Recent studies suggest that neuroblastoma (NB)-derived gangliosides may impair DC maturation, IL-12 secretion, and T/NK cell activity. Ganglioside-mediated abrogation of CD40 expression by DC and subsequent tumor-induced tolerance has not been studied in NB. The purpose of this study is to determine if the murine NB ganglioside, GM3, inhibits DC function via CD40 downregulation.

METHODS:

A/J mice were subcutaneously injected with saline (control) or aggressive murine NB (TBJ) and sacrificed at 21 days. Mature DC were generated from bone marrow progenitors. Control DC were matured with or without GM3. Both DC groups were analyzed by FACS for the maturation markers CD11c, CD40, and costimulatory molecules. Control and tumor-derived DC were stimulated with either CD40L-transfected murine fibroblasts or inactivated S. aureus (CD40-independent inducer of DC IL-12 synthesis). These groups were studied for induction of IL-12 mRNA and protein expression by RT-PCR and ELISA, respectively.

RESULTS:

GM3 downregulated CD11c, CD80, and CD86 expression by 15, 17, and 53 percent, respectively, relative to controls ($p<0.001$). CD40 expression on DC generated from NB bearing mice was decreased by 64 percent ($p<0.001$). NB inhibited CD40L-induced IL-12 production by 60 percent ($p<0.01$). No difference was seen in IL-12 secretion between control and NB derived DC with S. aureus stimulation ($p=0.8$). These data suggest that only CD40-dependent IL-12 production is abrogated in DC derived from NB bearing mice, and DC capacity to synthesize IL-12 remains intact.

CONCLUSIONS:

Neuroblastoma induced inhibition of dendritic cell function may be mediated by deficient CD40 expression and signaling. Gangliosides like GM3 may significantly downregulate CD40. Strategies to bypass or augment CD40-CD40 ligand signaling may improve current immunotherapies for neuroblastoma.

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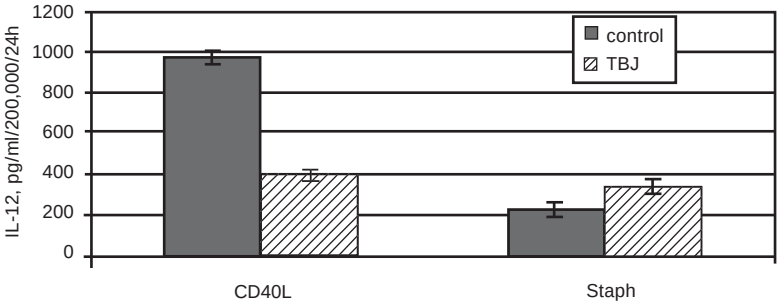

Figure 1: CD40Ligand-Dependent and Independent DC IL-12 Production

31 ADENO-ASSOCIATED VIRUS VECTOR MEDIATED DELIVERY OF PIGMENT EPITHELIUM-DERIVED FACTOR RESTRICTS NEUROBLASTOMA ANGIOGENESIS AND GROWTH (6 MINUTES)

Christian J. Streck, M.D.; Youbin Zhang, Ph.D.; Junfang Zhou, M.D.; Catherine Y. Ng, MS; Andrew M. Davidoff, M.D.
St. Jude Children's Research Hospital, Memphis, TN, USA

PURPOSE:
A gene therapy mediated approach to the delivery of an anti-angiogenic agent has a number of advantages including sustained, continuous expression. The purpose of this study was to inhibit neuroblastoma (NB) xenograft growth through delivery of pigment epithelium-derived factor (PEDF). We chose PEDF because in addition to being a potent inhibitor of angiogenesis, it is capable of inducing neural differentiation.

METHODS:
Cohorts of scid mice received either rAAV-PEDF at low, mid, or high dose (n=4/group) or control vector (rAAV-FIX, n=4) via tail vein. Subsequent PEDF expression was measured by ELISA. After 6 weeks, the mice were given 1.5 x 106 human NB cells by retroperitoneal injection. Mice were sacrificed after 5 weeks and tumor weight, microvessel density (MVD, CD 34 Immunohistochemistry), apoptosis (TUNEL) and levels of intratumoral VEGF expression (ELISA) were determined.

RESULTS:
Following tail vein injection of rAAV-hPEDF, stable transgene expression was generated and correlated with levels of vector administration (high = 1842 ng/ml, mid = 962 ng/ml, low = 212 ng/ml, control = 0 ng/ml). Neuroblastoma xenograft growth was restricted by PEDF in a dose-dependent fashion, with greatest efficacy in mice expressing the highest levels of PEDF (mean weight = 1.69 +/- 0.80g) as compared with tumors in control mice (7.05 +/- 1.32g, $p<0.014$, Fig 1A). Intratumoral VEGF expression was lowered by 50 percent in PEDF treated mice (high dose = 401+/- 214 pg) vs. control (813+/- 416 pg) (Fig 1B). This decreased level of VEGF expression correlated with lower MVD (Fig 1C) and higher levels of tumor apoptosis (Fig 1D) in PEDF treated mice.

CONCLUSIONS:
Treatment with PEDF had a significant impact on NB growth in mice when delivered continuously using a gene-therapy mediated approach. The activity of PEDF appears to be mediated in part by inhibition of tumor-induced angiogenesis through down-regulation of tumor-elaborated VEGF and increased intratumoral apoptosis.

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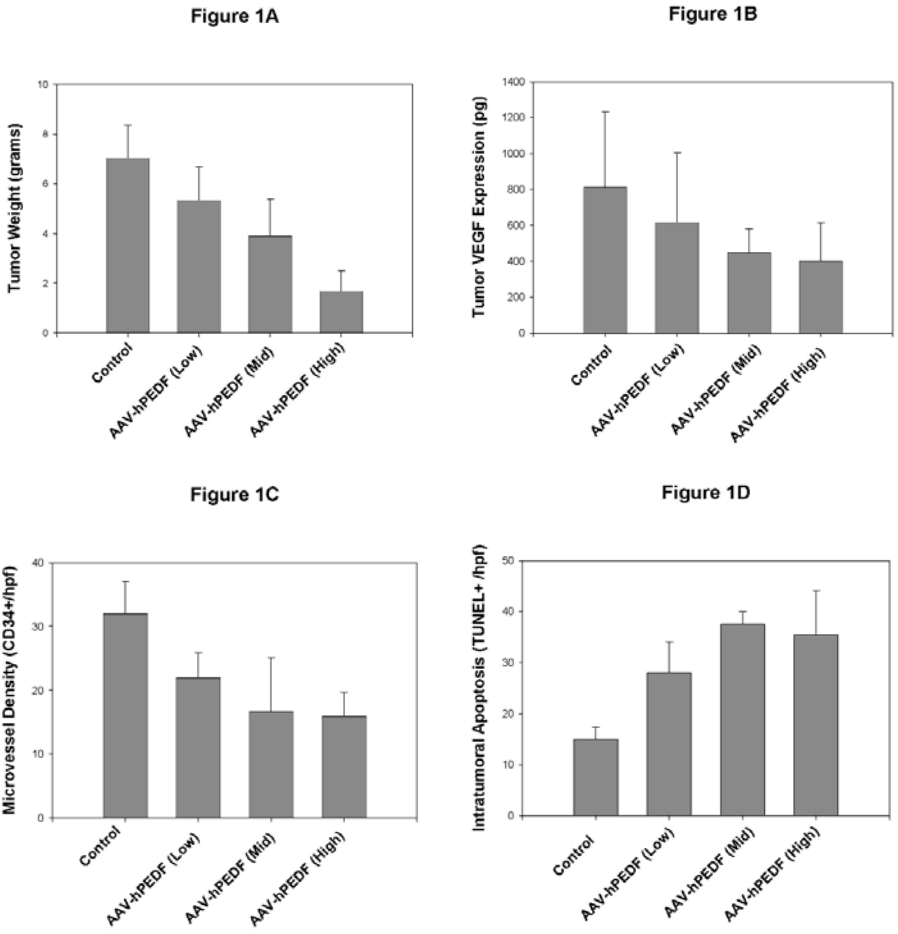

Figure 1: PEDF Restricts Neuroblastoma Angiogenesis and Growth

10:30 a.m. - Noon

32 EFFECTS OF SUBSPECIALITY TRAINING AND VOLUME ON OUTCOME AFTER PEDIATRIC INGUINAL HERNIA REPAIR (3 MINUTES)

Steven H. Borenstein, M.D., FRCS(C); Teresa To, Ph.D.; Anne Wajja; Jacob C. Langer, M.D., FRCS(C)
The Hospital for Sick Children, Toronto, Ontario, Canada

PURPOSE:
Inguinal hernia repair is the most common operation performed in children. We wished to determine if there are any differences in outcome when this procedure is performed by subspecialist pediatric surgeons when compared to general surgeons.

METHODS:
All pediatric inguinal hernias repaired in our province between 1993 and 2000 were reviewed using a population-based database. Children with complex medical conditions or prematurity were excluded. Cases done by general surgeons were compared to those done by pediatric surgeons. The chi-square test was used for nominal data and the Student's t-test was used for continuous variables. Probabilities were calculated based on a logistic regression model.

RESULTS:
Of 20,545 eligible hernia repairs, 50.3 percent were performed by pediatric surgeons and 49.7 percent were performed by general surgeons. Pediatric surgeons operated on 62.4 percent of children under 2 years of age, 51.8 percent of children aged 2-6 years and 37 percent of children greater than 7 years old. Duration of operation, length of hospital stay and incidence of early postoperative complications were similar among pediatric and general surgeons. The rate of recurrent inguinal hernia was higher in the general surgeon group compared to pediatric surgeons (1.10 percent versus 0.45 percent, $p<0.001$). Among pediatric surgeons, the estimated risk of hernia recurrence was independent of surgical volume. There was a significant inverse correlation between surgeon volume and recurrence risk, and between hospital volume and recurrence risk, among general surgeons, with the highest volume general surgeons achieving recurrence rates similar to pediatric surgeons.

CONCLUSIONS:
Pediatric surgeons have a lower rate of recurrence following inguinal hernia repair in children. General surgeons with high volumes have similar outcomes to pediatric surgeons.

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33 LAPAROSCOPIC INGUINAL HERNIA REPAIR —
A CONSECUTIVE, PERSONAL SERIES OF 408 CHILDREN (3 MINUTES)

Felix Schier, M.D.
Department of Pediatric Surgery, University Medical Centre Mainz, Mainz, Germany

PURPOSE:
To evaluate a consecutive series of laparoscopic hernia repairs in children.

METHODS:
551 inguinal hernias were operated laparoscopically in 408 children (299 boys, 109 girls, aged 4 days to 14 years, median 1.6 years). The internal inguinal ring was closed with a 4-0 nonabsorbable suture using 2-mm instruments.

RESULTS:
Follow up to date is 1 - 76 months (median 39). There were 4.4 percent hernia recurrences, 0.7 percent hydroceles and 0.2 percent testicular atrophies. Sixteen of the 18 recurrences occurred in boys and on the right side. The contralateral inner ring was open on the left side in 16 percent of boys and 12 percent of girls, on the right side in 18 percent of boys and 32 percent of girls. Direct hernias were found in 2.4 percent, femoral hernias in 1 percent, hernias en pantalon in 0.6 percent.

CONCLUSIONS:
Advantages of the laparoscopic approach include: technical ease, the cord structures remain untouched, the type of hernia is obvious, trocar placement is identical for any side or hernia type. Finally, recurrences are easier delt with, be it from a previous open or from a laparoscopic approach. Although recurrences were slightly more frequent in the early stages, now they are closer to the rate with the open procedure. Laparoscopic inguinal hernia repair can be a routine procedure with results comparable to those of open procedures. It is well suited for recurrences, the vas remains untouched. The visualization of structures is clear and leads to a defect-specific closure.

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34 SCREENING FOR ANDROGEN INSENSITIVITY SYNDROME IN GIRLS WITH INGUINAL HERNIAS BY MEASUREMENT OF VAGINAL DEPTH (3 MINUTES)

Umut Sarpel, M.D.; Shani K. Palmer, B.S.; Stephen E. Dolgin, M.D., FACS
Mt. Sinai School of Medicine, New York, NY, USA

PURPOSE:
Complete Androgen Insensitivity Syndrome (AIS) is a rare disorder, however surgeons have noted a surprisingly high occurrence in girls with inguinal hernias. A few retrospective studies have estimated the incidence of AIS to be 0.6-2.4 percent in girls with inguinal hernias. An inexpensive, quick screening method for this population has not been established. Since AIS is associated with a short vagina, measuring vaginal depth could serve this purpose if normal standards were known. We endeavored to: 1) identify normal standards of vaginal depth 2) prospectively confirm the incidence of AIS in girls with inguinal hernias, and 3) assess the usefulness of measuring vaginal depth to screen for AIS in girls with inguinal hernias.

METHODS:
Vaginal depths were measured in 270 girls with inguinal hernias at a university hospital from 1991-2003. A Fallopian tube was identified to exclude AIS. If AIS was suspected, gonadal tissue was sampled and karyotype was performed. Linear regression analysis was performed, and 95 percent confidence intervals were calculated for individual values. IRB approval was obtained.

RESULTS:
Normal vaginal length for age was established (Graph). Three patients were found to have significantly short vaginas: two were confirmed to have AIS, one did not (false positive). One other infant was proved to have AIS despite a normal vaginal length (false negative), however AIS was suspected when the Fallopian tube was absent and gonadal biopsy showed testis. The incidence of AIS in our study is 3/270 (1.1 percent). The negative predictive value of vaginal depth measurement is 99 percent.

CONCLUSIONS:
This is the first prospective study of the incidence of Androgen Insensitivity Syndrome in girls with hernias (1.1 percent). We also provide standards for normal vaginal depth in the pediatric population. Vaginal depth increases predictably with age. Measuring vaginal depth in girls with inguinal hernias is a useful screening method for Androgen Insensitivty Syndrome.

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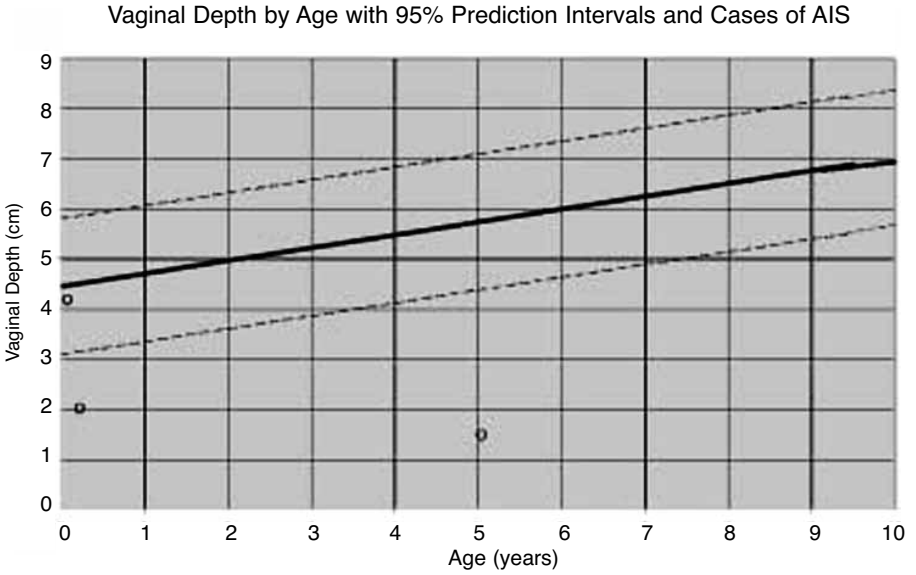

Graph: Vaginal Depth by Age with 95 percent Prediction Intervals and Cases of AIS

35 COST CONSIDERATIONS AND APPLICANT CHARACTERISTICS FOR THE PEDIATRIC SURGERY MATCH (3 MINUTES)

Danny C. Little, M.D.; Suzanne Yoder**, M.D.; Tracy C. Grikscheit***, M.D.; Carl-Christian A. Jackson†, M.D.; Julie R. Fuchs††, M.D.; Kimberly W. McCrudden†††, M.D.; George W. Holcomb**, M.D., MBA*

** Texas A&M University System Health Science Center, Temple, TX, USA*

*** Children's Mercy Hospital, Kansas City, MO, USA*

**** Massachusetts General Hospital, Boston, MA, USA*

† University of Chicago Hospitals, Chicago, IL, USA

†† Beth Israel Deaconess Medical Center, Boston, MA, USA

††† New York Presbyterian Hospital, New York, NY, USA

PURPOSE:

Formal training in pediatric surgery is highly competitive. The limited number of accredited positions has historically favored applicants with basic science experience, numerous publications, national presentations, and exposure to well-known pediatric surgeons. This review analyzes characteristics of successful applicants and costs associated with the matching process.

METHODS:

A survey was mailed to 45 applicants following the 2003 match. Geographic provenance, demographics, and qualifications were assessed. Respondents indicated their residency history and interview costs. Applicants were asked to rank their perception of a program's strength based on seventeen characteristics. Statistics were formulated by chi-square and student's T test.

RESULTS:

Thirty-six (80 percent) applicants responded. 77 percent of applicants were PGY 6 or higher. Successful characteristics for matched versus unmatched included: number of publications, 11.2 vs. 5.7 ($p<0.01$), first author designation, 6.4 vs. 3.1 ($p=0.02$), basic science papers, 5.7 vs. 1.7 ($p<0.01$), national presentations 5.8 vs. 2.4 ($p=0.02$), and presentations at pediatric surgical meetings, 2.0 vs. 0.6 ($p=0.04$). 90 percent of matched applicants took time off to perform basic science research ($p<0.01$).

Average candidate expense was $6974 and matched applicants spent $7302, which represented 14 percent of their pre-tax salary. 41 percent of applicants noted that cost limited the number of interviews taken. 50 percent preferred a regional interview process to limit expense. Finally, candidates ranked diversity of cases, total case volume, and mentor's advice as the most influential factors in their opinion of programs. Successful applicants matched at their fifth-ranked program on average. 86 percent of unsuccessful applicants will reapply.

CONCLUSIONS:

Results of this study are important to residents interested in pediatric surgery, their mentors, and others concerned with the training of future pediatric surgeons. Successful applicants were shown to have several national presentations and multiple scientific publications, especially in basic sciences. Applicant costs are high, totaling over $236,000 for survey respondents.

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36 THE IMPACT OF THE 80 HOUR WORK WEEK ON PEDIATRIC SURGICAL TRAINING: AN ASSOCIATION OF PEDIATRIC SURGERY TRAINING PROGRAM DIRECTORS SPONSORED STUDY (3 MINUTES)

Marion C.W. Henry, M.D.; Bonnie L. Silverman, Ph.D.; R. Lawrence Moss, M.D.
Yale University School of Medicine, Section of Pediatric Surgery, New Haven, CT, USA

PURPOSE:
To determine the impact of new work hour regulations upon Pediatric Surgical training programs.

METHODS:
We developed a survey to identify programmatic changes in pediatric surgery fellowship programs. The anonymous survey was sent to all program directors and fellows.

RESULTS:
Twenty-eight of 30 U.S. Pediatric Surgical programs responded, including 25 program directors (PDs) and 24 fellows. Nineteen of 28 programs reported hiring additional personnel to meet clinical demands: including nurse practitioners (9), non-resident M.D.s (9), residents (4), physician assistants (3). Fifty percent of programs report increased attending coverage; seven now have in-house call by attendings, and several have added attending staff. The daily composition of the surgical team has markedly changed. All post-call residents now leave in the morning, and in seven programs fellows leave mid-day post-call. When asked their subjective impression of quality of care, almost no physicians thought it had improved, while many thought quality had declined: PDs (56 percent), fellows (17 percent). Continuity of care was felt to be decreased by 80 percent of PDs and 65 percent of fellows. Eighty-four percent of the PDs and 52 percent of the fellows reported missed learning opportunities. When fellows were asked about changes in their lifestyle 46 percent felt more rested, 54 percent reported more time with family, and 21 percent reported increased time for social activities. In contrast, 52 percent of program directors felt less rested, 52 percent reported less time with family, and 48 percent reported decreased time for social activities. When asked if they were willing to increase the length of fellowship by one year to shorten hours, 44 percent of PDs said yes, while 4 percent of fellows said yes.

CONCLUSIONS:
Work hour regulation has resulted in a shift of care to personnel outside of training programs and to attending surgeons. PDs and fellows express concern regarding quality and continuity of care. The full impact of regulated hours awaits further review.

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37 TURNING WHINE INTO WINE: THE FISCAL IMPACT OF COMPREHENSIVE DOCUMENTATION AND BILLING FOR NON-OPERATIVE PEDIATRIC SURGICAL SERVICES (3 MINUTES)

Gerald Gollin, M.D.; Donald C. Moores, M.D.
Loma Linda University School of Medicine and Children's Hospital, Loma Linda, CA, USA

PURPOSE:
Many pediatric surgeons rarely document or bill for non-operative services, believing that the reimbursement provided for such care is negligible. In a busy, academic pediatric surgical practice we have recently focused upon increasing documentation and billing for the non-operative services that are provided. We evaluated the impact of documentation of various aspects of non-operative care on reimbursement.

METHODS:
After IRB approval was obtained, all bills submitted for inpatient, non-operative care between July 2002 and June 2003 were reviewed. The payer distribution was determined. Total billings and receipts for documented admission history and physicals (H&Ps), consultations, critical care, daily care, and discharges were tabulated. The evaluation and management (E&M) code billed for each service was recorded as well as the nature of the service provided (preoperative care, non-operative trauma management, other non-operative care, and consultations). The marginal financial yield of individual, non-operative services was calculated.

RESULTS:
During the period of the study 58 percent of services were covered by Medicaid and 31 percent by a contracted or commercial insurer. There were 607 billed admission H&Ps including 359 for trauma. Reimbursement for admission H&Ps (E&M codes 99223, 99222, 99221) totaled $43,493. Billable critical care services (E&M codes 99292, 99291) were provided to 49 trauma patients with reimbursement of $15,367. 639 inpatient consultations (445 preoperative) were performed. Reimbursement for consultations (E&M codes 99254, 99253, 99252) totaled $42,633. Daily care or discharge services were billed 1044 times, including 330 consult patient visits. Reimbursement for daily care and discharges (E&M codes 99232, 99231, 99238) totaled $71,579. Overall reimbursement for documented, non-operative services was $166,669. This represented 16.2 percent of total reimbursement.

CONCLUSIONS:
Despite a payer mix heavily weighted toward Medicaid, comprehensive documentation and billing of non-operative services increased total reimbursement by almost 20 percent. While many pediatric surgeons focus mostly upon operative services the yield from properly-documented, non-operative care can be substantial.

Notes

38 THE TIMING OF DELIVERY OF INFANTS WITH GASTROSCHISIS INFLUENCES OUTCOME (3 MINUTES)

Orkan Ergun, M.D.; Fisun S. Ergun, Ph.D., R.N.; Faisal G. Qureshi, M.D.; Edward M. Barksdale, M.D.; Tracy Prozen, M.D.; Kim Reblock, R.N.; Henri R. Ford, M.D.; David J. Hackam, M.D., Ph.D.

Children's Hospital of Pittsburgh, Pittsburgh, PA, USA

PURPOSE:

Delayed onset of intestinal function in children with gastroschisis may be due to the injurious effects of amniotic fluid on the exposed bowel. Proponents of this theory advocate early delivery to minimize intestinal damage and improve outcome; however this has not been carefully evaluated. We hypothesized that timing of delivery influences outcome in children with gastroschisis and thus sought to evaluate the relative impact of various predictors of outcome in this disease.

METHODS:

After IRB approval, all consecutive patients with gastroschisis (1992-2002) were retrospectively divided into those delivered before (early) or after (late) 36 weeks. The degree of bowel peel was described as thin or thick based on operative reports. Individual measures were analyzed by univariate analyses (Chi-square/Student t-test), and logistic regression was used to identify significant factors that predicted a length of stay (LOS) longer than the population average of 55 days.

RESULTS:

In 75 patients, 53 percent were early and 47 percent were late. Groups were similar with respect to maternal age, birth weight, delivery mode, gender and associated anomalies (Table). Thickness of bowel peel was not affected by delivery time, yet early patients had significantly longer LOS and time to enteral feeds (Table). By multiple regression, significant predictors of LOS greater than population average of 55 days included gestational age<36weeks (p=0.04, odds ratio 4.7), net weight gain>37 percent (p=0.0005, OR 40) and time to enteral feeds >26 days (p=0.016, OR 8.9). Non-significant predictors included associated anomalies, thickness of bowel peel and need for silo.

CONCLUSIONS:

Delivery before 36 weeks is associated with increased LOS compared with later delivery which reflects delayed acquisition of intestinal function. Fetal well-being should thus be the primary determinant of delivery for gastroschisis, as opposed to considerations regarding possible injurious effects to the bowel of prolonged gestation.

Notes

Factor (% of patients where indicated)	Early <36weeks	Late >36weeks	Significance
Maternal age (years)	19.9±5.4	21.5±4.9	NS
Birth Weight (kg)	1970±427	2329±636	p<0.05
Vaginal delivery	49%	71%	NS
% Male	58%	56%	NS
% with associated Anomalies	21%	10%	NS
% with thick peel	30%	53%	NS
% with need for silo	41.5%	35.1%	NS
Length of stay (days)	67±72	43±28	p<0.05
Time to onset enteral feeds (weeks)	30±19.3	21±10	p<0.05

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39 DIFFERENCES IN THE OUTCOME OF SURGICALLY PLACED LONG-TERM CENTRAL VENOUS CATHETERS IN NEONATES: NECK VS. GROIN PLACEMENT (3 MINUTES)

Ravindra K. Vegunta, FACS, FRCS, MBBS; Paul Loethen, B.S.; Lizabeth J. Wallace, ARNP, BSN, MS, R.N.; Viola L. Albert, BSN, R.N.; Richard H. Pearl, M.D., FACS, FRCS(C)
University of Illinois College of Medicine at Peoria, Peoria, IL, USA and Children's Hospital of Illinois at OSF St. Francis Medical Center, Peoria, IL, USA

PURPOSE:
Long-term tunneled central venous catheters (CVC) are frequently used in the Neonatal Intensive Care Unit (NICU) babies. They are usually placed either near the neck or in the groin based on surgeon's preference. There is meager information available about the relative risks of these lines.

METHODS:
This is a retrospective outcomes analysis of all the surgically placed long-term CVCs in NICU babies at a children's hospital between June of 1998 and February of 2003. Institutional Review Board approval was obtained. Single lumen Broviac catheters (Bard, Salt Lake City, Utah) were used in all cases. All the neck lines were placed under general anesthesia. Babies larger than 1500gms in weight had attempts at percutaneous subclavian access; failing which, ipsilateral internal jugular vein was accessed by cut-down. The groin lines were placed by cutdown through the long saphenous vein using local anesthetic, if no other concurrent procedure was being performed. A total of 137 catheters were placed in 126 patients. There were 88 neck lines and 49 groin lines. Specific locations are: right internal jugular: 44, right subclavian: 13, left internal jugular: 21, left subclavian: 8, right external jugular: 2, right saphenous: 41 and left saphenous: 8. No patient had two Broviac catheters concurrently.

RESULTS:
See Table for details.

CONCLUSIONS:
Broviac catheters placed in the groin, in NICU babies, are associated with significantly fewer complications even though these babies were significantly smaller by weight and gestational maturity. Despite being in the diaper area, infection rate is significantly lower for the groin lines. Accidental line removal occurred 10.2 percent of the time with neck lines and never with groin lines. Complications such as pneumothorax, pleural effusion and pericardial effusion are unique to the neck lines. Placement of a groin line frequently did not require a general anesthetic.

Notes

	Neck	Groin	p value
Age – days mean (SD)	25.5 (36.5)	14.1 (29)	0.043
Gestation – weeks mean (SD)	32.3 (5.3)	30.1 (4.8)	0.016
Weight at surgery – grams (SD)	2107 (1094)	1574 (891)	0.010
Catheter life – days mean (SD)	216 (238)	30.5 (45)	0.137
Total Complications (%)	26 (29.5)	4 (8.2)	0.005
Accidental removal (%)	9 (10.2)	0 (0)	0.030
Catheter infection (%)	11 (12.5)	1 (2)	0.012
Pleural/Pericardial complications (%)	4 (4.5)	0 (0)	
Clotted catheter (%)	0 (0)	1 (2.1)	
Leak from tunnel (%)	2 (2.3)	0 (0)	

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40 COMPARISON OF KARYDAKIS VERSUS PRIMARY MIDLINE EXCISION FOR TREATMENT OF PILONIDAL SINUS DISEASE (3 MINUTES)

Peter Morden, B.S.; Robert A. Drongowski, MA; James D. Geiger, M.D.; Ronald B. Hirschl, M.D.; Daniel H. Teitelbaum, M.D.
University of Michigan, Ann Arbor, MI, USA

PURPOSE:
Excision of diseased pilonidal sinus tracts is associated with a high rate of recurrence and complications. The Karydakis method, whereby an asymmetric subcutaneous flap obliterates the anal crease, has been shown to be effective in adults. The goal of this study is to assess the efficacy of the Karydakis procedure in the operative treatment of children compared to those treated via a primary midline excision (PME).

METHODS:
Sixty-eight cases of pediatric pilonidal sinus excision were reviewed over 10 years. Data abstracted included surgical approach, complication rate, recurrence rate and initial drainage of abscesses. Student's t-test or Chi square test, with $p<0.05$ being considered significant was used for the analysis.

RESULTS:
PME was performed in 44 and the Karydakis method was used in 24 children. Mean age at diagnosis was 13.8±5.5 years for the PME group compared to 15.7±4.3 years for the Karydakis patients (p=0.102). Mean operative time was significantly longer with the Karydakis method 58.7±25.6 minutes compared to 46.3±18.6 for the PME group (p=0.04). There was a 25 percent post-operative complication or recurrence rate in the Karydakis group compared to 36.4 percent in the PME group (P=.421). Initial drainage of abscess had no significant effect upon recurrence/complication rate in either group. Recurrence rate alone was lower in patients operated on via the Karydakis approach (0 percent) versus 11.4 percent using a PME (p=0.153).

CONCLUSIONS:
Recurrence and complication rates were lower for those patients with a pilonidal sinus treated by the Karydakis method compared to the primary midline excision, but the results were not statistically significant. In conclusion, this study does show a potential benefit for children treated with the Karydakis method for pilonidal sinus. This study mimics the data obtained in adult patients, and suggests that a larger study may achieve significance.

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41 WOUND MANAGEMENT WITH VACUUM ASSISTED CLOSURE: EXPERIENCE IN 51 PEDIATRIC PATIENTS (3 MINUTES)

Steven Teich, M.D.; Brenda Ruth, R.N.; Donna A. Caniano, M.D.
Children's Hospital and Ohio State University College of Medicine and Public Health, Department of Pediatric Surgery, Columbus, OH, USA

PURPOSE:
Soft tissue loss from infectious, vascular, and traumatic disorders often results in poor healing, painful wound care, and the need for repeated operations. This study evaluates our experience with the Vacuum Assisted Closure (VAC) device in a group of children with diverse soft tissue problems.

METHODS:
The medical records of 51 patients treated with VAC from January 2000 – July 2003 were reviewed retrospectively for demographics, diagnosis, duration of VAC, wound closure, recurrent disease, and complications.

RESULTS:
Patients were classified by diagnostic group: Group 1: pilonidal disease (N=21; primary=6 and recurrent=15); Group 2: sacral and extremity ulcers (N=9); Group 3: traumatic soft tissue wounds (N=9): and Group 4: extensive tissue loss from the abdominal wall (N=7), perineum (N=2), thigh (N=2), and axilla (N=1). Group 1 had an average age = 16 years (range 10-20), 67 percent were obese, and length of follow-up averaged 13 months (range 8-36). In 95 percent VAC was placed in the operating room with outpatient care that included device change three times weekly. Healing occurred in all patients with primary disease at an average of 37 days. For patients with recurrent disease, 12 healed at an average of 48 days and 3 developed recurrent sinuses. Group 2 was treated with VAC as a bridge to skin grafting or flap closure. All children in Group 3 achieved healing without skin grafting at an average of 10 days and with acceptable cosmesis. VAC in Group 4 was the only wound treatment in 10 patients and adjunctive to operative closure in 2. Complications from VAC occurred in 5 patients: retained sponge (2) and device malfunction (3).

CONCLUSIONS:
VAC offers a safe, cost-effective alternative to traditional complex wound care in children. Its advantages are less frequent dressing changes, outpatient management, resumption of daily activities including return to school, and high degree of patient tolerance.

Notes

42 SHORT BOWEL SYNDROME, CONGENITAL ANOMALIES AND COUNSELLING
(3 MINUTES)

Germana Casaccia, M.D.; Claudio Giorlandino, M.D.; Elena Bilancioni, M.D.; Antonella Nahom, M.D.; Lucia Aite, M.D.; Alessandro Trucchi, M.D.; Pietro Bagolan, M.D.
Bambino Gesù Pediatric Hospital, Roma, Italy

PURPOSE:
Short bowel syndrome (SBS) is a functional rather than anatomic definition, characterized by malabsorption. Congenital intestinal anomalies (CIA) detectable prenatally by ultrasound such as jejunoileal atresia, meconium peritonitis, complicated meconium ileus and volvulus can be responsible of it. Aims: to investigate 1) the frequency of SBS in babies with CIA and 2) the incidence of morbidity and mortality during the first admission in neonates affected by SBS due to CIA.

METHODS:
All records of babies with CIA treated from January 1997 to June 2002, were reviewed. In the cases with prenatal diagnosis, ultrasound findings were correlated with the incidence of SBS. A statistical analysis of epidemiological data, central venous line and parenteral nutrition complications, growth status at discharge and length of stay in hospital was performed in neonates with and without SBS using Student's t test.

RESULTS:
Forty-four neonates. Thirty-six (82 percent) neonates had prenatal diagnosis. A strong correlation with SBS was observed either in foetal isolated dilated bowel (14/24 - 58 percent) or in isolated ascites (2/5 - 40 percent). SBS developed in 19/44 (43 percent) neonates, ranged from 72 percent in volvulus to 0 percent in complicated meconium ileus. Birth weight, gestational age and growth status at discharge were statistically lower while incidence of septic episodes and length of hospital stay statistically higher in neonates with SBS. Three (16 percent) neonates died during the first recovery.

CONCLUSIONS:
Neonates with CIA can develop SBS in 43 percent of cases. 2) SBS is associated with a mortality rate of 16 percent. An accurate and honest counselling could be instituted to parents of foetuses and neonates with specific intestinal anomalies.

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43 FALSE POSITIVES: UNDERESTIMATED DRAWBACK OF PRENATAL DIAGNOSIS

(3 MINUTES)

Alessandro Borsellino, M.D.; Antonio Zaccara, M.D.; Antonella Nahom, M.D.; Lucia Aite, M.D.; Claudio Giorlandino, M.D.; Pietro Bagolan, M.D.
Ospedale Pediatrico Bambino Gesù, Roma, Italy

PURPOSE:

Technical refinements and increasingly sophisticated equipment have led to higher sensitivity in prenatal diagnosis of congenital malformations; however, such progresses may be accompanied by decreased specificity, which may result in unwarranted parental anxiety.

METHODS:

Retrospective review of prenatal ultrasound examinations performed at our Institution between 2000 and 2002 was conducted. The series includes pregnancies referred after detection of thoracic and abdominal anomalies at routine obstetrical sonography and with a follow-up entailing at least the first 6 months of life. Urologic malformations and suspected fetal anomalies which resolved before birth were excluded. Prenatal diagnoses not confirmed at birth were considered false positives (FP).

RESULTS:

One-hundred-fourty-seven (147) pregnancies underwent complete follow-up.
Prenatal diagnosis of esophageal atresia resulted in 11/20 FP (55 percent) over the 3 years observed. Isolated finding of hyperechoic bowel was not predictive of neonatal intestinal obstruction in 6/8 (75 percent) fetuses as well as ascites in 4/5 (80 percent).

No FP were found over the considered period with regard to abdominal wall defects (8 gastroschisis and 27 omphaloceles, all confirmed at birth). Concerning thoracic malformations, no FP were seen among the 28 cases of congenital diaphragmatic hernia, whereas diagnosis of pulmonary adenomatoid malformation presented a specificity of 90 percent (3/29 FP). Ovarian cysts accounted for an FP rate of 32 percent (7/22 FP). Overall a percentage of FP of 24 percent (12/49) was seen in 2000, of 26 percent (12/46) in 2001 and 17 percent (9/52) in 2002, with no statistically significant difference.

CONCLUSIONS:

Progress in prenatal ultrasonography has allowed most correctable malformations to be managed by appropriate perinatal medical and surgical therapy; however, due to the high FP rate regarding some particular anomalies, unnecessary psychological burden to prospective parents may ensue. This issue should be dealt with in future prospective studies.

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9:15 a.m. – 11 a.m.

44 CEREBRAL OXYGENATION IN MAJOR PEDIATRIC TRAUMA : ITS RELEAVENCE TO TRAUMA SEVERITY SCORES AND OUTCOMES (6 MINUTES)

Sathya C. Prasad, M.D., FRCS; Pradeep Narotam, M.D., FACS;*
Stephen C. Raynor, M.D., FACS; Malini B. Rao, M.D.; Charles Taylon, M.D., FACS
Creighton University Medical Center, Omaha, NE, USA
** Dr. Narotam is a consultant for Integra Neurosciences.*

PURPOSE:
Trauma remains the most common cause of death in the pediatric population. While being prone to diffuse primary brain injury due to a larger head to torso ratio, children are also more susceptible to secondary brain injury (e.g,hypoxia, hypotension). Standard monitoring modalities may not indicate true oxygen delivery at tissue level. In this study we discuss the merits of a critical care guide directed by PbtO2 monitoring and correlate PbtO2 to trauma severity and outcome.

METHODS:
16 patients with major trauma (ISS>16/PTS<7) had Licox PbtO2 monitor placed under local anesthesia using twist-drill craniostomy along with definitive management of associated injuries. PbtO2 monitoring directed therapy intensity level i.e. ventilator management, ionotropes, blood transfusion etc. Patient demographics, PbtO2 (initial, 2 hour and final),ICP, GCS, trauma scores and outcomes were recorded.

RESULTS:
There were 10 males and six females in the study group with a mean age of 14 (range 1.5-18). There were 14 motorvehicle accidents, one fall and one assault. The mean trauma scores were ISS=36 (16-59), PTS=3(0-7) and RTS=5.5(4-11). 11 of 16 (70 percent) had evidence of cerebral ischemia (initial PbtO2<20mmHg) on admission. With the implementation of the critical care guideline, the mean 2hrPbtO2 amongst the survivors was 21.6mmHg as compared to 7.2mmHg amongst those who died(p=0.009). Further the final PbtO2 was significantly higher amongst survivors, 25mmHg Vs 11mmHg (P=0.01).On Spearman rank order correlation, the RTS correlated with iPbtO2 (r=0.65), while a lesser correlation was noted between PTS and iPbtO2 (r=0.52). On discriminant analysis the 2hr PbtO2 was noted to be the most significant root contributory to mortality. The observed mortality was 37.5 percent as compared to an expected mortality of 55 percent (P=0.01).

CONCLUSIONS:
A significant proportion of pediatric trauma have cerebral ischemia which correlates to their injury severity. PbtO2 monitoring allows for early recognition of cerebral ischemia enabling appropriate therapeutic intervention, minimizing the deleterious effects of ischemia and secondary injury.

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45 EXTRACORPOREAL LIFE SUPPORT IN PEDIATRIC AND YOUNG ADULT TRAUMA PATIENTS WITH SYSTEMIC INFLAMMATORY RESPONSE SYNDROME (3 MINUTES)

Mary Austin, M.D.; Charles Leys, M.D.; Ysela Carrillo, M.D.; Philip Smith, M.D.; John Pietsch, M.D.
Vanderbilt University, Nashville, TN, USA

PURPOSE:
To review our experience with extracorporeal life support (ECLS) as rescue therapy for systemic inflammatory response syndrome (SIRS) in the pediatric and young adult population.

METHODS:
In the past year, ECLS was instituted as rescue therapy for respiratory failure and SIRS in four pediatric and young adult trauma patients. All four patients failed maximal ventilator support including the volume diffusive respirator (VDR). Retrospective analysis included demographic information, pre-ECLS pulmonary physiology and respiratory parameters, ECLS parameters including hemofiltration values, complications of ECLS and survival.

RESULTS:
All four subjects (mean 18.5 +/- 3.1 years, range 16-23 years, 50 percent male) suffered blunt trauma in motor vehicle accidents with injury severity scores (ISS) equal to 27 +/- 4.2 (range 25-34). These patients required aggressive fluid resuscitation due to SIRS with a mean of 34.8 +/- 10.5 liters in the first 24 hours and total fluid requirement pre-ECLS of 59.6 +/- 26 liters (range 29-91 liters). Severe adult respiratory distress syndrome ensued as defined by a mean PaO2:FiO2 ratio of 61 +/- 13.9 (range 48-81) on 90 percent FiO2 (max FiO2 on VDR) and venovenous ECLS was initiated. Hemofiltration resulted in mean fluid removal of 18.7 +/- 11.8 liters (range 5.7-29.9 liters) over 3-6 days (5.5 +/- 1.4 days) and three patients with previous decompressive celiotomies for abdominal compartment syndrome underwent primary fascial closure without complication. There were no serious complications of ECLS. All subjects demonstrated sufficient pulmonary recovery to wean from ECLS (mean duration 159 +/- 71 hours, range 82-220) which led to eventual extubation. One patient died of a cardiac arrest following an orthopedic procedure several weeks after extubation to room air.

CONCLUSIONS:
ECLS combined with aggressive hemofiltration is a potentially life-saving theraputic modality for severe posttraumatic SIRS in the pediatric and young adult population.

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46 A NEW PEDIATRIC TRAUMA MODEL—LIFE WITHOUT RESIDENTS (3 MINUTES)

Eric R. Scaife, M.D.; Kris W. Hansen, B.S., R.N.; Rebecka L. Meyers, M.D.; Daniel J. Vargo, M.D.; Earl C. Downey, M.D.; Richard E. Black, M.D.; Michael E. Matlak, M.D.
University of Utah, Salt Lake City, UT, USA

PURPOSE:
After August 2001, work-hour initiatives made residents unavailable to staff our trauma system. This necessitated a radical change in personnel managing the trauma service; based on ACS level I requirements. We compare the resident managed (RM) model to our current attending/nurse practitioner model (AM).

METHODS:
The RM period was 1999-2000 and the AM 2001-2002. A retrospective review of the trauma database, inpatient surveys-"patient perceptions of quality", and the economic impact was conducted.

RESULTS:
The trauma system cared for 1847 children during RM and 2061 during AM. Level I or II trauma activations accounted for 502 patients-RM and 796 patients-AM. The average ISS for each group was 17.5 and 15.6, respectively. The overall mortality for the two time periods was 2.2 percent and 2.2 percent. The average time to complete the initial trauma resuscitation decreased from 32 to 26 minutes. The patient perceptions of quality, as judged by inpatient surveys conducted in 1999 and 2002 remained high. The new trauma system separated attending trauma call from pediatric surgery call enlisting additional support from a dedicated group of affiliated adult general surgeons. The attending surgeon has 24/7 support from seven nurse practitioners (NP). The NP's have a dual role to cover pediatric inpatients as well as the trauma service. It cost approximately $690,000 to hire the nurse practitioners and fund the trauma contract. Despite the increased cost, the service remained profitable with an average margin of $700/ patient and increased its census by 30 percent.

CONCLUSIONS:
The loss of surgical resident staffing of a trauma service mandates a new model to maintain Level I trauma care. A system managed by attending surgeons and orchestrated by NP's is economically feasible while offering expert resuscitation and efficient trauma focused care on the wards.

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47 PULMONARY EMBOLISM: WHICH PEDIATRIC TRAUMA PATIENTS ARE AT RISK? (3 MINUTES)

Anne K. Truitt, M.D.; Donald L. Sorrells, M.D.; Eric Halvorson, M.D.; Paula Gormley, R.N.; Arlet G. Kurkchubasche, M.D.; Thomas F. Tracy, M.D.; Francois I. Luks, M.D., Ph.D.
Hasbro Children's Hospital and Brown Medical School, Providence, RI, USA

PURPOSE:
Deep vein thrombosis and pulmonary embolism (DVT/PE) are rare in pediatric trauma patients, and guidelines for prophylaxis are unclear. We sought to identify subgroups of patients who may be at higher risk of developing DVT/PE.

METHODS:
Case-control study of pediatric trauma patients with DVT/PE. Odds ratio (OR) and confidence interval (CI) were calculated for known risk factors of PE using matched trauma controls (chi-square analysis).

RESULTS:
3,136 pediatric trauma patients were admitted over the last 5 years. Three patients developed DVT/PE (overall incidence 0.096 percent). There were two females and one male, aged 15, 15 and 9, respectively. All three had an Injury Severity Score (ISS) 25 and an initial Glasgow Coma Score (GCS) 8. None of the known and potential risk factors significantly increased the OR for developing DVT/PE: age 9 (OR=.9, CI=0.1-6.8), presence of head injury (OR=2.9, CI=0.3-22), female gender (OR=1.2, CI=0.15-9.1), GCS 8 (OR=15.6, CI=1.8-116) and ISS 25 (OR=13, CI=1.5-93). The OR for a combination of risk factors (age, ISS, GCS) common to all 3 patients was 83 (CI 13-532, P<0.001).

CONCLUSIONS:
The overall incidence of DVT/PE in pediatric trauma patients is <0.1 percent and routine prophylaxis is not recommended. Children 9 years and older with an estimated ISS 25 and initial GCS 8 may constitute a high-risk group in which prophylaxis could be considered.

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48 PRELIMINARY OUTCOMES ASSESSMENT OF PEDIATRIC PELVIC FRACTURES: A PROSPECIVE MULTICENTER STUDY (3 MINUTES)

Paul Signorino, M.D.; John Densmore, M.D.; Andrea L. Winthrop, M.D.; Steven Stylianos, M.D.; Karen S. Guice, M.D.; Keith T. Oldham, M.D.*
Children's Hospital of Wisconsin, Milwaukee, WI, USA
** Children's Hospital of New York, New York, NY, USA*

PURPOSE:
A prospective study was designed to assess functional status and quality of life following hospital discharge for children with pelvic fractures.

METHODS:
Following IRB approval at each of 12 participating institutions, data collection began in May 2001. Study criteria include patients under the age of 18 years with documented pelvic fracture. For each patient, selected medical, functional, and quality of life information was entered using a secure online data entry system at the APSA Outcomes Center. In September 2003, 84 patients have entered the study; 56 patients have functional data recorded at hospital discharge and 21 have similar data recorded six months later using validated tools. Of 21 patients with both discharge and 6 month follow-up functional data, 76 percent have motor vehicle related injuries; average age is 10.1 years (range 3-16); average ISS is 14.9 (SE 2.3) and GCS is 13.9 (SE 0.6). Results are expressed as the mean score for each domain.

RESULTS:
(See image below)

CONCLUSIONS:
These preliminary data demonstrate that moderate assistance is required initially for self care and mobility functioning following childhood pelvic fracture. Minimal assistance is required for cognitive functioning. However, six months after hospital discharge, average functional outcomes are nearing normal. These results, although preliminary, show for the first time that the functional impairment associated with pelvic fractures in children is largely resolved 6 months after injury in most patients.

Notes

Results

	Study Data		Norms	
Functional Domain	Hospital Discharge	6 Months Post Discharge	Minimum Domain Score (Total Dependence)	Maximum Domain Score (Independence)
Self Care	37.6	54.3	8	56
Mobility	18.0	33.4	5	35
Cognition	29.6	35.3	5	35
Total	85.2	120.0	18	126

The quality of life assessment demonstrates successful normal health-related quality of life in children at 6 months post discharge

Underlining denotes the author scheduled to present at the meeting.

49 THE BENEFITS OF TRANSFER GUIDELINES FOR PEDIATRIC TRAUMA IN PENNSYLVANIA (3 MINUTES)

Christopher S. Hollenbeak, Ph.D.; Jennifer Findeis-Hosey, B.S.; Robert E. Cilley, M.D.; Andreas H. Meier, M.D.; Stanley J. Kurek, D.O.; Peter W. Dillon, M.D.
Penn State College of Medicine, Hershey, PA, USA

PURPOSE:
Pediatric trauma systems are designed to enhance the timely transfer of seriously injured children to tertiary trauma centers with expertise in pediatric care. However, because of the large number of injured children and the geographic rarity of specialized centers, injured children are treated in a variety of settings. The purpose of this research was to model formal guidelines for transferring pediatric patients between trauma centers and predict potential reductions in overall mortality in a statewide system.

METHODS:
Using data from the Pennsylvania Trauma Outcome Study (PTOS), we studied 24,172 pediatric trauma patients admitted to registered trauma centers in Pennsylvania between 1996 and 2002 and modeled the mortality that could be expected under hypothetical guidelines that would have transferred patients to a pediatric trauma center. Mortality was modeled using logistic regression, stratified by trauma center (level II adult, level I adult, and pediatric trauma centers).

RESULTS:
Results in the Table show that the actual mortality rate for pediatric patients was 3.0 percent, 8.2 percent and 4.4 percent at pediatric, level I and level II trauma centers, respectively. The model predicted that overall mortality would have remained at 4.0 percent if all patients age <1 had been treated at a pediatric trauma center. However, the model predicted a drop in the overall mortality rate from 4.0 percent to 3.8 percent if all patients age <1 or with a penetrating injury had been transferred. The model predicted drop from 968 deaths to 876 deaths, or a further drop in overall mortality to 3.6 percent, had patients with an injury severity score > 14 been treated at a pediatric trauma center.

CONCLUSIONS:
This study suggests that guidelines mandating the transfer to a pediatric trauma center of pediatric trauma patients less than 1 year of age, with penetrating injuries, and with ISS scores > 14 would have saved the lives of 92 children in Pennsylvania.

Notes

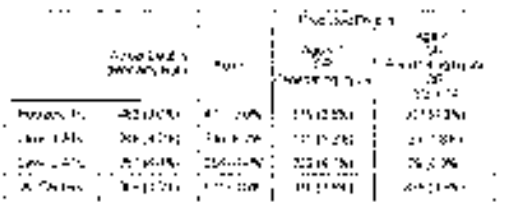

Table: Actual deaths and predicted death and mortality rate for simulated transfer guidelines

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50 THE MULTI-INSTITUTIONAL VALIDATION OF THE NEW DIAGNOSTIC INDEX FOR PHYSICAL CHILD ABUSE (DIPCA) (6 MINUTES)

David C. Chang, Ph.D., MPH, MBA; Vinita Knight, M.P.H.; Susan Ziegfeld, M.S.N.*; Adil Haider, M.D., M.P.H.†; Ellen MacKenzie, Ph.D.; Charles Paidas, M.D.**
Johns Hopkins Bloomberg School of Public Health; Johns Hopkins Medical Institutions Baltimore, MD, USA and New York Medical College†, Valhalla, NY, USA*

PURPOSE:
There is currently no evidence-based guideline for the diagnosis of physical child abuse. DIPCA was developed to assist in the identification of physical child abuse. It is a scale that assigned point values, based on variable weights from logistic regression models, to age and patterns of injuries (including fracture of base or vault of skull, contusion of eye, rib fracture, intracranial bleeding, multiple burns), with higher scores indicating greater suspicion for abuse. The purpose of this study was to validate this potentially new tool in another independent dataset.

METHODS:
A cross-sectional hospital discharge databases from 1961 hospitals in 17 states were used (n=58,558). Children age <=14 with ICD-9-CM codes 800-859 were included for analysis. Child abuse cases were identified by E codes and certain ICD-9-CM codes in the 995.5x range. DIPCA performance was evaluated by discrimination (Receiver Operating Characteristics (ROC)) and goodness-of-fit (pseudo r2).

RESULTS:
A total of 447 abuse patients (0.76 percent) were identified. The ROC of DIPCA in this dataset was 0.89, compared to 0.86 in the development dataset. The pseudo r2 of DIPCA in this dataset was 0.26, compared to 0.28 in the development dataset. A DIPCA score of 3 has a sensitivity of 86.6 percent and specificity of 80.5 percent for detecting physical abuse; raising the threshold to score of 4 improves the specificity to 93.1 percent but at a loss of sensitivity to 71.8 percent.

CONCLUSIONS:
The validity of the new DIPCA instrument is supported by its performance in independently derived dataset. A score of 3 on DIPCA represents a balanced tradeoff in sensitivity and specificity of the instrument in detecting physical abuse, and is an optimal threshold above which to begin considering abuse in differential diagnosis. Application of the instrument could assist clinicians in identifying physical child abuse cases among pediatric trauma patients.

Notes

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51 NEUROPEPTIDE, BOMBESIN AS AN AGENT FOR ALLOGRAFT SPECIFIC IMMUNOSUPPRESSION IN SMALL BOWEL TRANSPLANTATION IN RATS

(3 MINUTES)

Osamu Kimura, M.D.; Koji Higuchi, M.D.; Taizo Furukawa, M.D.; Seitetsu Go, M.D.; Naomi Iwai, M.D.

Division of Surgery, Children's Research Hospital, Kyoto Prefectural University of Medicine, Kawaramachi Hirokoji Kamigyo-ku, Kyoto, Japan

PURPOSE:

In small bowel transplantation (SBT), acute and chronic rejection remains formidable problems despite recent advances of immunosuppressive regimen based on Tacrolimus (FK506). However, FK506 may induce severe adverse effects such as renal toxicity, or encephalopathy. The authors have previously demonstrated that neuropeptide, bombesin (BBS) had an ability to prevent allograft mucosal atrophy under FK506 immunosuppression in rats. This study was done to investigate, on the concept of neuroendocrine-immune modulation, whether BBS itself had immunosuppressive effect on SBT and could be an useful agent for reducing the dose of FK506.

METHODS:

Allogeneic small bowel transplantation was heterotopically performed in rats (n=12). All rats received daily administration of extremely low dose of FK506 (0.1 mg/kg/day) from postoperative day 0 to day 14. Rats were divided into two groups of six rats each, and administered BBS or normal saline as a control. Biopsy of the allograft was performed from the stoma site at postoperative day 6 and 10. After two weeks of the treatment, all rats were killed and the graft mucosal villous state was evaluated by Hematoxylin and Eosin staining, and TUNEL immunohistochemistry. This experimental procedure was permitted by the Committee for Animal Research, Kyoto Prefectural University of Medicine.

RESULTS:

By postoperative day 14, complete mucosal destruction developed in control group accompanied by severe transmural cellular infiltration, whereas villous architecture was well preserved in BBS group with slight infiltration of lymphocytes into lamina propria of the allograft (Figure 1). The TUNEL index of graft mucosa in the control group was 1.26+/-0.37 percent (mean+/-SD) and that in the BBS group was 0.59+/-0.20 percent, respectively. There was a significant difference ($P<0.001$) between the 2 groups.

CONCLUSIONS:

This study demonstrated that bombesin had an immunosuppressive effect on transplanted allografts and could reduce the dose of FK506 dramatically. The concept of neuroendocrine-immune modulation can be useful for breaking through the problems of small bowel transplantation.

Notes

(graphic on next page)

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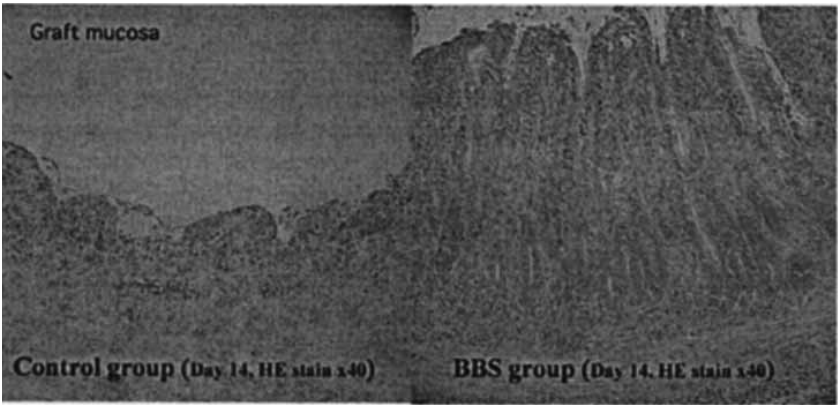

Figure 1: HE staining of the allograft mucosa. The villi in BBS group were well preserved whereas those in control group were completely destroyed.

52 EVOLUTIONARY EXPERIENCE WITH IMMUNOSUPPRESSION IN PEDIATRIC INTESTINAL TRANSPLANTATION (6 MINUTES)

Geoffrey J. Bond, M.D., George V. Mazariegos, M.D., Rakesh Sindhi, M.D., Kareem Abu-Elmagd, M.D., Jorge Reyes, M.D.
University of Pittsburgh Medical Center, Pittsburgh, PA, USA

METHODS:
From 1990 to 2003, 107 children received 113 allografts [64 L/I, 35 II,14 MV]. Mean recipient age was 4.8 years (0.5-18yrs). The graft was not immunomodulated. 38 percent received donor bone marrow augmentation [1995-2003]. 24 percent had a positive ve crossmatch. Advances in IS by era were: i) Baseline tacrolimus/steroids (n=52) [1990-1995,1997-1998]. ii) Addition of induction therapy with cyclophosphamide (n=16) [1995-1997] then daclizumab (n=24) [1998-2001]. Additional agents included azathioprine (n=16), mycophenolate mofetil (n=2) and sirolimus (n=16) [1990-2001]. iii) Thymoglobulin preconditioning protocol (TPP) and steroid free posttransplant tacrolimus monotherapy(n=21) [2002-2003]. In this later group, a dose of 2-5mg/kg of thymoglobulin was infused pre/post allograft reperfusion.

RESULTS:
Overall Kaplan-Meier patient/graft survival was 74 percent/69 percent at 1 year, 59 percent/53 percent at 3 years and 58 percent/50 percent at 5 years. Patient and graft survival continues to improve yearly with no loss of new grafts over the last 22 months. The incidence of CMV disease and PTLD markedly decreased throughout the experience. Likewise, incidence of rejection decreased from 88 percent to 38 percent. In the recent group (iii-TPP), tacrolimus weaning commenced 60 days post transplant. To date 18 recipients are on tacrolimus monotherapy, as little as a single dose three times a week.

CONCLUSIONS:
Intestinal transplantation has evolved to be the standard of care for children with intestinal failure. Thymoglobulin preconditioning allowing steroid free tacrolimus monotherapy and possible subsequent drug withdrawl offers profound long term benefits.

Notes

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53 ORTHOTOPIC LIVER TRANSPLANTATION IN CHILDREN UNDER ONE YEAR OF AGE
(3 MINUTES)

Greg M. Tiao, M.D.; Maria Alonso, M.D.; John Bucuvalas, M.D.; William Balistreri, M.D.; Nada Yazigi, M.D.; Jorge Bezerra, M.D.; James Heubi, M.D.; Frederick Ryckman, M.D.
Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA

PURPOSE:
The success of pediatric liver transplantation (OLTxp) has improved greatly since its widespread application in the 1980's. No group has benefited more from this than infants< 1 year of age. We report our experience in infants < 1 year of age who underwent OLTxp.

METHODS:
Retrospective review of all transplant patients < 1 year of age, transplanted between July 1986 and October 2003.

RESULTS:
81 infants < 1 underwent OLTxp (mean age = 7.6+/- 1.1 months). Biliary atresia was the primary indication for transplantation in 61 percent. The overall series survival was 77 percent. Patients were stratified according to time period when transplanted. One-year and overall graft and patient survival improved over time (table).

	One-year Survival Graft	One-year Survival Patient	Overall Survival Graft	Overall Survival Patient
1986-1989 (n=8)	50%	65%	50%	65%
1990-1994 (n=20)	82%	82%	56%	65%
1995-1999 (n=29)	87%	93%	77%	83%
2000-2003 (n=24)	81%	88%	81%	88%

Hepatic artery thrombosis occurred in six patients four of whom required retransplantation. All survived. One patient had primary non-function and subsequently expired. Sepsis/multisystem organ failure (MSOF) occurred in 12 patients all of whom expired. Post-transplant lymphoproliferative disease (PTLD) occurred in 2 patients both who subsequently expired. Four patients expired from recurrent disease.

CONCLUSIONS:
Successful OLTxp in infants is possible with post-transplant survival increasing over the study period. Technical complications (HAT/PNF) may require retransplantation but were uncommon causes of patient loss. MSOF was the most significant adverse complication. The consequences of immunosuppression (MSOF/PTLD) were the most common cause of patient loss. Further improvement in overall survival will require better immunosuppressive strategies.

Notes

Underlining denotes the author scheduled to present at the meeting.

Exhibit Dates and Hours

Friday, May 28	6:45 a.m. – 11 a.m.
Saturday, May 29	7 a.m. – 11 a.m.
	1 p.m. – 2 p.m.

The Sawgrass Marriott Resort & Beach Club
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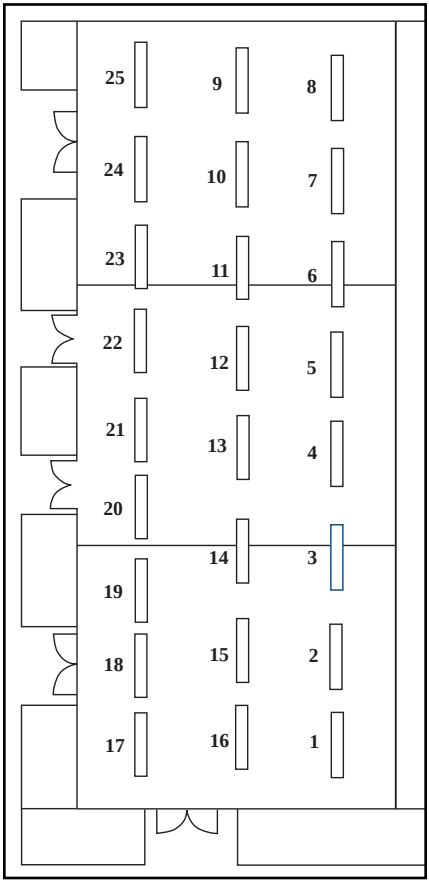

Company	Table Number
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Elsevier	13
Ethicon Endo-Surgery, Inc.	1
Fleet Pharmaceuticals	10
Hodder Arnold Publishers	7
Huntsville Hospital	15
Intuitive Surgical	20
JARIT® Surgical Instruments	9
Jerome Medical	21
Karl Storz Endoscopy-America, Inc.	17, 18
Kimberly-Clark/Ballard Medical	24
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Nemours/AI duPont Hospital for Children	2
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APSA Outcomes & Clinical Trials Center — Table: 6

633 N. St. Clair Street, 25 NE, Chicago, IL 60611
E-mail: mwerner@facs.org

The APSA Outcomes Center is a research initiative to develop specific national, evidence-based guidelines applicable across the continuum of care for infants and children with surgical problems. The Center will display article reprints, informational brochures, and fact sheets.

Bentec Medical, Inc. — Table: 5

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Elsevier publishes medical books, journals and multimedia.

Ethicon Endo-Surgery, Inc. Table: 1

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E-mail: dgreene@eesus.jnj.com

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Huntsville Hospital Table: 15

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Karl Storz Endoscopy-America, Inc. — Tables: 17,18

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