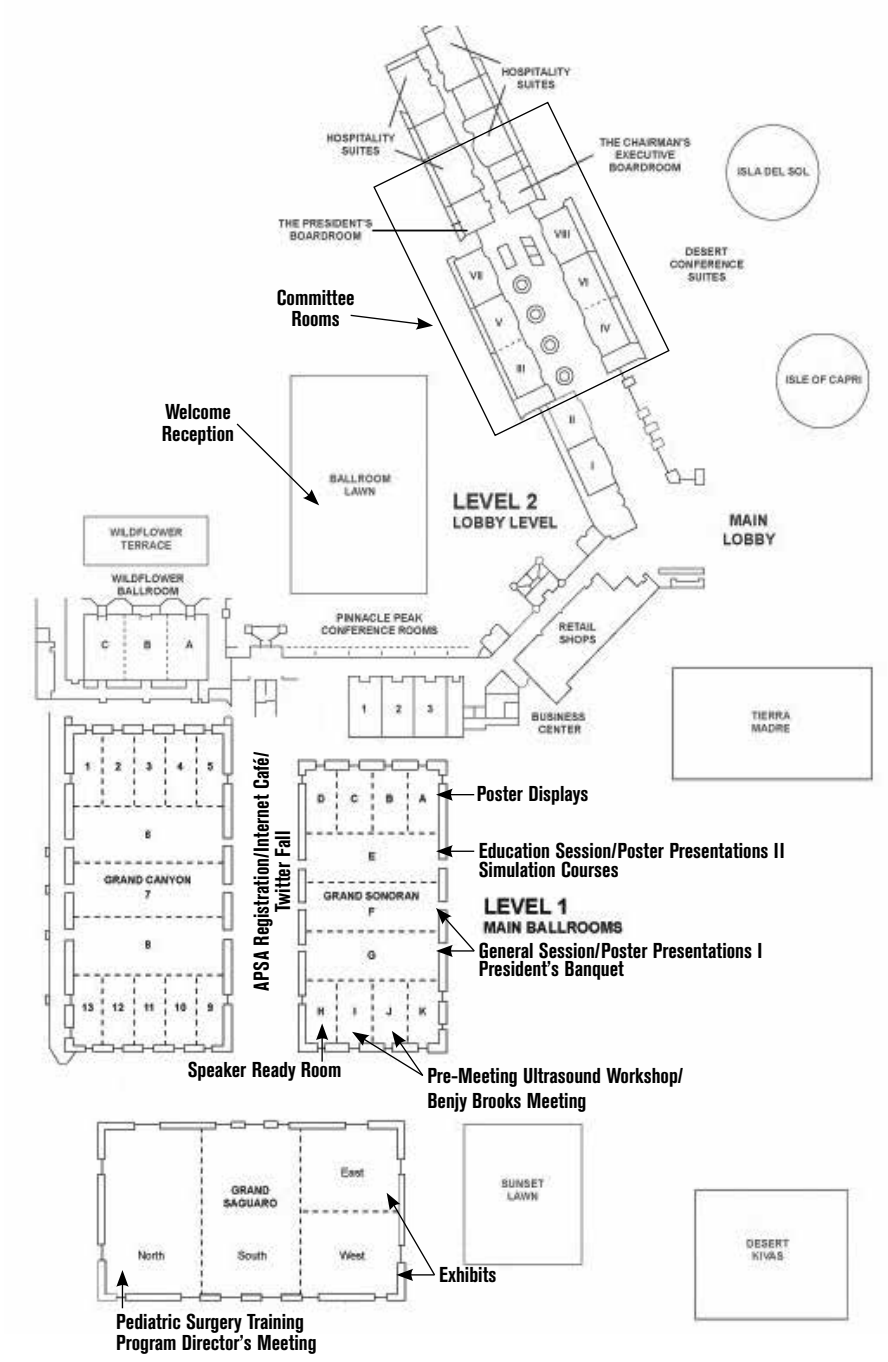
APSA 45TH ANNUAL MEETING

May 29 – June 1, 2014

JW Marriott Desert Ridge Resort & Spa
Phoenix, Arizona, USA

Final Program

www.eapsa.org


HOSPITALITY SUITES
HOSPITALITY SUITES
THE CHAIRMAN'S EXECUTIVE BOARDROOM
ISLA DEL SOL
THE PRESIDENT'S BOARDROOM
DESERT CONFERENCE SUITES
Committee Rooms
ISLE OF CAPRI
Welcome Reception
BALLROOM LAWN
LEVEL 2
LOBBY LEVEL
MAIN LOBBY
WILDFLOWER TERRACE
WILDFLOWER BALLROOM
PINNACLE PEAK CONFERENCE ROOMS
RETAIL SHOPS
BUSINESS CENTER
TIERRA MADRE
APSA Registration/Internet Café/ Twitter Fall
Poster Displays
Education Session/Poster Presentations II
Simulation Courses
LEVEL 1
MAIN BALLROOMS
General Session/Poster Presentations I
President's Banquet
Speaker Ready Room
Pre-Meeting Ultrasound Workshop/
Benjy Brooks Meeting
GRAND SAGUARO
East
North
South
West
SUNSET LAWN
DESERT KIVAS
Exhibits
Pediatric Surgery Training
Program Director's Meeting

American Pediatric Surgical Association Mission

To ensure optimal pediatric surgical care of patients and their families, to promote excellence in the field, and to foster a vibrant and viable community of pediatric surgeons.

We do this by:

- Developing and advocating for standards of care for infants and children and influencing public policy around the surgical care of children
- Encouraging discovery, innovation and improvement of care
- Providing rich venues for the dissemination of up-to-date knowledge
- Offering high quality continuing education to members
- Creating identity and community among pediatric surgeons
- Promoting a supportive health care environment for patients, staff and surgeons and to making certain that it is sustained by economic health

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Treasurer 2014-2017
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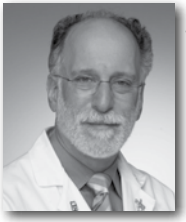
APSA THANKS DEPARTING BOARD MEMBERS



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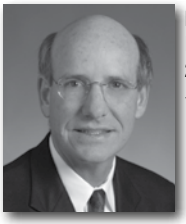
cjs3@columbia.edu



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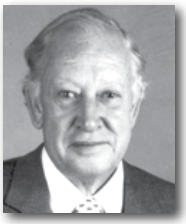
PAST PRESIDENTS

Robert E. Gross
1970-1971

Orvar Swenson
1973-1974

C. Everett Koop
1971-1972



Harvey E. Beardmore
1974-1975

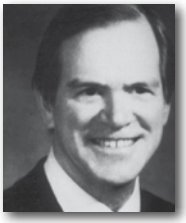
H. William Clatworthy, Jr.
1972-1973

Thomas M. Holder
1975-1976

PAST PRESIDENTS (CONT.)

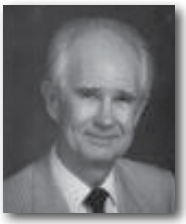
Alexander H. Bill
1976-1977

William B. Kiesewetter
1981



E. Thomas Boles, Jr.
1977-1978

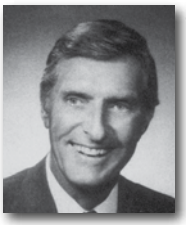
W. Hardy Hendren
1981-1983



Morton M. Woolley
1978-1979

Lester W. Martin
1983-1984

Robert G. Allen
1979-1980



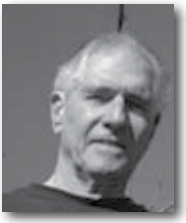
Judson G. Randolph
1984-1985

Thomas V. Santulli
1980-1981

Dale G. Johnson
1985-1986

PAST PRESIDENTS (CONT.)

J. Alex Haller, Jr.
1986-1987



Alfred A. deLorimier
1991-1992

Robert J. Izant, Jr.
1987-1988

Dick G. Ellis
1992-1993

James A. O'Neill, Jr.
1988-1989

Raymond A. Amoury
1993-1994

Eric W. Fonkalsrud
1989-1990

Jay L. Grosfeld
1994-1995

Robert M. Filler
1990-1991

Arvin I. Philippart
1995-1996

PAST PRESIDENTS (CONT.)

Keith W. Ashcraft
1996-1997

Arnold G. Coran
2001-2002

H. Biemann Othersen, Jr.
1997-1998

R. Peter Altman
2002-2003

Marc I. Rowe
1998-1999

Bradley M. Rodgers
2003-2004

Kathryn D. Anderson
1999-2000

Robert J. Touloukian
2004-2005

David Tapper
2000-2001

M. Judah Folkman
2005-2006

PAST PRESIDENTS (CONT.)

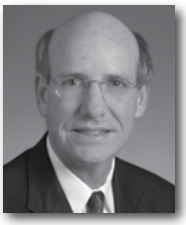
Patricia K. Donahoe
2006-2007

Marshall Z. Schwartz
2010-2011

Moritz M. Ziegler
2007-2008

Robert C. Shamberger
2011-2012

Michael R. Harrison
2008-2009



Keith T. Oldham
2012-2013

Keith E. Georgeson
2009-2010

Thomas M. Krummel
2013-2014

PAST OFFICERS

Secretary

Thomas M. Holder 1970–1973
Dale G. Johnson 1973–1976
James A. O'Neill, Jr 1976–1979
Robert J. Touloukian. 1979–1982
Anthony Shaw 1982–1985
Raymond A. Amoury 1985–1988
Kathryn D. Anderson 1988–1991
Keith W. Ashcraft 1991–1994
Howard C. Filston 1994–1997
Keith T. Oldham 1997–2000
Robert M. Arensman 2000–2003
Donna A. Caniano 2003–2006
Ronald B. Hirschl 2006–2009
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Treasurer

Alfred A. deLorimier 1970–1972
Lucian L. Leape 1972–1975
Robert G. Allen 1975–1978
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J. Alex Haller, Jr 1981–1984
Dick G. Ellis 1984–1987
William P. Tunell 1987–1990
Bradley M. Rodgers 1990–1993
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Robert M. Arensman 1996–1999
Moritz M. Ziegler 1999–2002
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Neil J. Sherman 2005–2008
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Charles J. Stolar 2011-2014

Governor

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Tague C. Chisholm 1971–1973
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Dale G. Johnson 1977–1979
Lester W. Martin 1978–1980

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APSA REPRESENTATIVES

APSA members volunteer and hold positions within many professional organizations worldwide, and we commend their dedication to advancing the field of pediatric surgery. The list below consists of those representatives who have been elected, nominated or otherwise appointed by the APSA Board of Governors. We appreciate their time serving as official APSA representatives.

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Anthony D. Sandler

American Academy of Orthopaedic Surgeons
Writing Panel of the Appropriate Use Criteria for Pediatric Supracondylar Humerus Fractures
Fizan Abdullah

Review Panel of the Appropriate Use Criteria for Pediatric Supracondylar Humerus Fractures
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Pediatric Surgery Board of the American Board of Surgery
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John H.T. Waldhausen

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Advisory Council for Pediatric Surgery Specialty Society Representative
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American Medical Association
Relative Value Update Committee
Mustafa H. Kabeer
Samuel D. Smith

Trauma Center Association of America
Pediatric Committee
Michael L. Nance

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Stephen C. Raynor 2013-2016

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Ankush Gosain 2013-2016
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Mary Beth Madonna 2011-2014
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Patricia Lange 2013-2016
Steven L. Lee 2013-2016
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John H.T. Waldhausen 2009-2014
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Brian Kenney, *Friend of Committee*
Gretchen Jackson, *Liaison from Informatics and Telemedicine Committee*

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Eugene D. McGahren, 2011-2014
Andreas H. Meier, 2011-2014
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Craig W. Lillehei, *Friend of Committee*
Andreas H. Meier, *Friend of Committee*
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APSA COMMITTEES 2013-2014

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Foong-Yen Lim, 2012-2015
Christopher S. Muratore, 2011-2014
George B. Mychaliska, 2013-2016
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Amy J. Wagner, 2012-2015
Abdalla E. Zarroug, 2012-2015

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Todd A. Ponsky, 2010-2016
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Edward P. Tagge, 2012-2015
Mark L. Wulkan, 2011-2014
Matthew T. Harting, 2013-2016, *Consultant*
Jeffrey S. Upperman, *Ex Officio*

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Matias Bruzoni, 2013-2016
Marilyn W. Butler, 2012-2015
Diana L. Farmer, 2012-2015
Gerald M. Haase, 2010-2014
Ai-Xuan L. Holterman, 2013-2016
Sanjay Krishnaswami, 2009-2015
Marc A. Levitt, 2009-2015
Donald E. Meier, 2012-2015
Benedict C. Nwomeh, 2012-2015
Keith T. Oldham, 2012-2015
David H. Rothstein, 2011-2014
Doruk E. Ozgediz, 2012-2015, *Consultant*

Membership and Credentials

Michael A. Skinner, Chair, 2013-2015
Michael.Skinner@childrens.com
Harry Applebaum, Vice Chair, 2013-2015
happlebaum@mednet.ucla.edu
Gail E. Besner, 2012-2015
Adela Casas-Melley, 2012-2015
Robert A. Cowles, 2010-2016
Bryan J. Dicken, 2012-2015
Julie R. Fuchs, 2012-2015
Loretto A. Glynn, 2012-2015
Stephen S. Kim, 2012-2015
Richard H. Pearl, 2010-2016
Mark L. Silen, 2011-2014

New Technology

Christopher K. Breuer, Chair, 2013-2015
christopher.breuer@nationwidechildrens.org
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eskarsgard@cw.bc.ca
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Robert Cina, 2011-2014
Sanjeev Dutta, 2013-2016
Timothy J. Fairbanks, 2012-2015
Marcus Jarboe, 2012-2015
Tamir H. Keshen, 2012-2015
Steven Teich, 2013-2016

Russell K. Woo, 2013-2016
Abdalla E. Zarroug, 2011-2014
James K. Wall, 2013-2016, *Consultant*

Nominating

Jessica J. Kandel, Chair, 2013-2014
jkandel@surgery.bsd.uchicago.edu
Barbara A. Gaines, 2013-2014
Andrea A. Hayes-Jordan, 2013-2014
Don K. Nakayama, 2013-2014
Keith T. Oldham, 2013-2016
Marshall Z. Schwartz, 2011-2014
Robert C. Shamberger, 2012-2015
Daniel H. Teitelbaum, 2013-2014

Outcomes and Clinical Trials

Saleem Islam, Chair, 2013-2015
islamsa@surgery.ufl.edu
Cynthia D. Downard, Vice Chair, 2013-2015
c0down01@louisville.edu
Mary T. Austin, 2012-2015
Martin L. Blakely, 2011-2014
Casey M. Calkins, 2010-2014
Li Ern Chen, 2012-2015
Roshni A. Dasgupta, 2012-2015
Katherine J. Deans, 2013-2016
Adam B. Goldin, 2010-2015
Kathleen Graziano, 2012-2015
Monica E. Lopez, 2012-2015
Milissa A. McKee, 2013-2016
Pramod S. Puligandla, 2012-2015
Elizabeth J. Renaud, 2012-2015
Jacqueline M. Saito, 2011-2014
Shawn D. St. Peter, 2009-2014
Fizan Abdullah, 2013-2015, *Ex Officio*
Charles D. Vinocur, 2012-2014
Holly L. Hedrick, 2012-2015, *Liaison*
James E. Stein, 2012-2015, *Liaison*

Eblast/Literature Review Subcommittee

Martin L. Blakely, Chair, 2011-2014
martin.blakely@vanderbilt.edu
Monica E. Lopez, 2012-2015

IT/Website Subcommittee

Pramod S. Puligandla, Chair, 2012–2015
pramod.puligandla@mcgill.ca

Survey Subcommittee

Adam B. Goldin, Chair, 2011-2014
adam.goldin@seattlechildrens.org
Li Ern Chen, 2012-2015
Elizabeth J. Renaud, 2013-2014

Practice

J. Duncan Phillips, Chair, 2012-2014
dphillips@wakemed.org
David M. Notrica, 2012-2014
dnotrica@surgery4children.com
Lisa Abramson, 2012-2015
Anthony Chin, 2012-2015
John J. Doski, 2012-2015
Nicholas F. Fiore, Jr., 2012-2015
James C. Gilbert, 2010-2016
Philip L. Glick, 2009-2014
Randall M. Holland, 2011-2014
Mustafa H. Kabeer, 2009-2014
Tamir H. Keshen, 2012-2015
Stephen G. Kimmel, 2013-2016
Marc S. Lessin, 2012-2015
Kevin P. Moriarty, 2011-2014
Don K. Nakayama, 2010-2016
Nam Nguyen, 2011-2014
Ann O'Connor, 2012-2015
Ellen M. Reynolds, 2011-2014
David J. Schmeling, 2013-2016
Andrew M. Schulman, 2013-2016
Donald B. Shaul, 2012-2015
Dennis W. Vane, 2010-2016

APSA COMMITTEES 2013-2014 (CONT.)

Program

Peter F. Ehrlich, Chair, 2012-2015
pehrlich@med.umich.edu
Daniel J. Ostlie, Vice Chair 2012-2015
ostlie@surgery.wisc.edu
Terry L. Buchmiller, 2010-2016
Casey M. Calkins, 2012-2015
J. Ted Gerstle, 2011-2014
Allan M. Goldstein, 2012-2015
Kenneth W. Gow, 2012-2015
Andre V. Hebra, 2012-2015
Romeo C. Ignacio, 2011-2014
Sundeep G. Keswani, 2013-2016
Steven L. Lee, 2012-2015
Tippi C. MacKenzie, 2012-2015
George B. Mychaliska, 2013-2016
Wallace W. Neblett, 2011-2014
Peter F. Nichol, 2013-2016
Todd A. Ponsky, 2011-2014
David A. Rodeberg, 2011-2014
Eric R. Scaife, 2012-2015
Anthony Stallion, 2012-2015
Adam M. Vogel, 2013-2016

Publications

Anne C. Fischer, Chair 2013-2015
Anne.Fischer@beaumont.edu
Doug Miniati, Vice Chair, 2013-2015
dminiati@yahoo.com
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Charles S. Cox, 2011-2014
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APSA FOUNDATION

APSA FOUNDATION HISTORY

The APSA Foundation is a 501(c)(3) tax-exempt charitable corporation. Its intent is to foster support for scientific investigation in the field of children's surgery by providing an Annual Enrichment Grant to qualified applicants.

Since its inception, the APSA Foundation has provided more than $385,000 in grant support for our young pediatric surgeon-scientists (see list below). The return on investment has been extraordinary! A formal grant application process with stringent peer review has been established as the method for selecting each grant recipient. The stipend for each grant has gradually increased and in the past five years has reached $25,000 per grant. In 2013, a total of three grants were awarded.

Most of the recipients have used their Enrichment Grants from the APSA Foundation as a springboard from which to acquire significant external funding from the National Institutes of Health (NIH) and other sources.

The Foundation was established in the state of Florida in 1993, thanks to a group of APSA members led by Dr. Albert H. Wilkinson, Jr., and included former presidents Kathryn D. Anderson, James A. O'Neill, Jr., the late Alfred A. de Lorimier, APSA President Dick G. Ellis, APSA Treasurer Bradley M. Rodgers and APSA Secretary Keith W. Ashcraft.

Dr. Jay L. Grosfeld was installed as the Chairman of the Board of Directors serving indefinitely at the discretion of the Board.

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Your tax-exempt contributions to APSAF have energized young and deserving pediatric surgeons to become some of the leading surgeon-scientists of the future.

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Splenic Neurovascular Units in Hirschsprung's Associated Enterocolitis

David M. Gourlay, MD
IAP Prevents Intestinal Inflammation in the Newborn Intestine

Shawn D. Larson, MD
Inflammasome Activation is Critical for Neonatal Emergency Myelopoiesis and Expansion of Hematopoietic Stem Cells for Inflammation

2012
Harold N. Lovvorn, III, MD
Induced Pluripotent Stem Cells for the Study of Wilms' Tumorigenesis

KuoJen Tsao, MD
Errors and Adverse Events in the Setting of the Neonatal Surgery Performed in the NICU

2011
Shaun M. Kunisaki, MD
Mesenchymal Stem Cell Regulation of Fetal Lung Development in Diaphragmatic Hernia

Peter F. Nichol, MD
Using a Genetic Model of Duodenal Atresia to Understand Regenerative Mechanisms within the Intestine

2010
Cynthia D. Downard, MD
Control of Intestinal Microcirculation in NEC

Cassandra M. Kelleher, MD
Extracellular Components Critical to Alveolarization: Contributions of Elastin

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2009
Tippi C. MacKenzie, MD
Maternal Immune Response *in Utero* Hematopoietic Stem Cell Transplantation

Kelly A. Miller, MD
The Pathogenic Role of Enteric Glia in Hirschsprung's Enterocolitis

2008
Douglas N. Miniati, MD
Role of Notch4 Signaling in Aberrant Pulmonary Vascular Development

2007
Alan M. Goldstein, MD
Role of Sonic Hedgehog in Enteric Nervous System Development

2006
James C.Y. Dunn, MD
Enteric Nervous System Regeneration for Hirschsprung's Disease

2005
Elizabeth A. Beierle, MD
Focal Adhesion Kinase and Vascular Endothelial Growth Factor Receptor-3 in Human Neuroblastoma

Kerilyn K. Nobuhara, MD
Intestinal Dysmotility in Fetal Repair of Gastroschisis

2004
Karl G. Sylvester, MD
Liver Regeneration and Stem Cell Regulation via the WNT Signaling Pathway

Christopher K. Breuer, MD
Do Tissue Engineered Venous Conduits Grow? Investigating the Growth Potential of Tissue Engineered Venous Conduits in a Juvenile Lamb Model

2003
Peter F. Ehrlich, MD
Injury Prevention through Brief Intervention: A Novel Approach to Pediatric Injury Prevention

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2002
Mary Beth Madonna, MD
Growth Factor Receptor Signaling and its Relationship to Cell Proliferation and Differentiation in a Neuroblastoma Cell Line

2001
Anthony Stallion, MD
Intestinal Ischemia Reperfusion Injury Contributes to the Initiation of the Systemic Inflammatory Response Syndrome

2000
Edward M. Barksdale, Jr., MD
The Therapy of Neuroblastoma-Induced Disorders of Dendropoiesis of Dendritic Cell Development

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Evidence-Based Guidelines for Resource Utilization in Pediatric Spleen/Liver Injury

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Heparin-Binding EGF-Like Growth Factor (HBEGF) and Intestinal Ischemia Reperfusion Injury

1997
Charles N. Paidas, MD
Septation of the Cloaca

1996
Michael G. Caty, MD
Preservation of Intestinal Mucosal Structure and Function with Intraluminal Oxygenated Perfluorocarbon

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ACS /APSA Executive Leadership Program in Health Policy and Management
Max R. Langham, Jr. - 2014
Steven Teich - 2013
Peter W. Dillon - 2012
Patrick V. Bailey - 2011
Aviva L. Katz - 2010
Dennis P. Lund - 2009
George W. Holcomb, III - 2008

APSA /Association of Pediatric Surgeons Training Program Directors M. Judah Folkman Memorial Award Recipients

Best Podium Presentation
2013
Basic Science
Eric D. Girard, MD
Amniotic Fluid Stem Cells in a Bioengineered Scaffold: a New Frontier in Patient Specific Therapy for Premature Lung Disease

Clinical Science
Ryan P. Cauley, MD
Higher Costs Charges and Resource Utilization do not Affect Survival in Congenital Diaphragmatic Hernia

2012
Amar Nijagal, MD
Fetal Intervention Triggers the Activation of Paternal Antigen-Specific Maternal T Cells

AWARD RECIPIENTS (CONT.)

2011
Amar Nijagal, MD
The Maternal Adaptive Immune Response Against Paternal Antigens Incites Fetal Demise After Fetal Intervention

2010
Mehul V. Raval, MD
Pediatric ACS NSQIP: Feasibility of a Novel Prospective Assessment of Surgical Outcomes — a Phase I Report

2009
Eric Jelin, MD
Effects of Notch4 on Lung Vascular Remodeling

2008
Emily T. Durkin, MD
The Ontogeny of Human Fetal NK Cell Allorecognition: A Potential Barrier to *in Utero* Transplantation

Best Poster Presentation

2012
Eric J. Stanelle, MD
Pediatric Synovial Sarcoma: Prognostic Factors, Management of Pulmonary Metastasis, and Survival Outcomes

2011
Barrie S. Rich, MD
Predictors of Survival in Childhood and Adolescent Cutaneous Melanoma

2010
Allison L. Speer, MD
Tissue-Engineered Esophagus is a Versatile *in Vivo* Mouse Model with Intact Architecture

2009
Laura A. Boomer, MD
Cholangiocyte Apoptosis During Lamprey Metamorphosis

2008
Henry L. Chang, MD
In Vivo Metastatic/Invasion Assay to Identify Cancer Stem Cells and their Markers

AWARD RECIPIENTS (CONT.)

APSA Posters of Distinction

Basic Science
2013
Leo Andrew O. Benedict, MD
Spinal Cord Expression of Virally Derived Mullerian Inhibiting Substance Extends Life and Promotes Survival of Motor Neurons in Transgenic SOD1 Mutant Mice

2012
Syamal D. Bhattacharya, MD
Temporal Relationships Between Positive Urine Culture and Onset of Necrotizing Enterocolitis

2011
R. Dawn Fevurly, MD
Novel Zebrafish Model Reveals Critical Role for MAPK in Lymphangiogenesis

2010
Hayden W. Stagg, MD
Matrix Metalloproteinase-9 Induces Hyperpermeability Following Traumatic Burn Injury

2009
Francois I. Luks, MD
Reflectance Spectrometry for Realtime Hemoglobin Determination of Placental Vessels During Endoscopic Laser Surgery for TTTS

Clinical Science
2013
Deidre C. Kelleher, MD
Impact of a Checklist on ATLS Task Performance During Pediatric Trauma Resuscitation

2012
Alejandro Garcia, MD
The Role of Notch Inhibition in a Novel Hepatoblastoma Orthotopic Model

2011
Jesse R. Gutnick, MD
Circulating Thyrotropin Receptor MRNA for Evalution of Thyroid Nodules and Surveillance of Thyroid Cancer

AWARD RECIPIENTS (CONT.)

2010
Diana L. Diesen, MD
Temporal Association Between Blood Transfusion and Necrotizing Enterocolitis in Premature Infants

2009
Henry L. Chang, MD
Mullerian Inhibiting Substance Inhibits Migration of Epithelial Cancer Cell Lines

The Sheikh Zayed Institute Award for Innovation in Pediatric Surgery

This award, in the amount of $10,000, is presented for Best Innovation abstract. The award is supported by a generous grant from the Sheikh Zayed Institute for Pediatric Surgical Innovation at Children's National Medical Center, Washington, DC. The winning presentation is selected by a special committee.

2013
Veronica F. Sullins, MD
A Novel Biodegradable Device for Intestinal Lengthening

2012
Sabina Siddiqui, MD
Development of an Isolation Bed for Patients Undergoing MIBG Treatment for Neuroblastoma

2011
Maridelle B. Millendez, MD
Evaluation of Intestinal Viability Using 3-CCD (Charge Coupled Device) in Children Undergoing Appendectomy

Travel Fellowship

The Travel Fellowship, supported by APSA and the APSA Foundation, is an annual award for young surgeons from a resource-poor area outside the United States and Canada to attend and experience the educational and networking opportunities of the APSA Annual Meeting. The winner attends and presents at the APSA Annual Meeting. The 2014 Travel Fellowship is supported by a generous grant from Sidra Medical and Research Center.

2014
John K.M. Nyagetuba, MB, ChB
Bethany Kids at Kijabe Hospital
Nairobi, Kenya
Paediatric Surgery in Kenya: Challenges and Solutions

Tran Anh Quynh, MD, PhD
National Hospital of Pediatrics
Hanoi, Vietnam
The Development of Vietnam Pediatric Surgery

2013
Omolara Williams, MD
Lagos State University College of Medicine and Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria
Practicing in a Resource Constrained Environment: Stumbling Blocks and Stepping Stones

NEW MEMBERS 2013-2014

The APSA Board of Governors and Membership Congratulates Our Newest Members

Regular Members

Alkhoury, Fuad
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Vasudevan, Sanjeev A.

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Pierro, Agostino

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Stroud, Andrea M.
Talbot, Lindsay J.
Tashiro, Jun
Sullins, Veronica F.
Waters, Alicia M.

NEW MEMBERS 2013-2014 (CONT.)

Pledge for New Members of the American Pediatric Surgical Association

This pledge will be read before the New Member Induction Ceremony.

As president of the American Pediatric Surgical Association, it is my pleasure to welcome you into regular membership and to stress the obligations that you assume by such membership.

The American Pediatric Surgical Association was founded on April 15, 1970, by 200 surgeons drawn together to encourage specialization in the field of pediatric surgery; to make available the benefits to be derived from the services of qualified pediatric surgeons; to promote and maintain the quality of education in pediatric surgery through meetings, lectures and the distribution of printed materials; to raise the standards of the specialty by fostering and encouraging research and scientific progress in pediatric surgery and by establishing standards of excellence in the surgical care of infants, children and teenagers; and to provide a forum for the dissemination of information with regard to pediatric surgery.

The association expects its new members to support the objectives and obligations of the association as set forth in the Articles of Incorporation and to reflect the values expressed in the Principles of Medical Ethics as stated in the Preamble to the Bylaws. The members are also expected to support the association through active participation in its meetings. We look forward to your contributions in advancing its proud traditions.

If you pledge to exemplify the high ethical and professional standards of the American Pediatric Surgical Association in your practice of surgery, and if you will participate actively in future meetings, please respond by stating "I will." Since you have indicated your intent to become an active and worthy member and since you have been duly elected, I now declare you to be a regular member of the American Pediatric Surgical Association.

I now call upon the current members and guests of the American Pediatric Surgical Association to rise and join me in welcoming our new colleagues.

IN MEMORIAM

Besserman, Abraham M. 2013
Noseworthy, John. 2013
Wilkinson, Albert H., Jr. 2013

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SCHEDULE & PROGRAM

SCHEDULE-AT-A-GLANCE

Wednesday, May 28

7:00 a.m. – 1:00 p.m.	APSA Board of Governors Meeting	*President's Boardroom*
1:00 p.m. – 6:00 p.m.	**Ultrasound Course** *Pre-registration Required*	*Grand Sonoran I-J*
1:00 p.m. – 7:00 p.m.	Pediatric Surgery Training Program Directors Meeting	*Grand Saguaro North*
2:00 p.m. – 6:00 p.m.	Registration	*Grand Sonoran Foyer*
2:00 p.m. – 6:00 p.m.	Internet Cafe/Twitter Fall Open	*Grand Sonoran Foyer*
2:00 p.m. – 6:00 p.m.	Speaker Ready Room Open	*Grand Sonoran Salon H*
6:30 p.m. – 10:00 p.m.	Publications Committee Meeting	*Chairman's Boardroom*

Thursday, May 29

EDUCATION DAY

6:00 a.m. – 8:00 a.m.	Committee Meetings See Page 59 for Ancillary Meeting Schedule	
6:30 a.m. – 5:00 p.m.	Registration Open	*Grand Sonoran Foyer*
6:30 a.m. – 5:00 p.m.	Speaker Ready Room Open	*Grand Sonoran Salon H*
6:30 a.m. – 5:00 p.m.	Internet Cafe/Twitter Fall Open	*Grand Sonoran Foyer*
7:15 a.m. – 7:45 a.m.	Continental Breakfast	*Grand Sonoran Foyer*
7:45 a.m. – 8:00 a.m.	President's Welcome	*Grand Sonoran Salons F/G*
8:00 a.m. – 10:00 a.m.	Companion Hospitality Room Open for Registered Companions	*twenty6, Lower Lobby, Level 1*
8:00 a.m. – 11:00 a.m.	**Education Session I** Surgical Critical Care	*Grand Sonoran Salons F/G*
11:00 a.m. – 11:15 a.m.	Refreshment Break	*Grand Sonoran Foyer*
11:15 a.m. – 12:15 p.m.	**International Guest Lecture** *Professor Jacques Marescaux* **Next Step in Minimally Invasive Surgery: Hybrid Image-Guided Surgery**	*Grand Sonoran Salons F/G*
11:15 a.m. – 3:00 p.m.	Exhibitors Set Up	*Grand Saguaro E/W and Foyer*
12:15 p.m. – 12:30 p.m.	Box Lunch Pick Up	*Grand Sonoran Foyer*
12:30 p.m. – 1:30 p.m.	**Outcomes and Clinical Trials Committee** Systematic Reviews on Management of Asymptomatic Malrotation and Congenital Diaphragmatic Hernia	*Grand Sonoran Salons F/G*
1:30 p.m. – 2:00 p.m	**APSA Foundation Scholars** *Ankush Gosain, MD* Splenic Neurovascular Units in Hirschsprung's Associated Enterocolitis *David M. Gourlay, MD* IAP Prevents Intestinal Inflammation in the Newborn Intestine *Shawn D. Larson, MD* Inflammasome Activation is Critical for Neonatal Emergency Myelopoiesis and Expansion of Hematopoietic Stem Cells for Inflammation	*Grand Sonoran Salons F/G*

SCHEDULE-AT-A-GLANCE (CONT.)

2:00 p.m. – 4:00 p.m.	**Education Session II** Surgeon Wellness: Achieving and Maintaining Surgeon Wellness	*Grand Sonoran Salon E*
2:00 p.m. – 4:00 p.m.	**Education Session III** Innovation: Where is "the Puck Going" in the Advancement of Our Field?	*Grand Sonoran Salons F/G*
3:00 p.m. – 5:30 p.m.	Exhibits Open	*Grand Saguaro E/W and Foyer*
4:00 p.m. – 5:00 p.m.	Wine and Cheese Reception with Exhibitors	*Grand Saguaro E/W and Foyer*
4:30 p.m. – 6:15 p.m.	**Concurrent Poster Sessions**	
	Poster Session I Clinical, Fetal and Trauma Surgery	*Grand Sonoran Salons F/G*
	Poster Session II Basic Science, Quality Improvement, Critical Care and Oncology	*Grand Sonoran Salon E*
7:00 p.m. – 9:00 p.m.	Welcome Reception	*Ballroom Lawn*

Friday, May 30

6:00 a.m. – 7:30 a.m.	Committee Meetings See Page 59 for Ancillary Meeting Schedule	
6:15 a.m. – 7:30 a.m.	APSA Foundation Board Meeting	*Desert Conference Suite 3*
6:30 a.m. – 10:00 a.m.	Poster Set Up	*Grand Sonoran Salons A-D*
6:30 a.m. – 1:00 p.m.	Registration Open	*Grand Sonoran Foyer*
6:30 a.m. – 1:00 p.m.	Internet Café/Twitter Fall Open	*Grand Sonoran Foyer*
6:30 a.m. – 1:00 p.m.	Exhibits Open	*Grand Saguaro E/W and Foyer*
6:30 a.m. – 2:00 p.m.	Speaker Ready Room Open	*Grand Sonoran Salon H*
6:45 a.m. – 7:30 a.m.	Continental Breakfast	*Grand Saguaro E/W and Foyer*
7:30 a.m. – 9:00 a.m.	**Scientific Session I** Basic Science, Fetal and Developmental Biology	*Grand Sonoran Salons F/G*
8:00 a.m. – 10:00 a.m.	Companion Hospitality Room Open for Registered Companions	*twenty6, Lower Lobby, Level 1*
9:00 a.m. – 10:00 a.m.	**Robert E. Gross Lecture** *Diana L. Farmer, MD* Standing on the Shoulders of Giants: From Singapore to Stem Cell Therapy	*Grand Sonoran Salons F/G*
10:00 a.m. – 10:30 a.m.	Refreshment Break	*Grand Saguaro E/W and Foyer*
10:00 a.m. – 1:00 p.m.	Posters Open for Viewing	*Grand Sonoran Salons A-D*
10:30 a.m. – 11:00 a.m.	**Travel Fellow Presentations** *John K.M. Nyagetuba, MB, ChB*	*Grand Sonoran Salons F/G*

SCHEDULE-AT-A-GLANCE (CONT.)

	Pediatric Surgery in Kenya: Challenges and Solutions *Tran Anh Quynh, MD, PhD* The Development of Vietnam Pediatric Surgery	
11:00 a.m. – 12:15 p.m.	**Scientific Session II** Oncology and General Surgery	*Grand Sonoran Salons F/G*
12:15 p.m. – 1:15 p.m.	**Jay and Margie Grosfeld Lecture** *Gail E. Besner, MD* A Pain in the NEC: Research Challenges and Opportunities	*Grand Sonoran Salons F/G*
1:15 p.m. – 2:45 p.m.	**Benjy Brooks Meeting and Luncheon** *Pre-Registration Required*	*Grand Sonoran I/J*
1:15 p.m.	Leisure Time	
1:30 p.m. – 9:00 p.m.	Committee Meetings See Page 59 for Ancillary Meeting Schedule	
2:00 p.m. – 4:00 p.m.	**APSMA Session** ICD-10 Coding: Introduction, Documentation and Financial Impact of ICD-10 CME not offered	*Grand Sonoran Salons F/G*
2:00 p.m. – 5:00 p.m.	**Simulation Courses** *Pre-Registration Required* • Endosurgical Simulation Course CME not offered • High-fidelity Endosurgical Simulation Course CME not offered	*Grand Sonoran Salon E*
5:00 p.m. – 6:30 p.m.	***Journal of Pediatric Surgery* Reception** *By Invitation*	*Desert Conference Suites 3-5*
6:00 p.m. – 6:30 p.m.	Rehearsal for New Member Induction Ceremony *By Invitation*	*Grand Sonoran Salons F/G*
6:30 p.m. – 7:30 p.m.	New Member Reception *By Invitation*	*President's Suite*

Saturday, May 31

6:30 a.m. – 8:00 a.m.	Member Business Meeting with Breakfast Members Only	*Grand Sonoran Salons F/G*
6:30 a.m. – 11:30 a.m.	Exhibits Open	*Grand Saguaro E/W and Foyer*
6:30 a.m. – 3:30 p.m.	Registration Open	*Grand Sonoran Foyer*
6:30 a.m. – 3:30 p.m.	Speaker Ready Room Open	*Grand Sonoran Salon H*
6:30 a.m. – 3:30 p.m.	Internet Café/Twitter Fall Open	*Grand Sonoran Foyer*
6:30 a.m. – 3:30 p.m.	Posters Open for Viewing	*Grand Sonoran Salons A-D*
7:00 a.m. – 8:00 a.m.	Continental Breakfast for Non-members	*Grand Saguaro E/W and Foyer*
8:00 a.m. – 9:00 a.m.	***Journal of Pediatric Surgery* Lecture** *Eric A. Rose, MD* Understanding Translational Research	*Grand Sonoran Salons F/G*

SCHEDULE-AT-A-GLANCE (CONT.)

8:00 a.m. – 10:00 a.m.	Companion Hospitality Room Open for Registered Companions	*twenty6, Lower Lobby, Level 1*
9:00 a.m. – 10:30 a.m.	**Scientific Session III** Surgical Quality: Are We Doing What We Think We Are?	*Grand Sonoran Salons F/G*
10:30 a.m. – 11:00 a.m.	Refreshment Break	*Grand Saguaro E/W and Foyer*
11:00 a.m. – Noon	**Scientific Session IV** Trauma and Critical Care	*Grand Sonoran Salons F/G*
11:30 a.m.	Exhibit Dismantle	*Grand Saguaro E/W and Foyer*
Noon – 12:15 p.m.	Introduction of New Members	*Grand Sonoran Salons F/G*
12:15 p.m. – 1:15 p.m.	**Presidential Address** *Thomas M. Krummel, MD* Try Again. Fail Again...Fail Better.	*Grand Sonoran Salons F/G*
1:15 p.m. – 1:30 p.m.	Box Lunch Pick Up	*Grand Sonoran Foyer*
1:30 p.m. – 2:30 p.m.	Innovation Session	*Grand Sonoran Salons F/G*
2:30 p.m. – 3:30 p.m.	Video Session	*Grand Sonoran Salons F/G*
3:30 p.m. – 5:30 p.m.	Poster Dismantle	*Grand Sonoran Salons A-D*
3:30 p.m. – 6:30 p.m.	Leisure Time	
6:30 p.m. – 7:15 p.m.	President's Reception	*Grand Sonoran Foyer*
7:15 p.m. – 11:00 p.m.	President's Banquet	*Grand Sonoran Salons F/G*

Sunday, June 1

6:00 a.m. – 8:00 a.m.	Committee Meetings See Page 59 for Ancillary Meeting Schedule	
7:00 a.m. – 8:00 a.m.	Continental Breakfast	*Grand Sonoran Foyer*
7:00 a.m. – 10:30 a.m.	Speaker Ready Room Open	*Grand Sonoran Salon H*
7:00 a.m. – 11:30 a.m.	Registration Open	*Grand Sonoran Foyer*
7:00 a.m. – 11:30 a.m.	Internet Café/Twitter Fall Open	*Grand Sonoran Foyer*
8:00 a.m. – 9:15 a.m.	**Scientific Session V** Miscellaneous Surgery	*Grand Sonoran Salons F/G*
9:15 a.m. – 10:15 a.m.	**COG Surgeon Update** New Concepts for Neuroblastoma Surgery, Spinal Tumors and Understanding GIST Tumors	*Grand Sonoran Salons F/G*
10:15 a.m. – 10:30 a.m.	Refreshment Break	*Grand Sonoran Foyer*
10:30 a.m. – Noon	**Pediatric Surgery Case Debates and Controversies**	*Grand Sonoran Salons F/G*
Noon	Annual Meeting Concludes	

ANCILLARY MEETINGS BY GROUP

Committee	Date/Time	Room
APSA Board of Governors Board Meeting	Wednesday, May 28, 7:00 a.m. – 1:00 p.m.	*President's Boardroom*
APSA Foundation Board Meeting	Friday, May 30, 6:15 a.m. – 7:30 a.m.	*Desert Conference Suite 3*
APSMA	Friday, May 30, 1:00 p.m. – 2:00 p.m.	*Desert Conference Suite 3*
APSTPD – Association of Pediatric Surgery Training Program Directors	Wednesday, May 28, 1:00 p.m. – 7:00 p.m.	*Grand Saguaro North*
BCM Reunion – Baylor College of Medicine	Friday, May 30, 5:30 p.m. – 7:00 p.m.	*Desert Conference Suite 7*
Cancer Committee	Sunday, June 1, 7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 3*
Childhood Obesity Committee	Thursday, May 29, 6:00 a.m. – 7:00 a.m.	*Desert Conference Suite 8*
CME Subcommittee	Friday, May 30, 6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 8*
DHREAMS	Saturday, May 31, 3:30 p.m. – 5:00 p.m.	*Desert Conference Suite 3*
Education Committee	Friday, May 30, 6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 8*
Ethics and Advocacy Committee	Thursday, May 29, 6:00 a.m. – 7:00 a.m.	*Desert Conference Suite 6*
Fetal Diagnosis & Treatment Committee	Friday, May 30, 6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 5*
HDRC – Hirschsprung Disease Research Collaborative	Thursday, May 29, 7:00 a.m. – 8:00 a.m.	*President's Boardroom*
Industry Advisory Committee	Thursday, May 29, 7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 8*
Informatics and Telemedicine Committee	Thursday, May 29, 6:00 a.m. – 7:00 a.m.	*Desert Conference Suite 3*
International Relations Committee	Friday, May 30, 6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 6*
JPS Reception *By invitation*	Friday, May 30, 5:00 p.m. – 6:30 p.m.	*Desert Conference Suites 3-5*

ANCILLARY MEETINGS BY GROUP

Committee	Date/Time	Room
Membership & Credentials Committee	Thursday, May 29, 7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 3*
NAT Subcommittee	Friday, May 30, 2:30 p.m. – 4:30 p.m.	*Chairman's Boardroom*
NEST – Necrotizing Enterocolitis Surgery Trial	Friday, May 30, 1:30 p.m. – 3:00 p.m.	*Desert Conference Suite 8*
New Technology Committee	Friday, May 30, 6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 4*
Outcomes & Clinical Trials Committee	Thursday, May 29, 6:00 a.m. – 7:00 a.m.	*Desert Conference Suite 5*
PAACS	Friday, May 30, 1:30 p.m. – 2:30 p.m.	*Desert Conference Suite 7*
Patient/Family Subcommittee	Friday, May 30, 6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 8*
PedSRC – Pediatric Surgery Research Collaborative	Friday, May 30, 3:00 p.m. – 5:00 p.m.	*Desert Conference Suite 6*
Practice Committee	Thursday, May 29, 7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 4*
Program Committee	Thursday, May 29, 7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 7*
Publications Committee	Wednesday, May 28, 6:30 p.m. – 10:00 p.m.	*Chairman's Boardroom*
Simulation Subcommittee	Friday, May 30, 6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 8*
Student/Resident Subcommittee	Thursday, May 29, 7:00 a.m. – 8:00 a.m.	*Chairman's Boardroom*
Surgical Quality & Safety Committee	Thursday, May 29, 7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 5*
Surgical Critical Care Committee	Friday, May 30, 6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 7*
SURPris	Saturday, May 31, 4:00 p.m. – 5:00 p.m.	*Desert Conference Suite 4*
Trauma Committee	Thursday, May 29, 6:00 a.m. – 7:00 a.m.	*Desert Conference Suite 4*
W. Hardy Hendren Education Foundation for Pediatric Surgery and Urology	Friday, May 30, 1:30 – 2:30 p.m.	*Desert Conference Suite 5*
Workforce Committee	Thursday, May 29, 7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 6*

ANCILLARY MEETINGS BY DAY

Committee	Time	Room
Wednesday, May 28		
APSA Board of Governors Board Meeting	7:00 a.m. – 1:00 p.m.	*President's Boardroom*
Association of Pediatric Surgery Training Program Directors (APSTD)	1:00 p.m. – 7:30 p.m.	*Grand Saguaro North*
Publications Committee	6:30 p.m. – 10:00 p.m.	*Chairman's Boardroom*
Thursday, May 29		
Childhood Obesity Committee	6:00 a.m. – 7:00 a.m.	*Desert Conference Suite 8*
Ethics and Advocacy Committee	6:00 a.m. – 7:00 a.m.	*Desert Conference Suite 6*
HDRC – Hirschsprung Disease Research Collaborative	7:00 a.m. – 8:00 a.m.	*President's Boardroom*
Industry Advisory Committee	7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 8*
Informatics and Telemedicine Committee	6:00 a.m. – 7:00 a.m.	*Desert Conference Suite 3*
Membership & Credentials Committee	7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 3*
Outcomes & Clinical Trials Committee	6:00 a.m. – 7:00 a.m.	*Desert Conference Suite 5*
Practice Committee	7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 4*
Program Committee	7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 7*
Student/Resident Subcommittee	7:00 a.m. – 8:00 a.m.	*Chairman's Boardroom*
Surgical Quality & Safety Committee	7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 5*
Trauma Committee	6:00 a.m. – 7:00 a.m.	*Desert Conference Suite 4*
Workforce Committee	7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 6*
Friday, May 30		
APSA Foundation Board Meeting	6:15 a.m. – 7:30 a.m.	*Desert Conference Suite 3*
APSMA	1:00 p.m. – 2:00 p.m.	*Desert Conference Suite 3*
BCM Reunion – Baylor College of Medicine	5:30 p.m. – 7:00 p.m.	*Desert Conference Suite 7*
CME Subcommittee	6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 8*
Education Committee	6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 8*

ANCILLARY MEETINGS BY DAY

Committee	Time	Room
Friday, May 30 (cont.)		
Fetal Diagnosis & Treatment Committee	6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 5*
International Relations Committee	6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 6*
W. Hardy Hendren Foundation for Pediatric Surgery and Urology	1:30 p.m. – 2:30 p.m.	*Desert Conference Suite 5*
NAT Subcommittee	2:30 p.m. – 4:30 p.m.	*Chairman's Boardroom*
JPS Reception *By invitation*	5:00 p.m. – 6:30 p.m.	*Desert Conference Suites 3-5*
NEST – Necrotizing Enterocolitis Surgery Trial	1:30 p.m. - 3:00 p.m.	*Desert Conference Suite 8*
New Technology Committee	6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 4*
PAACS	1:30 p.m. – 2:30 p.m.	*Desert Conference Suite 7*
Patient/Family Subcommittee	6:00 a.m. – 7:30 .am.	*Desert Conference Suite 8*
PedSRC – Pediatric Surgery Research Collaborative	3:00 p.m. - 5:00 p.m.	*Desert Conference Suite 6*
Simulation Subcommittee	6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 8*
Surgical Critical Care Committee	6:00 a.m. – 7:30 a.m.	*Desert Conference Suite 7*
Saturday, May 31		
DHREAMS	3:30 p.m. – 5:00 p.m.	*Desert Conference Suite 3*
SURPris	4:00 p.m. – 5:00 p.m.	*Desert Conference Suite 4*
Sunday, June 1		
Cancer Committee	7:00 a.m. – 8:00 a.m.	*Desert Conference Suite 3*

EDUCATIONAL OVERVIEW

The APSA Annual Meeting is designed to provide comprehensive continuing education in the field of pediatric surgery. APSA strives to bring together the world's leading pediatric surgery authorities to present and discuss the most recent clinical and research efforts. Education Day will feature sessions on surgical critical care, surgeon wellness, innovation, systematic reviews, as well as two poster sessions focusing on clinical and basic science. There will be five scientific sessions with abstract presentations, a video session, an innovation session, a COG update session and case debates and controversies. As is customary, there will be four invited lecturers, the presidential address and three APSA Foundation scholar presentations.

The APSA Annual Meeting covers the breadth of pediatric surgery and is intended to acquaint attendees with the latest research findings, updates on evidence-based care guidelines, innovations in quality improvement and clinical discoveries and trends that influence the day-to-day practice of pediatric surgery. Specific sessions relating to educating members on new developments in medical technology have been added to supplement the traditional sessions on clinical practice and basic science research chosen by the Program and Education Committees. The scientific sessions consist of basic research and practical clinical presentations. The poster sessions are intended to provide young investigators an opportunity to share preliminary clinical research, basic science work and novel ideas.

Accreditation Statement

The American Pediatric Surgical Association is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. This live CME activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME).

CME Credit for Session Participation

APSA designates this live activity for a maximum of 23.75 *AMA PRA Category 1 Credits*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

MOC Credit for Session Participation

Attendees earn maintenance of certification (MOC) CME credits for session attendance. As with general meeting CME credits, attendees will be able to claim their credits online via the APSA website after the meeting.

DISCLOSURES

Disclaimer: THESE MATERIALS AND ALL OTHER MATERIALS PROVIDED IN CONJUNCTION WITH CME ACTIVITIES ARE INTENDED SOLELY FOR PURPOSES OF SUPPLEMENTING CME PROGRAMS FOR QUALIFIED HEALTH CARE PROFESSIONALS. ANYONE USING THE MATERIALS ASSUMES FULL RESPONSIBILITY AND ALL RISK FOR THEIR APPROPRIATE USE. APSA MAKES NO WARRANTIES OR REPRESENTATIONS WHATSOEVER REGARDING THE ACCURACY, COMPLETENESS, CURRENTNESS, NONINFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE MATERIALS. IN NO EVENT WILL APSA BE LIABLE TO ANYONE FOR ANY DECISION MADE OR ACTION TAKEN IN RELIANCE ON THE MATERIALS. IN NO EVENT SHOULD THE INFORMATION IN THE MATERIALS BE USED AS A SUBSTITUTE FOR PROFESSIONAL CARE.

Policy on Faculty Disclosure

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

Faculty

In the case of faculty presentations the following faculty members have disclosed a financial relationship with an industry partner. The relationship was proven not to have an impact on the science presented at this annual meeting. All other faculty indicated that they have no financial relationships to disclose

Jacques Marescaux	Karl Storz, COVIDIEN, Intuitive Surgical, SIEMENS
Eric A. Rose	Salaries: SIGA Technologies, MacAndrews & Forbes Holdings, Inc; Ownership Interest: SIGA Technologies, Circulite
Thomas M. Krummel	Ownership Interest: California Water Services, Cantimer, EarLens, eMed, Intervene, Miret Surgical, Procept Biorobotics, PuraCath, Relign, Vantage Surgical, Visible productions, Wadsworth Medical, Wing-Tec, Zipline Medical
Michael R. Harrison	Grant/research support: Magnets in Me, Magnamosis Inc, Magnap, Inc., My Pectus, Inc.; Ownership interest (i.e. stockholder): Magnets in Me, Magnamosis, Inc., Magnap, Inc., My Pectus, Inc.

DISCLOSURES

Committees

Disclosure forms were provided to and signed by all APSA 2013-2014 committee members. These committee members have reported the following financial relationships and it has been determined that no conflict of interest exists with any of these relationships. All other committee members indicated that they have no financial relationships to disclose.

Sean J. Barnett	Salary: Kaleidescope Animations Inc.; Consultant: Surgical Innovations Groups PLC
Sanjeev Dutta	Consultant: Stryker; Johnson & Johnson; Commercial Interest/stock holder: NuRep
George W. Holcomb, III	Commercial Interest/minor stock holder: Just Right Surgical

INTERNATIONAL GUEST LECTURE

Thursday, May 29, 11:15 a.m. – 12:15 p.m.
Professor Jacques Marescaux
Head of the Department of Digestive and Endocrine Surgery, New Hôpital Civil, Hepatic and Digestive Pole - Department of Digestive and Endocrine Surgery
University Hospital of Strasbourg, Strasbourg, France

Next Step in Minimally Invasive Surgery: Hybrid Image-Guided Surgery

Professor Jacques Marescaux is Professor of Surgery, CEO of the Image-Guided Minimally Invasive Surgical Institute (IHU Strasbourg) and President and Founder of IRCAD (1994) a uniquely structured institute advancing the field of surgery into the information era. In addition he founded the European Institute for Telesurgery (EITS) as a training facility to disseminate the groundbreaking work at IRCAD. Over the last 19 years this center has gained international acclaim by training more than 38,000 surgeons from 124 countries, and mirror IRCAD institutes have been created in Taiwan and Brazil.

In 2000, the IRCAD-EITS implemented a virtual online university, WeBSurg, resulting from the need to maintain the link between the training center and the surgeons. WeBSurg encapsulates high-quality technology with high-speed multimedia communication systems to broadcast pre-recorded surgical interventions; the website is available in five different languages (French, English, Spanish, Japanese and Chinese).

In 2001, Marescaux performed the first transcontinental laparoscopic surgery on a patient in Strasbourg, France, while being in New York; this is known as “Operation Lindbergh.” On April 2, 2007, he is believed to be the first in the world to operate a person without leaving a scar.

Marescaux and his team published up to 3,200 national and international articles and communications. He has received a number of honorary degrees and honorary fellowships. He was made Chevalier de la Légion d’honneur (1999), Officier dans l’Ordre national du Mérite (2007) and Officier de la Légion d’honneur (2012).

Marescaux was invited to deliver more than 380 speeches in many European, American, Japanese and Chinese universities or schools of medicine, including the “Address to Diplomates” he gave at the Royal College of Surgeons in London, the Nobel Lecture he gave in Stockholm, and the Fogarty Lecture he gave at Stanford University.

ROBERT E. GROSS LECTURE

Friday, May 30, 9:00 a.m. – 10:00 a.m.
Diana L. Farmer, MD
Pearl Stamps Stewart Professor and Chair
Department of Surgery, University of California,
Davis School of Medicine
Surgeon-in-Chief, University of California,
Davis Children's Hospital
Sacramento, CA USA

Standing on the Shoulders of Giants: From Singapore to Stem Cell Therapy

Dr. Diana L. Farmer, an internationally renowned fetal and neonatal surgeon, is chair of the Department of Surgery at UC Davis Health System. Previously at UC San Francisco, she was chief of pediatric surgery, vice chair of surgery, surgeon-in-chief of the UCSF Benioff Children's Hospital and a professor of surgery, pediatrics and obstetrics, gynecology and reproductive sciences.

Farmer is known for her skilled surgical treatment of congenital anomalies and for her expertise in cancer, airway and intestinal surgeries in newborns. She is principal investigator of several National Institutes of Health clinical trials on the effectiveness and safety of spina bifida treatments before birth, and she is researching a novel stem cell therapy for repairing damaged neural tissue in spina bifida patients. She is a worldwide innovator in treating complex birth defects and diseases in very young children.

A recognized leader in pediatric surgery, Farmer has authored more than 100 peer-reviewed research articles, including studies of neuroblastoma, Chiari II malformation, twin-to-twin transfusion syndrome, fetal trauma and necrotizing enterocolitis.

After receiving a bachelor's degree in marine and molecular biology at Wellesley College, Farmer completed her medical degree and internship at the University of Washington in Seattle. She completed her general surgery residency training at UC San Francisco and pediatric surgical training at Children's Hospital of Michigan. In 2010, Farmer was inducted as a fellow into the Royal College of Surgeons of England, becoming only the second woman surgeon from the United States to receive this prestigious honor. In 2011, she was elected to membership in the Institute of Medicine of the National Academies, one of the highest honors in medicine.

Farmer consistently has been recognized for her teaching and service by UC San Francisco, including the 2009 Golden-Headed Cane Award (the highest faculty teaching award), She is included in the 2010 edition of Who's Who Among American Women and the 2011 edition of Best Doctors in America. She has appeared on the Lifetime television network and the "Oprah Winfrey Show" to discuss surgical innovations.

JAY & MARGIE GROSFELD LECTURE

Friday, May 30, 12:15 p.m. – 1:15 p.m.
Gail E. Besner, MD
H. William Clatworthy, Jr. Professor of Surgery, and Chief of the Department of Pediatric Surgery at Nationwide Children's Hospital and the Ohio State University College of Medicine Columbus, OH USA

A Pain in the NEC: Research Challenges and Opportunities

Dr. Gail Besner is the H. William Clatworthy, Jr. Professor of Surgery and Pediatrics at Nationwide Children's Hospital and the Ohio State University College of Medicine. Her laboratory work focuses on novel strategies to protect the intestines from necrotizing enterocolitis and other forms of injury. Much of the work centers around a growth factor known as heparin-binding EGF-like growth factor (HB-EGF) which Besner first identified. More recently her laboratory has focused on both mesenchymal stem cell and neural stem cell transplantation to protect the intestines and the enteric nervous system from injury.

Recently she was appointed to the National Advisory General Medical Sciences Council by HHS Secretary Sebelius. This council of 17 of America's most distinguished and accomplished scientists advises the Secretary and NIH Director Collins and other key government leaders on our national research agenda.

JOURNAL OF PEDIATRIC SURGERY LECTURE

Saturday, May 31, 8:00 – 9:00 a.m.
Eric A. Rose, MD
Mount Sinai Medical Center, Professor Health Evidence & Policy, Medicine Surgery and CT Surgery; SIGA Technologies, CEO & Chairman of the Board of Directors; MacAndrews & Forbes Holdings Inc., Executive VP for Life Sciences
New York, NY USA

Understanding Translational Research

Dr. Eric Rose, is an academic physician and entrepreneur with interests in drug discovery, biodefense, clinical evaluative research and health policy. From 1994 through 2007, he served as Surgeon in Chief at New York-Presbyterian Hospital/ Columbia and Chairman of the Department of Surgery at the Columbia University College of Physicians and Surgeons, where he held a distinguished professorship. Rose grew one of the nation's premier departments of surgery while managing, investigating and developing complex medical technologies ranging from heart transplantation and novel approaches to Alzheimer's disease to bioterrorism.

Since 2007, he is the Executive Vice President for Life Sciences at MacAndrews & Forbes and CEO of Siga Technologies, Inc., a developer of anti-viral drug directed at potential agents of bioterror. From 2001 through 2007, he served on the National Biodefense Scientific Board which advises the HHS Secretary on biodefense, influenza and emerging diseases. From 2008 through 2012, he chaired the Department of Health Evidence & Policy at the Mount Sinai School of Medicine, which he now serves as co-chair and Professor.

Rose has authored or co-authored more than 300 scientific publications and has received more than $25 million in NIH support for his research. He pioneered heart transplantation in children, performing the first successful pediatric heart transplant in 1984, and has investigated many alternatives to heart transplantation, including cross-species transplantation and man-made heart pumps. Siga has received more than $100 million in federal research support since he joined the company, developing anti-viral drugs for smallpox, dengue and Lassa fever. In 2011, Siga was awarded a $433 million contract to provide 2 million courses of its novel oral smallpox anti-viral drug to the Strategic National Stockpile to protect the civilian population in the event of a smallpox outbreak, a recognized material threat to US national security. More than 1 million courses of the drug have been delivered to the SNS, with completion of deliveries expected by the 4th quarter of 2014. He received both his undergraduate and medical degrees from Columbia University.

PRESIDENTIAL ADDRESS

Saturday, May 31, 12:15 p.m. – 1:15 p.m.

Thomas M. Krummel, MD
Emile Holman Professor and Chair, Department of Surgery
Stanford University School of Medicine
Susan B. Ford Surgeon-in-Chief
Lucile Packard Children's Hospital at Stanford
Co-Director, Biodesign Program at Stanford
Palo Alto, CA USA

Try Again. Fail Again...Fail Better.

Dr. Thomas M. Krummel has served in leadership positions in the American College of Surgeons, the American Surgical Association, the American Board of Surgery, the American Board of Pediatric Surgery and is currently President of the American Pediatric Surgical Association. He has mentored over 200 students, residents and post docs.

Throughout his career, Krummel has been a pioneer and an innovator.

- While just a surgical resident, he formed what was then the world's second ECMO team. The success of that team served as a major impetus to wide spread adoption.
- He helped "jump start" the study of the cellular and biochemical mechanisms of scarless repair in the fetus; his work has been funded by the NIH for more than 18 years. He is the recipient of more than $3M in research funding over his career.

Over the last 15 years he has been a pioneer in the application of information technology to simulation-based surgical training and surgical robotics. Along with Dr. Kenneth Salisbury, Professor of Surgery and Computer Science, Krummel is the recipient of one of the first NIH Phased Innovation R21/R33 programs to develop collaborative simulation-based surgical training systems. For his work in this arena he was awarded two Smithsonian Information Technology Innovators Awards.

- For the past 12 years he has partnered with Dr. Paul Yock to direct the Biodesign Innovation Program. This Program is designed to teach the invention and implementation of new surgical technologies through interdisciplinary education at the emerging frontiers of engineering and the biomedical sciences (http://innovation.stanford.edu).
- Krummel has lectured throughout the world and is author or co-author of more than 300 publications, chapters and books. He has served as a frequent consultant to the medical device industry.
- He serves on the following company Boards: California Water Service Company – Board of Directors; Cantimer, Inc. – SAB; eMed – SAB; InterVene, Inc – SAB; Miret Surgical, Inc. – SAB; Procept Biorobotics – Board of Directors; Relign, Inc. – SAB; Vantage Surgical – SAB; Visible Productions – SAB; WingTec, Inc. – SAB; and Zipline Medical, Inc. – SAB.

APSA 2013 FOUNDATION SCHOLARS

Thursday, May 29, 1:30 – 2:00 p.m.

Ankush Gosain, III, MD
Assistant Professor
University of Wisconsin, American Family Children's Hospital
Madison, WI USA

Splenic Neurovascular Units in Hirschsprung's-Associated Enterocolitis

David A. Gourlay, MD
Associate Professor of Surgery
Medical College of Wisconsin
Milwaukee, WI USA

IAP Prevents Intestinal Inflammation in the Newborn Intestine

Shawn D. Larson, MD
Assistant Professor of Surgery, Division of Pediatric Surgery
University of Florida College of Medicine
Gainesville, FL USA

Inflammasome Activation is Critical for Neonatal Emergency Myelopoiesis and Expansion of Hematopoietic Stem Cells for Inflammation

APSA 2014 TRAVEL FELLOWS

Friday, May 30, 10:30 a.m. – 11:00 a.m.

John K.M. Nyagetuba, MB, ChB
AIC Kijabe Hospital, Nairobi, Kenya

Pediatric Surgery in Kenya: Challenges and Solutions

Dr. John Nyagetuba received a MB, ChB and Mmed from University of Nairobi, Kenya. He is completing his pediatric surgery residency at AIC Kijabe Hospital in partnership with BethanyKids of Kijabe Hospital. His goals are to practice as a pediatric surgeon while doing research and mentoring the next generation of surgeons.

Tran Anh Quynh, MD, PhD
National Hospital of Pediatrics, Hanoi, Vietnam

The Development of Vietnam Pediatric Surgery

Dr. Tran Quynh received his diploma in general doctoring from Thai Nguyen Medical University of Vietnam, and in general surgery from the Hanoi Medical University of Vietnam. He received his Master of Science in Medicine and a PhD from the Military Academy of Medicine.

Dr. Quynh is a surgeon at the National Hospital of Pediatrics in Hanoi, Vietnam. He is especially interested in developing and perfecting the area of laparoscopic surgery in the treatment of childhood illnesses such as Hirschsprung's disease, imperforate anus and duodenal obstruction.

APSA PAST MEETING LECTURES

Journal of Pediatric Surgery Lectures

2013
David B. Hoyt, MD
The American College of Surgeons Model for Quality Improvement

2012
Brad W. Warner, MD
Adaptation: Paradigm for an Academic Career and the Gut

2011
Professor Lewis Spitz
The History of Paediatric Surgery in the United Kingdom and the National Health Service

2010
Robert H. Bartlett, MD
ECMO: Gross, Beethoven, Krummel and Georgeson

2008
Thomas M. Krummel, MD
Inventing Our Future: Training the Next Generation of Surgeon Innovators

2007
Alan W. Flake, MD
Stem Cell Biology and Pediatric Surgery – Deciphering the Venn Diagram

2006
Pedro Rosselló, MD
The Unfinished Business of American Healthcare

2005
Alberto Peña, MD
Luck and Serendipity, the History of a Surgical Technique

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

2003
Patricia K. Donahoe, MD
Sustained Inquiry and Perseverance in the Clinic and at the Bench

APSA PAST MEETING LECTURES (CONT.)

2002
Michael R. Harrison, MD
Fetal Surgery: Trials, Tribulations and Territory

2001
Joseph P. Vacanti, MD
The History and Current Status of Tissue Engineering

Robert E. Gross Lectures

2013
Jorge D. Reyes, MD
Intestinal Transplantation: an Unexpected Journey

2012
Daniel M. Green, MD
The Evolution of Treatment of Wilms' Tumor

2011
Judson G. Randolph, MD
Notes on the Early Development of Pediatric Surgery in the United States

2010
John D. Birkmeyer, MD
Measuring and Improvement the Quality of Pediatric Surgery

2009
Stanley B. Prusiner, MD
Designer Prions and a Quest for Therapy

2008
Michael W.L. Gauderer, MD
Creativity and the Surgeon

2007
Francisco G. Cigarroa, MD
Leading an Academic Health Center in the 21st Century: A Pediatric Surgeon's Perspective

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

APSA PAST MEETING LECTURES (CONT.)

2005
W. Hardy Hendren, MD
Looking Back 50 Years

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

2003
Lucien Leape, MD
Safe Health Care — Are We Up to It?

2002
Harold Shapiro, PhD
The Ethical Dimensions of Scientific Progress

2001
M. Judah Folkman, MD
Angiogenesis-Dependent Diseases

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

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

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

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

1996
Robert H. Bartlett, MD
Surgery, Science and Respiratory Failure

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

APSA PAST MEETING LECTURES (CONT.)

1994
W. French Anderson, PhD
Human Gene Therapy

1993
M. Judah Folkman, MD
Clinical Applications of Angiogenesis Research

1992
Warren Zapol, MD
Inhaled Nitric Oxide: A Selective Vaso-Dilator

1991
Joel Cooper, MD
History and Current Status of Lung Transplantation

1990
Richard Simmons, MD
Role of the Gut Flora in Surgery

Jay & Margie Grosfeld Lectures

2013
Jessica J. Kandel, MD
Serendipity, Translational Research, High Quality Care, and the Children's Hospital

2012
M. James Kaufman, PhD
Heath Care Reform – The Impact on Children

2011
Anthony Atala, MD
Regenerative Medicine: New Approaches to Healthcare

2010
Christopher K. Breuer, MD
The Development and Translation of the Tissue Engineered Vascular Grafts

2009
Michael T. Longaker, MD, MBA
Regenerative Medicine: A Surgeon's Perspective

APSA PAST MEETING LECTURES (CONT.)

2008
Frederick J. Rescorla, MD
What's New in Pediatric Surgery

International Guest Lectures

2013
Agostino Pierro, MD
Across the Ocean: Perspectives for Clinical Care, Training and Research

2012
Benno M. Ure, MD
Enthusiasm, Evidence and Ethics: the Triple E of Minimally Invasive Pediatric Surgery

2011
Professor Takeshi Miyano, MD
A Brief History of Pediatric Surgery and Healthcare Delivery Systems in Japan

2010
Jan Alice Marcel Deprest, MD
Prenatal Management of the Fetus with Isolated CDH

2009
Marcelo Martinez Ferro, MD
New Approaches to Pectus and Other MIS in Argentina

2008
Tadashi Iwanaka, MD
Technical Innovation, Standardization and Skill Qualification of Pediatric Minimally Invasive Surgery in Japan

2007
Claire Nihoul-Fékété, MD
Is Regionalism of Complex Pediatric Malformations Desirable and Feasible? The Example of Disorders of Sexual Development

2005
Prof. Frans W.J. Hazebroek, MD, PhD
Is Continuation of Life Support Always the Best Option for the Surgical Neonate?

APSA PAST MEETING LECTURES (CONT.)

2004
David A. Lloyd, MD
Tomorrow's Surgeons: Who Cares for the Patient?

2003
Claire Nihoul-Fékété, MD
Modern Surgical Management of Congenital Hyperinsulinemic Hypoglycemia

2002
Takeshi Miyano, MD
Biliary Tree: A Gardener's 30-Year Experience

2001
Pedro Rosselló, MD
One Nation, with Liberty and Justice…and Healthcare for All

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

1999
Bernardo Ochoa, MD
Pediatric Surgery in Latin America

1998
Sidney Cywes, MD
Some of the Little Things We Do — Something Old, Something New

1997
Justin Kelly, MD
Bladder Exstrophy — Problems and Solutions

1996
Prem Puri, MD
Variant Hirschsprug's Disease

1995
Sir Lewis Spitz, MD, PhD
Esophageal Atresia — Past, Present and Future

1994
Sean J. Corkery, MCh
In Pursuit of the Testis

APSA PAST MEETING LECTURES (CONT.)

1993
Edward M. Kiely, MD
The Surgical Challenge of Neuroblastoma

1992
Yann Revillon, MD
Intestinal Transplantation in France

1991
Shemuel Nissan, MD
The History of Surgery and Medicine in the Holy Land from the 19th Century

1990
Jan C. Molenaar, MD
Congenital Diaphragmatic Hernia — What Defect?

APSA 45TH ANNUAL MEETING
PROGRAM IN DETAIL

PROGRAM IN DETAIL

Wednesday, May 28, 2014

1:00 p.m. – 6:00 p.m.	**Ultrasound Course** *Pre-registration Required*	*Grand Sonoran I-J*

Thursday, May 29, 2014

8:00 a.m. – 11:00 a.m.	**Education Session I**	*Grand Sonoran Salons F/G*

Surgical Critical Care
Moderator:
Brian Kenney, MD

Ventilatory Support
Marjorie J. Arca, MD

ECMO Update
Ronald B. Hirschl, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Identify the current indications for use of extracorporeal support in the setting of cardiorespiratory failure
- Recognize the advent of new devices which are being applied to extracorporeal support and how they have changed the complexity and challenges associated with the technique
- Recognize cannulation options and associated advantages, disadvantages and potential complications of each

Pulmonary Hypertension
Pramod S. Puligandla, MD, MSc

Learning Objectives
At the conclusion of this session, participants will be able to:
- Describe the basic pathophysiologic principles of pulmonary hypertension and its clinical implications
- Explain the latest developments in local and regional modalities of pain management as well as complementary and alternative pain therapies
- Develop a better understanding of the specific management strategies for infants and children with acute and chronic pulmonary hypertension

PROGRAM IN DETAIL

Thursday, May 29, 2014 (cont.)

Intensive Support Monitoring in the ICU
David W. Bliss, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Apply existing technologies for monitoring children in the ICU in recognizable clinical scenarios
- Explain the latest developments in local and regional modalities of pain management as well as complementary and alternative pain therapies
- Implement emerging monitoring technologies such as near infrared spectroscopy and pulse waveform analysis and their implications for ICU care

Head Injury
David Juang, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Identify the key issues in management of children with severe TBI
- Apply the current guidelines and updates in the management of pediatric TBI

Surgical Neonate
Faisal G. Qureshi, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Apply optimal neonatal nutrition strategies in varying clinical scenarios
- Explain the latest developments in local and regional modalities of pain management as well as complementary and alternative pain therapies
- Assess perioperative problems in the neonate and the implications of non-surgical comorbidities on surgical outcome
- Determine appropriate surgical decisions for necrotizing enterocolitis and the implications for long-term outcome

11:15 a.m. – 12:15 p.m.	**International Guest Lecture**	*Grand Sonoran Salons F/G*

Professor Jacques Marescaux
Next Step in Minimally Invasive Surgery: Hybrid Image-Guided Surgery

PROGRAM IN DETAIL

Thursday, May 29, 2014 (cont.)

Learning Objectives
At the conclusion of this session, participants will be able to:
- Understand the imaging technology leading to personalized anatomical surgery
- Understand the role of laparoscopic, endoscopic and interventional radiology, all together leading to a new hybrid speciality
- Understand the future of robotics

12:15 p.m. – 12:30 p.m.	Box Lunch Pick Up	*Grand Sonoran Foyer*
12:30 p.m. – 1:30 p.m.	**Outcomes and Clinical Trials Committee Systematic Reviews**	*Grand Sonoran Salons F/G*

Systematic Reviews on Management of Asymptomatic Malrotation and Congenital Diaphragmatic Hernia
Moderators:
Saleem Islam, MD; Cynthia D. Downard, MD

Ladds Procedure for Asymptomatic Malrotation
Kathleen Graziano, MD; Katherine J. Deans, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Select the best tests to study malrotation
- Decide which anomaly requires surgical evaluation
- Identify the pros and cons of the different surgical approaches (MIS vs. Open)

Management of the Newborn with Congenital Diaphragmatic Hernia
Saleem Islam, MD; Holly L. Hedrick, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Define best practices in ventilation of the newborn CDH
- Assess the role of vasoactive drugs in managing cardiac issues and pulmonary HTN
- Determine what is the best time to repair the defect – before, during or after ECMO?

PROGRAM IN DETAIL

Thursday, May 29, 2014 (cont.)

1:30 p.m. – 2:00 p.m. **APSA Foundation Scholars** *Grand Sonoran Salons F/G*

Splenic Neurovascular Units in Hirschsprung's Associated Enterocolitis
Ankush Gosain, MD
University of Wisconsin, Madison, WI, USA

IAP Prevents Intestinal Inflammation in the Newborn Intestine
David M. Gourlay, MD
Children's Hospital of Wisconsin, Milwaukee, WI, USA

Inflammasome Activation is Critical for Neonatal Emergency Myelopoiesis and Expansion of Hematopoietic Stem Cells for Inflammation
Shawn D. Larson, MD
University of Florida, Gainesville, FL, USA

2:00 p.m. – 4:00 p.m. **Education Session II** *Grand Sonoran Salon E*

Surgeon Wellness: Achieving and Maintaining Surgeon Wellness
Moderator:
Aviva L. Katz, MD

Ergonomics and Surgeon Wellness
Mary L. Hilfiker, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Explain the role of ergonomics in the operating room environment
- Identify good habits/body usage early in a surgical career
- Describe methods to help older surgeons work more comfortably and safely

Work Hours and Impact on Surgeon Wellness
Aviva L. Katz, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Restate the history behind the institution of work hour reforms
- Describe the impact of acute sleep deprivation, especially the impact on cognitive skills
- Explain the impact of chronic sleep deprivation, especially the impact on mental and physical health

PROGRAM IN DETAIL

Thursday, May 29, 2014 (cont.)

Work-life Balance
John R. Wesley, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Describe the need for a well thought-out balance between a surgical career and a healthy personal and family life
- Explain the impact of a stressful and demanding surgical career on fertility, both male and female, and delayed child-bearing in the female
- Recognize the importance of developing interests outside of surgery in planning for a rewarding retirement

Second Victim Syndrome
Louis M. Marmon, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Explain the concept of the surgeon as a "second victim" of poor patient outcomes
- Identify how surgeons are affected by medical errors and their patients' adverse outcomes
- Design a support system to assist surgeons in coping with the emotional and psychological impact of medical errors and adverse patient outcomes

Stress and the Surgeon: Mind-Full-Mess or Mindfulness
Edward P. Tagge, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Explain the mechanism and physiologic impact of stress
- Assess the impact of stress on both the physician and the patient
- Describe potential management strategies, including exercise and mindfulness

2:00 p.m. – 4:00 p.m. **Education Session III** *Grand Sonoran Salons F/G*

Innovation: Where is "the Puck Going" in the Advancement of Our Field?
Moderator:
Thomas M. Krummel, MD

Learning Objectives:
At the conclusion of this session, participants will be able to:
- Understand that there are many options to move the field of pediatric surgery forward outside of the basic laboratory research paradigm
- Gain a deeper appreciation for what 'big data' can and can't do
- Learn basic concepts of LEAN management in hospital and practice management

PROGRAM IN DETAIL

Thursday, May 29, 2014 (cont.)

Surgical Procedure Innovation
Bradley M. Rodgers, MD

Device Development
Michael R. Harrison, MD

Education and Training
David M. Powell, MD

Informatics/Big Data
Gretchen Purcell Jackson, MD

Process/Quality Improvement
Craig T. Albanese, MD

4:30 p.m. – 6:15 p.m. **Concurrent Sessions**

Poster Session I: *Grand Sonoran Salons F/G*
Clinical Fetal and Trauma Surgery
Moderators:
Terry L. Buchmiller, MD; Adam M. Vogel, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Discuss surgical options for Myasthenia Gravis
- Explain the difference between adult and pediatric trauma centers
- Determine long-term risk factors for children with intestinal failure

P1 **THYMECTOMY FOR MYASTHENIA GRAVIS IN CHILDREN: A COMPARISON OF OPEN AND THORACOSCOPIC APPROACHES**
Seth D. Goldstein, MD, Nicholas Culbertson, BS, Deiadra Garrettt, MD, Kimberly McIltrot, DNP, Michelle Felix, CRNP, Jose H. Salazar, MD, Kyle Van Arendonk, MD, PhD, Fizan Abdullah, MD, PhD, Thomas Crawford, MD, Paul Colombani, MD, MBA.
Johns Hopkins Hospital, Baltimore, MD, USA.

P2 **PEDIATRIC SURGICAL COMPLICATIONS OF MAJOR GENITOURINARY RECONSTRUCTION IN THE EXSTROPHY-EPISPADIAS COMPLEX**
Dylan Stewart, MD, **Brian M. Inouye, MD**, Ali Tourchi, MD, Seth D. Goldstein, MD, Eric Z. Massanyi, MD, Heather N. Di Carlo, MD, Adam J. Kern, MD, Bhavik B. Shah, MD, Nima Baradaran, MD, John P. Gearhart, MD.
Johns Hopkins Hospital, Baltimore, MD, USA.

PROGRAM IN DETAIL

Thursday, May 29, 2014 (cont.) POSTER SESSIONS

P3 IDENTIFYING STRATEGIES TO DECREASE INFECTIOUS COMPLICATIONS OF GASTROSCHISIS REPAIR

Rachel K. Lemke, Kenneth S. Azarow, MD, Andrea Green, MD, Meera Varman, MD, Shahab F. Abdessalam, MD, Stephen C. Raynor, MD, Robert A. Cusick, MD.

University of Nebraska Medical Center and Children's Hospital, Omaha, NE, USA.

P4 METABOLIC BONE DISEASE IN PEDIATRIC INTESTINAL FAILURE PATIENTS: PREVALENCE AND RISK FACTORS

Faraz A. Khan, MD, Sigrid Bairdain, MD, MPH, Jeremy G. Fisher, MD, Eric Sparks, MD, David Zurakowski, PhD, Biren P. Modi, MD, Tom Jaksic, MD, PhD.

Boston Children's Hospital, Boston, MA, USA.

P5 VACTERL ASSOCIATIONS IN CHILDREN WITH TRACHEO-ESOPHAGEAL FISTULA/ESOPHAGEAL ATRESIA AND ANORECTAL MALFORMATIONS

Timothy B. Lautz, MD[1], Ankur Mandelia, MBBS[1], Jayant Radhakrishnan, MD[2].

[1]Lurie Children's Hospital of Chicago, Chicago, IL, USA, [2]University of Illinois Chicago, Chicago, IL, USA.

P6 CLINICAL FEATURES AND OCCURRENCE OF HIRSCHSPRUNG'S DISEASE IN THE PREMATURE NEWBORN

Earl C. Downey, MD, Elizabeth Hughes, Angelica Putnam, MD, Henry Baskin, MD, Michael D. Rollins, MD.

University of Utah, Salt Lake City, UT, USA.

P7 DOES THORACOSCOPIC REPAIR OF CONGENITAL DIAPHRAGMATIC HERNIA AND ESOPHAGEAL ATRESIA CAUSE NEURODEVELOPMENTAL DELAY? FOLLOWUP OF A RANDOMISED CONTROLLED TRIAL

Nurain Z. Sim[1], Mark Bishay[1], Angela Huertas[2], Joe Brierley[3], Kate MK Cross[3], Edward M. Kiely[3], Joe I. Curry[3], Paolo De Coppi[1], Agostino Pierro[4], **Simon Eaton[1]**.

[1]UCL Institute of Child Health, London, United Kingdom, [2]University College London Hospitals, London, United Kingdom, [3]Great Ormond Street Hospital, London, United Kingdom, [4]Hospital for Sick Children, Toronto, ON, Canada.

PROGRAM IN DETAIL

Thursday, May 29, 2014 (cont.) POSTER SESSIONS

P8 THREE-YEAR CONSECUTIVE PROSPECTIVE STUDY CHARACTERIZING THE NORMAL ADAPTIVE RESPONSE AND FACTORS LEADING TO ENTERAL AUTONOMY IN NEONATAL SURGICAL PATIENTS ON TPN

Kavita Deonarine, MD, Misty Troutt, MS, Samuel Kocoshis, MD, Conrad Cole, MD, Michael A. Helmrath, MD.

Cincinnati's Children Medical Center, Cincinnati, OH, USA.

P9 CONGENITAL HEART DISEASE AND NECROTIZING ENTEROCOLITIS IN VERY LOW BIRTH WEIGHT NEONATES: A PROSPECTIVE COHORT ANALYSIS

Jeremy G. Fisher, MD[1], Sigrid Bairdain, MD, MPH[2], **Eric Sparks, MD, MPH[1]**, Faraz Khan, MD, MPH[1], Jeremy Archer, MD[3], Michael Kenny, MS[4], Biren P. Modi, MD[1], Scott Yeager, MD[5], Jeffrey Horbar, MD[4], Tom Jaksic MD, PhD[1].

[1]Department of Surgery, Center for Advanced Intestinal Rehabilitation, Boston Children's Hospital, Boston, MA USA, [2]Department of Surgery, Boston Children's Hospital, Boston, MA, USA, [3]Congenital Heart Center, University of Florida, Gainesville, FL and Billings Clinic, Billings, MT, [4]Vermont Oxford Network, Burlington, VT, USA, [5]Division of Pediatric Cardiology, University of Vermont, Burlington, VT, USA.

P10 THE ROLE OF SURGERY FOR CHILDREN WITH PERIANAL CROHN'S DISEASE IN THE ERA OF ANTI-TNF THERAPY

Natashia M. Seemann, MD[1], Abdul Elkadri, MD[2], Thomas D. Walters, MBBS, MSc, FRACP[2], Jacob C. Langer, MD, FRCSC, FACS[3].

[1]Department of General Surgery University of Toronto, Toronto, ON Canada, [2]Department of Gastroenterology, The Hospital for Sick Children, Toronto, ON Canada, [3]Department of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, ON, Canada.

P11 PROCEDURAL MANAGEMENT OF CHOLELITHIASIS IN INFANTS UNDER ONE YEAR OF AGE

Cerine Jeanty, MD, S. Christopher Derderian, MD, Jesse Courtier, MD, Shinjiro Hirose MD.

University of California, San Francisco, San Francisco, CA, USA.

P12 CT-RELATED RADIATION EXPOSURE IN CHILDREN TRANSFERRED TO A LEVEL 1 PEDIATRIC TRAUMA CENTER

Adam S. Brinkman, MD[1], Kara G. Gill, MD[2], Carly M. Glarner, MD[1], Jocelyn Burke, MD[1], Andrew P. Rogers, MD[1], Mary J. Anderson, RN[3], Charles M. Leys, MD[1], Daniel J. Ostlie, MD[1], Ankush Gosain, MD, PhD[1].

[1]University of Wisconsin Department of Surgery Division of Pediatric Surgery, Madison, WI, USA, [2]University of Wisconsin Department of Radiology, Division of Pediatric Radiology, Madison, WI, USA, [3]University of Wisconsin American Family Children's Hospital Pediatric Trauma Program, Madison, WI, USA.

PROGRAM IN DETAIL

Thursday, May 29, 2014 (cont.) **POSTER SESSIONS**

P13 **THE EPIDEMIOLOGY AND TEMPORAL TRENDS IN TREATMENT AND OUTCOMES FOR NEUROBLASTOMA: AN ANALYSIS OF THE NCDB**

Brian C. Gulack, MD, Brian R. Englum, MD, Asvin M. Ganapathi, MD, Paul J. Speicher, MD, Timothy A. Driscoll, MD, Susan G. Kreissman, MD, Henry E. Rice, MD.

Duke University, Durham, NC, USA.

P14 **PRENATAL SILDENAFIL AND DEXAMETHASONE RESPECTIVELY IMPROVE OXYGENATION AND VENTILATION IN THE NITROFEN MODEL OF CONGENITAL DIAPHRAGMATIC HERNIA (CDH)**

Carmen Mesas Burgos, Pablo Laje, Huimin Jia, Erik Pearson, Marcus G. Davey, Alan W. Flake, William H. Peranteau.

The Children's Hospital of Philadelphia, Philadelphia, PA, USA.

P15 **A COMPARISON OF PEDIATRIC AND ADULT TRAUMA CENTERS IN THE TREATMENT OF 15-17 YEAR-OLD PATIENTS**

James M. DeCou, MD[1], **Jeremy C. Bushman, MD[2]**, Erik Akopian[3], Derek Axibal[3], David J. Hobbs, MD[2], Alan T. Davis, PhD[2], Todd A. Nickoles, RN[1].

[1]Helen DeVos Children's Hospital, Grand Rapids, MI, USA, [2]GRMEP and MSU Dept of Surgery, Grand Rapids, MI, USA, [3]Michigan State University, Grand Rapids, MI, USA.

4:30 p.m. – 6:15 p.m. **Poster Session II** *Grand Sonoran Salon E*

Basic Science, Quality Improvement, Critical Care and Oncology
Moderators:
Steven L. Lee, MD; Wallace W. Neblett, III, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Identify basic science research as a basis for advancing pediatric surgical therapy
- Utilize laboratory tests in acute appendicitis
- Identify airway foreign bodies in children

P16 **A NOVEL SMALL BOWEL MODEL OF INFLAMMATORY BOWEL DISEASE**

Jennifer L. Knod, MD, Mary Dusing, Kelly Crawford, Artur Chernoguz, MD, Jason S. Frischer, MD.

Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA.

PROGRAM IN DETAIL

Thursday, May 29, 2014 (cont.) POSTER SESSIONS

P17 **TISSUE INHIBITOR OF MATRIX METALLOPROTEINASES-2 INHIBITS THERMAL INJURY INDUCED HYPERPERMEABILITY IN MICROVASCULAR ENDOTHELIAL CELLS**

Katie Wiggins-Dohlvik, MD, Min S. Han, BA, Hayden W. Stagg, MD, Dhriti Mukhopadhyay, MD, Lena Perger, MD, Himakarnika Alluri, MS, Matthew L. Davis, MD, Binu Tharakan, PhD.

Scott and White Memorial Hospital, Temple, TX, USA.

P18 **ECMO IN POST-TERM INFANTS: IS BIGGER ALWAYS BETTER?**

Elizabeth M. Pontarelli, MD, Philippe Friedlich, MD, MSEpi, MBA, James E. Stein, MD, MS.

Children's Hospital Los Angeles, Los Angeles, CA, USA.

P19 **DIAGNOSTIC AND CLINICAL UTILITY OF COMMON LABORATORY TESTS IN CHILDREN WITH COMPLICATED APPENDICITIS: DO THEY HELP GUIDE MANAGEMENT?**

Feroze Sidhwa, MD, MPH, Christina Feng, MD, Seema Anandalwar, BS, Shawn Rangel, MD, MSCE.

Children's Hospital Boston, Boston, MA, USA.

P20 **DEFINING PREDICTORS OF ENTERAL AUTONOMY IN PEDIATRIC SHORT BOWEL SYNDROME AFTER 12 MONTHS OF PARENTERAL NUTRITION**

Farokh R. Demehri, MD, Lauren Stephens, BS, Brady West, MA, Ann Mehringer, MS, Meghan A. Arnold, MD, Pamela Brown, MD, Daniel H. Teitelbaum, MD.

University of Michigan, Ann Arbor, MI, USA.

P21 **NUTRITION IN NEONATAL AND PEDIATRIC EXTRACORPOREAL LIFE SUPPORT: A SURVEY OF CURRENT PRACTICE**

Thomas J. Desmarais, BS[1], Yan Yan, MD, PhD[2], Martin S. Keller, MD[2], **Adam M. Vogel, MD[2]**.

[1]Geisel School of Medicine at Dartmouth, Hanover, NH, USA, [2]Washington University School of Medicine in Saint Louis, St Louis, MO, USA.

P22 **COLLAGEN DEPOSITION IS CRUCIAL TO THE DEVELOPMENT OF PULMONARY HYPERTENSION IN SLIT3 KNOCKOUT MODEL OF CONGENITAL DIAPHRAGMATIC HERNIA**

Michael R. Phillips, MD, Scott Moore, MD, Sean E. McLean, MD.

University of North Carolina School of Medicine, Chapel Hill, NC, USA.

P23 **THE ESOPHAGEAL ANASTOMOTIC STRICTURE INDEX (EASI) AS A MANAGEMENT TOOL AFTER ESOPHAGEAL ATRESIA REPAIR**

Linda Yi-Chan Sun, Jean-Martin Laberge, MD, Yasmine Yousef, **Robert Baird**.

McGill University, Montreal, QC, Canada.

PROGRAM IN DETAIL

Thursday, May 29, 2014 (cont.) **POSTER SESSIONS**

P24 **AIRWAY FOREIGN BODIES IN PEDIATRIC PATIENTS: IN-HOSPITAL MORTALITY AND CORRELATION OF ANATOMIC LOCATION OF FOREIGN BODY WITH OUTCOME**

Kevin N. Johnson[1], David Notrica, MD[2].

[1]Mayo Clinic Arizona, Phoenix, AZ, USA, [2]Phoenix Children's Hospital, Phoenix, AZ, USA.

P25 **HEALTH DISPARITIES IMPACT OUTCOME IN CHILDREN WITH CANCER**

Mary T. Austin, MD, MPH[1], Hoang Nguyen, PhD[1], Jan M. Eberth, PhD[2], Andras Heczey, MD[3], Dennis P. Hughes, MD, PhD[1], Kevin P. Lally, MD, MS[4], Linda S. Elting, DrPh[1].

[1]The University of Texas MD Anderson Cancer Center, Houston, TX, USA, [2]University of South Carolina, Columbia, SC, USA, [3]Baylor College of Medicine, Houston, TX, USA, [4]The University of Texas Medical School at Houston, Houston, TX, USA.

P26 **DEFINING THE ROLE OF PROTEIN KINASE A AND APOPTOSIS IN NECROTIZING ENTEROCOLITIS**

Catherine J. Hunter MD, Douglas Wood, BS.

Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL, USA.

P27 **HYPOXIA ENHANCES AN ALTERNATIVE DNA REPAIR PATHWAY IN NEUROBLASTOMA CELLS**

Lindsey Gasto, Daniela Bashllari, BS, Fujia Lu, PhD, Anthony Opipari, MD, PhD, Valerie Castle, **Erika Newman**.

The University of Michigan, Ann Arbor, MI, USA.

P28 **DIFFERENTIAL EXPRESSION OF AN ALTERNATIVE END-JOINING PATHWAY PROVIDES A NOVEL THERAPEUTIC STRATEGY IN HIGH-RISK NEUROBLASTOMA**

Fujia Lu, PhD, Daniela Bashllari, BS, Anthony Opipari, MD, PhD, Valerie Castle, MD, **Erika Newman MD**.

The University of Michigan, Ann Arbor, MI, USA.

P29 **PROGNOSTIC FACTORS IN FIBROLAMELLAR HEPATOCELLULAR CARCINOMA IN YOUNG PEOPLE**

David G. Darcy, MD, Marcus M. Malek, MD, **Michael P. La Quaglia, MD**.

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

P30 **RAPID SCREENING FOR PIK3CA MUTATIONS IN LYMPHATIC MALFORMATIONS**

Alexander Osborn, MD, PhD, Peter Dickie, PhD, Anita Gupta, MD, Denise Adams, MD, Belinda Hsi Dickie, MD, PhD.

Cincinnati Children's Hospital, Cincinnati, OH, USA.

PROGRAM IN DETAIL

Friday, May 30, 2014 **SCIENTIFIC SESSION I**

7:30 a.m. – 9:00 a.m. **Scientific Session I** *Grand Sonoran Salons F/G*

Basic Science, Fetal and Developmental Biology
Moderators:
George B. Mychaliska, MD; Thomas M. Krummel, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Describe the role of pulmonary hypoplasia in congenital lung disease
- Explain how amniotic mesenchymal stem cells helps in experimental spina bifia treatment
- Indicate how propranolol interacts with lymphatic malformations

1 THE MACROPHAGE INHIBITOR CNI-1493 PREVENTS LUNG METASTASES IN EWING'S SARCOMA

Anthony J. Hesketh, MD, MS[1], Christopher A. Behr, MD[1], Morris Edelman, MD[2], Richard D. Glick, MD[2], Yousef Al-Abed, PhD[1], Marc Symons, PhD[1], Bettie M. Steinberg, PhD[1], Samuel Z. Soffer, MD[2].

[1]Feinstein Institute for Medical Research, Manhasset, NY, USA, [2]Steven and Alexandra Cohen Children's Medical Center of New York, New Hyde Park, NY, USA.

2 OVEREXPRESSION OF HB-EGF PROMOTES SURVIVAL AND DIFFERENTIATION OF ENTERIC NEURAL STEM CELLS AFTER TRANSPLANTATION IN MOUSE DYSGANGLIONIC COLON

Yu Zhou, MD, PhD, Gail E. Besner, MD.

Nationwide Children's Hospital, Columbus, OH, USA.

3 VCAM-1 EXPRESSION IN A MURINE OSTEOSARCOMA MODEL ENHANCES METASTASIS TO DRAINING LYMPH NODE AND LUNG

Iuliana D. Bobanga[1], Francesca Scrimieri, PhD[2], David J. Corn[3] Jaclyn A. Bjelac, MD[2], Saada Eid[2], Alex Y. Huang, MD, PhD[2].

[1]University Hospital Case Medical Center/CWRU SOM, Cleveland, OH, USA, [2]Case Western Reserve University School of Medicine, Cleveland, OH, USA, [3]Case Western Reserve University Biomedical Engineering, Cleveland, OH, USA.

4 HIRSCHSPRUNG-ASSOCIATED ENTEROCOLITIS CHANGES COMPOSITION OF INTESTINAL MICROBIOTA IN CHILDREN WITH HIRSCHSPRUNG'S DISEASE

Philip K. Frykman, MD, PhD, MBA[1], Tomas Wester, MD, PhD[2], Agneta Nordenskjold, MD, PhD[3], Akemi Kawaguchi, MD[4], Thomas T. Hui, MD[5], Anna L. Granstrom, MD[2], Zhi Cheng, MD[1], Vince Funari, PhD[6], for the HAEC Collaborative Research Group[1].

[1]Division of Pediatric Surgery, Departments of Surgery and Biomedical

Sciences, Cedars-Sinai Medical Center, Los Angeles, CA, USA, [2]Department of Pediatric Surgery, Astrid Lindgren's Children's Hospital, Karolinska University Hospital, Stockholm, Sweden, [3]Department of Women's and Children's Health and Center of Molecular Medicine-CMM, Karolinska Institute, Stockholm, Sweden, [4]Division of Pediatric Surgery, Children's Hospital Los Angeles, Los Angeles, CA, USA, [5]Division of Pediatric Surgery, Children's Hospital of Oakland, Oakland, CA, USA, [6]Genomics Core Laboratory, Medical Genetics Institute, Cedars- Sinai Medical Center, Los Angeles, CA, USA.

5 **FECAL TRANSPLANT CAN RESCUE FROM CONFIRMED DISSEMINATED GUT-DERIVED SEPSIS DUE TO RESISTANT AND VIRULENT HUMAN PATHOGENS: POSSIBLE ROLE IN LATE ONSET NEONATAL SEPSIS**

Jennifer R. DeFazio, Sangman Kim, Irma Fleming, Bana Jabri, Olga Zaborina, John C. Alverdy.

University of Chicago, Chicago, IL, USA.

6 **PROPRANOLOL AS A NOVEL THERAPY FOR LYMPHATIC MALFORMATIONS**

Connie H. Keung MD[1], Julie Monteagudo, MD[1], Peter Liou, MD[1], Chris K. Kitajewski, BA[1], Maia Reiley, MS[1], John Paul Andrews, BA[1], June K. Wu, MD[1], Carrie J. Shawber, PhD[1], Jessica J. Kandel, MD[2].

[1]Columbia University Medical Center, New York, NY, SA [2]Comer Children's Hospital, The University of Chicago Medicine & Biological Sciences, Chicago, IL, USA.

7 **PARTIAL OR COMPLETE COVERAGE OF EXPERIMENTAL SPINA BIFIDA BY SIMPLE INTRA-AMNIOTIC INJECTION OF CONCENTRATED AMNIOTIC MESENCHYMAL STEM CELLS**

Beatrice Dionigi, MD, Azra Ahmed, BS, Joseph Brazzo, III, BS, John Patrick Connors, BS, David Zurakowski, PhD, Dario O. Fauza, MD, PhD.

Boston Children's Hospital, Boston, MA, USA.

8 **ARE ALL PULMONARY HYPOPLASIA THE SAME? A COMPARISON OF PULMONARY OUTCOMES IN NEONATES WITH OMPHALOCELE, CONGENITAL LUNG MALFORMATION AND CONGENITAL DIAPHRAGMATIC HERNIA**

Adesola C. Akinkuotu, MD, Fariha Sheikh, MD, Iriving J. Zamora, MD, Darrell L. Cass, MD, Timothy C. Lee, MD, Christopher I. Cassady, MD, Amy R. Mehollin-Ray, MD, Jennifer L. Williams, MD, Rodrigo Ruano, MD, PhD, Stephen E. Welty, MD, Oluyinka O. Olutoye, MD, PhD.

Baylor College of Medicine, Houston, TX, USA.

PROGRAM IN DETAIL

Friday, May 30, 2014 (cont.) **SCIENTIFIC SESSION I**

9 **IS ALL HYDROPS THE SAME? A COMPARISON BETWEEN HYDROPIC PATIENTS WITH DIFFERENT UNDERLYING DISEASE PROCESSES**

S. Christopher Derderian, MD, Cerine Jeanty, MD, Lily Cheng, MD, Roberta L. Keller, MD, Anita Moon-Grady, MD, Jody A. Farrell, MSN, PNP, Shinjiro Hirose, MD, Juan M. Gonzalez, MD, Tippi C. MacKenzie.

University of California, San Francisco, San Francisco, CA, USA.

10 **MATERNAL PRE-ECLAMPSIA INCREASES RISK OF NEONATAL NECROTIZING ENTEROCOLITIS**

Dhriti Mukhopadhyay, MD[1], Luka Komidar, PhD[2], Katie Wiggins-Dohlvik, MD[1], Madhava R. Beeram, MD[1], Lena Z. Perger, MD[3].

[1]Scott & White Hospital/Texas A&M University, Temple, TX, USA, [2]University of Ljubljana, Ljubljana, Slovenia, [3]McLane Children's Hospital/Texas A&M University, Temple, TX, USA.

9:00 a.m. – 10:00 a.m. **Robert E. Gross Lecture** *Grand Sonoran Salons F/G*

Diana L. Farmer, MD
Standing on the Shoulders of Giants: From Singapore to Stem Cell Therapy

Learning Objectives
At the conclusion of this session, participants will be able to:
- Understand ongoing research to develop stem cell-based therapies for birth defects
- Identify key milestones in the history of regenerative medicine
- Describe key strategies to successfully navigate a career as a surgeon-scientist

10:30 a.m. – 11:00 a.m. **Travel Fellows Presentations** *Grand Sonoran Salons F/G*

John K.M. Nyagetuba, MB, ChB
Pediatric Surgery in Kenya: Challenges and Solutions

Tran Anh Quynh, MD, PhD
The Development of Vietnam Pediatric Surgery

11:00 a.m. – 12:15 p.m. **Scientific Session II** *Grand Sonoran Salons F/G*

Oncology and General Surgery
Moderators:
Marleta Reynolds, MD, Sundeep G. Keswani, MD

PROGRAM IN DETAIL

Friday, May 30, 2014 (cont.) **SCIENTIFIC SESSION II**

Learning Objectives:
At the conclusion of this session, participants will be able to:
- Identify complications of antiangiogenic therapy
- Discuss the concept of surgical quality in cancer
- Compare vertical sleeve gastrectomy as compared in gastric bands in bariatric surgery

11 **PNEUMOTHORAX AS A COMPLICATION OF COMBINATION ANTI-ANGIOGENIC CHEMOTHERAPY IN CHILDREN AND YOUNG ADULTS WITH REFRACTORY SOLID TUMORS**

Rodrigo B. Interiano, MD, Beth McCarville, MD, Jianrong Wu, PhD, Andrew M. Davidoff, MD, Fariba Navid, MD, John Sandoval, MD.

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

12 **UTILITY OF SENTINEL LYMPH NODE BIOPSY VERSUS PET CT IN DIAGNOSIS OF LYMPH NODE METASTASIS IN PEDIATRIC SOFTTISSUE SARCOMA — A PROSPECTIVE ANALYSIS**

Nathalie L. Kremer, MD, Lars Wagner, MD, Michael Gelfand, MD, Greg M. Tiao, MD, Daniel von Allmen, MD, Brian Turpin, MD, Rajaram Nagarajan, MD, Hong Yin MD, Roshni A. Dasgupta, MD, MPH.

Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA.

13 **COG RENAL TUMOR STUDY: SURGICAL PROTOCOL VIOLATIONS AS A SURROGATEMARKER FOR PEDIATRIC SURGERY CANCER QUALITY**

Peter F. Ehrlich[1], Tom Hamilton[2], Ken Gow[3], Doug Barnhart[4], Roshni Das Gupta[5], Mike Chen[6], Jessica Kandel[7], **Richard Glick[8]**, Ferd Ferrer[9].

[1]University of Michigan, Ann Arbor, MI, USA, [2]Boston Childrens Hopsital, Boston, MA, USA, [3]University of Washington, Seattle, WA, USA, [4]Primary Childrens Hospital, Salt Lake City, UT, USA, [5]Cincinnati, OH, USA, [6]University of Alabama Birmingham, Birmingham, AL, USA, [7]University of Chicago, Chicago, IL, USA, [8]Cohen Childrens Hospital, Long Island, NY, USA, [9]Connecticut Childrens Hopsital, Hartford, CT, USA.

14 **PULMANARY RESECTION IN CHILDREN AND ADOLESCENTS WITH OSTEOSARCOMA — IS IT STILL HELPFUL WHEN METASTATIC DISEASE IS NOT LIMITED TO THE LUNGS?**

Austen Slade, BS[1], Carla L. Warneke, MS[2], Dennis P. Hughes, MD, PhD[2], Pamela A. Lally, MD[1], Kevin P. Lally, MD, MS[1], Andrea Hayes-Jordan, MD[2], Mary T. Austin, MD, MPH[2].

[1]The University of Texas Medical School at Houston, Houston, TX, USA, [2]The University of Texas MD Anderson Cancer Center, Houston, TX, USA.

PROGRAM IN DETAIL

Friday, May 30, 2014 (cont.) **SCIENTIFIC SESSION II**

15 **COMPLETE RESECTION OF HIGH-RISK NEUROBLASTOMA WITH METASTATIC DISEASE: A PROPENSITY ANALYSIS**

Brian R. Englum, Paul J. Speicher, MD, Asvin M. Ganapathi, MD, Anthony W. Castleberry, MD, Timothy A. Driscoll, MD, Susan G. Kreissman, MD, Henry E. Rice, MD.

Duke University Medical Center, Durham, NC, USA.

16 **MYCN DEREGULATION MODELS TUMOR INITIATION IN HUMAN NEURAL CREST STEM CELLS**

Daniela Bashllari, BS, Fujia Lu, PhD, Elizabeth Lawlor, MD, PhD, Anthony Opipari, MD, PhD, Valerie Castle, MD, **Erika Newman, MD**.

The University of Michigan, Ann Arbor, MI, USA.

17 **LAPAROSCOPIC VERTICAL SLEEVE GASTRECTROMY SIGNIFICANTLY IMPROVES SHORT-TERM WEIGHT LOSS AS COMPARED TO LAPAROSCOPIC GASTRIC BAND PLACEMENT IN MORBIDLY OBESE PEDIATRIC PATIENTS**

Felipe E. Pedroso, MD, Jeffrey Gander, MD, Pilyung Stephen Oh, MD, Jeffrey L. Zitsman, MD.

New York Presbyterian Hospital-Columbia University Medical Center, Dept. of Surgery, Division of Pediatric Surgery, New York, NY, USA.

18 **MINIMAL VS MAXIMAL ESOPHAGEAL DISSECTION AND MOBILIZATION DURING LAPAROSCOPIC FUNDOPLICATION: LONG-TERM FOLLOW-UP FROM A PROSPECTIVE RANDOMIZED TRIAL**

Amita A. Desai, MD, Hanna Alemayehu, MD, George W. Holcomb, III, MD, Shawn D. St. Peter, MD.

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

12:15 p.m. – 1:15 p.m. **Jay & Margie Grosfeld Lecture** *Grand Sonoran Salons F/G*

Gail E. Besner, MD

A Pain in the NEC: Research Challenges and Opportunities

Learning Objectives

At the conclusion of this session, participants will be able to:

- Understand how growth factors and stem cells may be used in the future for patients with necrotizing enterocolitis
- Understand the challenges inherent in developing therapeutic strategies for necrotizing enterocolitis
- Understand future opportunities for treating patients with necrotizing enterocolitis

PROGRAM IN DETAIL

Friday, May 30, 2014 (cont.)

2:00 p.m. – 4:00 p.m.	**ICD-10 Coding and Billing**	*Grand Sonoran Salons F/G*

John F. Burns, CPC, CPC-I, CEMC, CPMA®, AHIMA
Introduction, Documentation and Financial Impact of ICD-10

2:00 p.m. – 5:00 p.m.	**Simulation Courses** *Pre-registration Required* *CME Not Offered*	*Grand Sonoran Salon E*

Endosurgical Simulation Course
A hands-on course designed to teach beginning and advanced endosurgical techniques to learners of all levels. Limited to 45 participants.

High-fidelity Endosurgical Simulation Course
A hands-on course designed for advanced learners, ideally those who are already beginning or are about to begin implementing advanced minimally invasive surgical techniques for congenital anomalies of neonates and infants. The course focuses on thoracoscopic esophageal atresia/tracheoesophageal fistula repair; thoracoscopic diaphragmatic hernia repair; thoracoscopic lobectomy; and laparoscopic duodenal atresia repair. Limited to 16 participants.

Learning Objectives
At the conclusion of this session, the participants will be able to:
- Practice basic and advanced suturing skills
- Practice how to perform complex procedures laparoscopically (SILS, lobectomy, sleeve gastrectomy, TEF, diaphragmatic hernia repair, gastrostomy placement)
- Learn complication avoidance and recovery

PROGRAM IN DETAIL

Saturday, May 31, 2014

8:00 a.m. – 9:00 a.m.	***Journal of Pediatric Surgery* Lecture**	*Grand Sonoran Salons F/G*

Eric A. Rose, MD
Understanding Translational Research

Learning Objectives
At the conclusion of this session, participants will be able to:
- Define transitional research
- Understand the classical, the alternative pathway, and the components of translational research
- Understand the concept of interventional biology and the role of surgeon scientists

9:00 a.m. – 10:30 a.m.	**Scientific Session III**	*Grand Sonoran Salons F/G*

Surgical Quality: Are We Doing What We Think We Are?
Moderators:
Allan M. Goldstein, MD; Charles J. Stolar, MD

Learning Objectives:
At the conclusion of this session, participants will be able to:
- Compare the evidence for home oral antibiotics compared to intravenous antibiotics for perforated appendicitis
- Assess the timing of Ladds procedure in patients with critical heart disease
- Discuss surgical wound classification

19 SURGICAL WOUND MISCLASSIFICATION: A MULTICENTER EVALUATION

Shauna M. Levy, MD[1], Kevin P. Lally, MD, MS[1], Martin L. Blakely, MD, MS[2], Casey M. Calkins, MD[3], Sid Dassinger, MD[4], Eileen Duggan, MD[2], Eunice Y. Huang, MD, MS[5], Akemi L. Kawaguchi, MD[6], Monica E. Lopez, MD[7], Robert T. Russell, MD, MPH[8], Shawn D. St. Peter, MD[9], Christian J. Streck, MD[10], Adam M. Vogel, MD[11], KuoJen Tsao, MD[1], for the Pediatric Surgical Research Collaborative[1].

[1]Children's Memorial Hermann Hospital, University of Texas Health Science Center at Houston, Houston, TX, USA, [2]Vanderbilt Children's Hospital, Vanderbilt University Medical Center, Nashville, TN, USA, [3]Children's Hospital of Wisconsin, Medical College of Wisconsin, Milwaukee, WI, USA, [4]Arkansas Children's Hospital, University of Arkansas for Medical Sciences, Little Rock, AR, USA, [5]Le Bonheur Children's Hospital, The University of Tennessee Health Science Center, Memphis, TN, USA, [6]Children's Hospital Los Angeles, Keck Medical Center of USC, Los Angeles, CA, USA, [7]Texas Children's Hospital, Baylor College of Medicine, Houston, TX, USA, [8]Children's of Alabama,

University of Alabama Birmingham School of Medicine, Birmingham, AL, USA, [9]Children's Mercy Hospital, University of Missouri-Kansas City School of Medicine, Kansas City, MO, USA, [10]MUSC Children's Hospital, Medical University of South Carolina, Charleston, SC, USA, [11]St. Louis Children's Hospital, Washington University School of Medicine, St. Louis, MO, USA.

20 RECENT TRENDS IN THE OPERATIVE EXPERIENCE OF JUNIOR PEDIATRIC SURGEONS: A STUDY OF APSA APPLICANT CASE LOGS

Christopher A. Behr, MD[1], Anthony J. Hesketh, MD, MS[1], Meredith Akerman, MS[1], Stephen E. Dolgin, MD[2], Robert A. Cowles MD[3].

[1]The Feinstein Institute for Medical Research, Manhasset, NY, USA, [2]Steven and Alexandra Cohen Children's Medical Center, New Hyde Park, NY, USA, [3]Yale School of Medicine, New Haven, CT, USA.

21 EARLY VERSUS DELAYED REPAIR FOR NEONATAL INGUINAL HERNIA

Jason P. Sulkowski, MD[1], Jennifer N. Cooper, PhD[1], Eileen M. Duggan, MD[2], Ozlem Balci, MD[3], Seema Anandalwar[4], Martin L. Blakely, MD, MS[2], Kurt Heiss, MD[3], Shawn J. Rangel, MD, MSCE[4], Peter C. Minneci, MD, MHSc[1], Katherine J. Deans, MD, MHSc[1].

[1]Nationwide Children's Hospital Columbus OH, USA, [2]Monroe Carell Jr Children's Hospital, Nashville, TN, USA, [3]Children's Hospital of Atlanta, Atlanta, GA, USA, Children's Hospital Boston, Boston, MA, USA.

22 TIMING OF LADD'S PROCEDURE IN PATIENTS WITH CRITICAL CONGENITAL HEART DISEASE

Jason P. Sulkowski MD[1], Jennifer N. Cooper, PhD[1], Eileen M. Duggan, MD[2], Ozlem Balci, MD[3], Seema Anandalwar[4], Martin L. Blakely, MD, MS[2], Kurt Heiss, MD[3], Shawn J. Rangel, MD, MSCE[4], Katherine J. Deans, MD, MHSc[1], Peter C. Minneci, MD, MHSc[1].

[1]Nationwide Children's Hospital, Columbus, OH, USA, [2]Monroe Carell Jr Children's Hospital, Nashville, TN, USA, [3]Children's Hospital of Atlanta, Atlanta, GA, USA, [4]Children's Hospital Boston, Boston, MA, USA.

23 PRIORITIZING QUALITY IMPROVEMENT IN PEDIATRIC GENERAL SURGERY: INSIGHT FROM THE PEDIATRIC NATIONAL SURGICAL QUALITY IMPROVEMENT PROJECT

Anne M. Stey, MD, MSc[1], R. Lawrence Moss, MD[2], Bruce Lee Hall, MD, PhD, MBA[3], Charles Vinocur, MD[4], Kari Kraemer, PhD[3], Mark E. Cohen, PhD[3], Clifford Y. Ko, MD, MS, MSHS[3], Shawn J. Rangel, MD, MSCE[5].

[1]University of California, Los Angeles, Los Angeles, CA, USA, [2]Nationwide Children's Hospital, Columbus, OH, USA, [3]American College of Surgeons National Surgery Quality Improvement Program, Chicago, IL, USA, [4]Nemours / Alfred I duPont Hospital for Children, Wilmigton, DE, USA, [5]Boston Children's Hospital, Boston, MA, USA.

Saturday, May 31, 2014 (cont.) **SCIENTIFIC SESSION III**

24 CURRENT TRENDS IN THE SURGICAL TREATMENT OF PEDIATRIC OVARIAN TORSION: WE CAN DO BETTER

Danielle M. Austin[1], Owen Kahn[1], Melissa C. McCann[2], Trudy J. Lerer[2], Kyle Lee[2], Shefali Thaker[2], Katherine W. Herbst[2], Christine M. Rader[1], Brendan T. Campbell[1].

[1]Connecticut Children's Medical Center and University of Connecticut School of Medicine, Hartford, CT, USA, [2]Connecticut Children's Medical Center, Hartford, CT, USA.

25 DECREASED MORTALITY FROM PARENTERAL NUTRITION-ASSOCIATED LIVER DISEASE IN PAIR-MATCHED INFANTS TREATED WITH PARENTERAL FISH OIL

Prathima Nandivada, MD, Kathleen M. Gura, PharmD, Mark Puder, MD, PhD.

Boston Children's Hospital, Boston, MA, USA.

26 A DYNAMIC DISCHARGE PROTOCOL PROVIDES EFFICIENT CARE FOR UNCOMPLICATED APPENDICITIS

David E. Skarda, MD[1], **Kathy Schall, MD[1]**, Doug Barnhart, MD[1], Michael Rollins, MD[1], Rebecka Meyers, MD[1], Elizabeth Soukup, MD[1], Seth Andrews, MBA[2], Molly McFadden[3], Jared A. Olson, PharmD[2], Eric Scaife, MD[1].

[1]Division of Pediatric Surgery, Primary Children's Hospital, Salt Lake City, UT, USA, [2]Intermountain Healthcare, Primary Children's Hospital, Salt Lake City, UT, USA, [3]University of Utah School of Medicine, Division of Epidemiology, Salt Lake City, UT, USA.

27 HOME INTRAVENOUS VERSUS ORAL ANTIBIOTICS FOLLOWING APPENDECTOMY FOR PERFORATED APPENDICITIS, A RANDOMIZED CONTROLLED TRIAL

David A. Klima, MD, **Blair A. Wormer, MD**, Paul D. Colavita, MD, Chukwuma N. Eruchalu, Amanda L. Walters, MS, Graham H. Cosper, MD, B Todd Heniford, MD, Andrew M. Schulman, MD.

Carolinas Medical Center, Charlotte, NC, USA.

28 REDUCING CT SCANS FOR APPENDICITIS BY INCREASING THE DIAGNOSTIC ACCURACY OF ULTRASONOGRAPHY

Jason W. Nielsen, MD[1], Laura Boomer, MD[1], Kelli Kurtovic, BS[1], Ryan Mallory, BA[2], Eric Lee, MD[1], Brent Adler, MD[1], Greg Bates, MD[1], Jennifer Cooper, PhD[1], Brian Kenney, MD[1].

[1]Nationwide Children's Hospital, Columbus, OH, USA, [2]Ohio State University College of Medicine, Columbus, OH, USA.

29 A RISK-STRATIFIED COMPARISON OF FASCIAL VERSUS FLAP CLOSURE TECHNIQUES ON EARLY OUTCOMES OF INFANTS WITH GASTROSCHISIS

Claudia N. Emami, MD, MPH, Fouad Youssef, MD, Robert J. Baird, MD, CM, MSc, Pramod Puligandla, MD, MSc.

Montreal Children's Hospital, Montreal, QC, Canada.

PROGRAM IN DETAIL

Saturday, May 31, 2014 (cont.) **SCIENTIFIC SESSION IV**

11:00 a.m. – Noon **Scientific Session IV** *Grand Sonoran Salons F/G*

Trauma and Critical Care
Moderators:
Anthony Stallion, MD; Kevin P. Lally, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Discuss blood transfusion components flowing major trauma in children
- Explain the efficacy of perflubron induced lung growth in congenital diaphragmatic hernia
- Assess nutritional concerns in children with congenital diagrammatic hernia

30 **SAFETY AND EFFICACY OF PERFLUBRONINDUCED LUNG GROWTH IN NEONATES WITH CONGENITAL DIAPHRAGMATIC HERNIA: RESULTS OF A PROSPECTIVE, RANDOMIZED TRIAL**

George B. Mychaliska, MD, **Benjamin S. Bryner, MD**, Ronald Dechert, DrPH, MSc, RRT, Jeannie Kreutzman, RN, MSN, CPNP, Michael Becker, RRT, Ronald B. Hirschl, MD.

University of Michigan, Ann Arbor, MI, USA.

31 **CAROTID REPAIR POST-ECMO: PATENCY RATES AND DEVELOPMENTAL OUTCOMES**

Eileen M. Duggan, MD, Amy Zhai, MD, Harish Krishnamoorthi, Melissa E. Danko, MD, Jamie Tice, BSN, Igor V. Voskresensky MD, Daphne Hardison BSN, John B. Pietsch, MD, Harold N. Lovvorn III, MD.

Vanderbilt University Medical Center, Nashville, TN, USA.

32 **NUTRITIONAL STATE OF SURVIVORS OF CONGENITAL DIAPHRAGMATIC HERNIA — PREDICTORS OF GROWTH IN THE FIRST 12 MONTHS**

Sigrid Bairdain, MD, MPH, Jeremy Fisher, MD, Faraz A. Khan, MD, Ryan P. Cauley, MD, MPH, Katelyn Ariagno, RD, David Zurakowski, PhD, Jill Zalieckas, MD, MPH, Tom Jaksic, MD, PhD, Jay M. Wilson, MD, Nilesh Mehta, MD.

Boston Children's Hospital, Boston, MA, USA.

33 **MANAGING MODERATELY INJURED PEDIATRIC PATIENTS WITHOUT IMMEDIATE SURGEON PRESENCE: 10 YEARS LATER**

Laura A. Boomer, MD, Jason Nielsen, MD, Wendi Lowell, Kathy Haley, Carla Coffey, Kathy Nuss, MD, Benedict C. Nwomeh, MD, MPH, Jonathan I. Groner, MD.

Nationwide Children's Hospital and the Ohio State University College of Medicine, Columbus, OH, USA.

PROGRAM IN DETAIL

Saturday, May 31, 2014 (cont.) **SCIENTIFIC SESSION IV**

34 **THE EFFECT OF BALANCED BLOOD COMPONENT RESUSCITATION AND CRYSTALLOID ADMINISTRATION IN PEDIATRIC TRAUMA PATIENTS REQUIRING TRANSFUSION IN IRAQ AND AFGHANISTAN**

Mary J. Edwards, MD, Michael B. Lustik, MS, Margaret Clark, MD.
Tripler Army Medical Center, TAMC, HI, USA.

35 **PEDIATRIC EMERGENCY DEPARTMENT THORACOTOMY: A LARGE CASE SERIES REVIEW FROM A LEVEL 1 TRAUMA CENTER**

Casey J. Allen, MD, Evan J. Valle, MD, Chad Thorson, MD, MSPH, Anthony R. Hogan, MD, Eduardo A. Perez, MD, Holly Neville, MD, Tanya Zakrison, MD, MPH, Juan E. Sola, MD.
University of Miami Miller School of Medicine, Miami, FL, USA.

Noon – 12:15 p.m.	Introduction of New Members	*Grand Sonoran Salons F/G*
12:15 p.m. – 1:15 p.m.	**Presidential Address**	*Grand Sonoran Salons F/G*

Thomas M. Krummel, MD
Try Again. Fail Again...Fail Better.

Learning Objectives
At the conclusion of this session, participants will be able to:
- Recall that failures throughout the early days of pediatric surgery have enabled and reformed our current success
- Use the lessons of failure from endurance athletics, medtech start ups and surgery to better understand failure
- Rethink our current culture of risk/failure aversion

1:30 p.m. – 2:30 p.m.	**Innovation Session**	*Grand Sonoran Salons F/G*

Abstracts on New and Innovative Techniques and Procedures
Moderators:
Erik D. Skarsgard, MD; Todd A. Ponsky, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Discuss the artificial placenta
- Assess the use of a novel tool for noninvasive treatment of pyloric stenosis
- Evaluate the use of a mobile tool to help with remote patient care

PROGRAM IN DETAIL

Saturday, May 31, 2014 (cont.) **INNOVATION SESSION**

i1 **AN EXTRACORPOREAL ARTIFICIAL PLACENTA SUPPORTS EXTREMELY PREMATURE LAMBS FOR ONE WEEK**

Benjamin S. Bryner, MD, Brian W. Gray, MD, Elena Perkins, Hayley Hoffman, BS, Gabe Owens, MD, PhD, John Barks, MD, Alvaro Rojas-Pena, MD, Robert H. Bartlett, MD, George B. Mychaliska, MD.

University of Michigan, Ann Arbor, MI, USA.

i2 **MYPECTUS: A NOVEL MOBILE HEALTH SYSTEM FOR REMOTE ASSESSMENT OF TREATMENT**

Brittany Harrison, BA[1], Lily Stern, BS[1], Philip Chung, MS[1], Mozziyar Etemadi, MS, PhD[1], Dillon Kwiat, BS[1], Michael R. Harrison, MD[1], Marcelo Martinez Ferro, MD[2].

[1]University of California, San Francisco, San Francisco, CA, USA, [2]Hospital Privado de Niños Fundación Hospitalaria, Buenos Aires, Argentina.

i3 **A NOVEL ENDOLUMINAL CATHETER TOOL SHOWS POTENTIAL FOR NON-INVASIVE TREATMENT OF INFANTILE HYPERTROPHIC PYLORIC STENOSIS (IHPS)**

Carolyn Cochenour, BSc, Tim Kane, MD, Peter C. Kim, MD, PhD, Axel Krieger.

Children's National Health System, Washington, DC, USA.

i4 **GENERATION OF AN ARTIFICIAL INTESTINE AND VALIDATION IN DOGS: A PROOF-OF-CONCEPT STUDY**

Shahab Shaffiey, MD[1], Hongpeng Jia, MD[1], Tim Keane, BS[2], Misty Good, MD[1], Chhinder Sodhi, PhD[1], Tom Prindle, BS[1], Cait Costello, PhD[3], John March, PhD[3], Deborah Nagle, MD[4], Stephen Badylak, DVM PhD MD[2], David J. Hackam, MD, PhD[1].

[1]Children's Hospital of Pittsburgh, Pittsburgh, PA, USA, [2]University of Pittsburgh, Pittsburgh, PA, USA, [3]Cornell University Ithaca, NY, USA, [4]Beth Israel Deaconess Medical Center, Boston, MA, USA.

i5 **ENDOBRONCHIAL OCCLUSION WITH ONE-WAY ENDOBRONCHIAL VALVES: A NOVEL TECHNIQUE FOR PERSISTENT AIR LEAKS IN CHILDREN**

Michael F. Reed, MD, **Abigail B. Podany, MD**, Dorothy V. Rocourt MD, Christopher R. Gilbert, DO, Mary C. Santos, MD, Robert E. Cilley, MD, Peter W. Dillon, MD, Jennifer W. Toth, MD.

Pennsylvania State Hershey Medical Center, Hershey, PA, USA.

i6 **SACRAL NERVE STIMULATOR FOR DYSFUNCTIONAL ELIMINATION SYNDROME IN CHILDREN**

Jason P. Sulkowski, MD, Kristine M. Nacion, MPH, Peter C. Minneci, MD, MHSc, Hayat M. Mousa, MD, Seth A. Alpert, MD, **Steven Teich, MD**.

Nationwide Children's Hospital, Columbus, OH,USA.

PROGRAM IN DETAIL

Saturday, May 31, 2014 (cont.) VIDEO SESSION

2:30 p.m. – 3:30 p.m. **Video Session** *Grand Sonoran Salons F/G*

Moderators:
Casey M. Calkins, MD; Mary L. Brandt, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Assess the role of ultrasound in rectal procedures
- Perform duodenal web repair using a natural orifice
- Employ surgery for congenital sternal cleft repair

V1 THORACOSCOPIC REPAIR OF ESOPHAGEAL ATRESIA WITH DISTAL TRACHEOESOPHAGEAL FISTULA AND A PROXIMAL TYPE-H TRACHEOESOPHAGEAL FISTULA

Zachary J. Kastenberg, MD, James K. Wall, MD, **Matias Bruzoni**.
Stanford University, Palo Alto, CA, USA.

V2 HYDROCOLPOS DRAINAGE IN CLOACA

Andrea Bischoff, MD, Belinda Dickie, MD, Jason Frischer, MD, Marc A. Levitt, MD, Alberto Peña, MD.
Cincinnati Children's Hospital, Cincinnati, OH, USA.

V3 CONGENITAL STERNAL CLEFT REPAIR

Cathy A. Burnweit, MD[1], Jun Tashiro, MD, MPH[2].
[1]Miami Children's Hospital, Miami, FL, USA, [2]University of Miami Miller School of Medicine, Miami, FL, USA.

V4 RESECTION OF DUODENAL WEB USING HYBRID NATURAL ORIFICE TRANSLUMINAL ENDOSCOPIC SURGERY (NOTES)

Maria Carmen Mora, MD[1], Kevin P. Moriarty, MD[2], Michael V. Tirabassi, MD[2], Gregory T. Banever, MD[2].
[1]Baystate Medical Center, Springfield, MA, USA, [2]Baystate Children's Hospital, Springfield, MA, USA.

V5 ENDOSONOGRAPHY IN PERIRECTAL PROCEDURES

Arun Thenappan, Daniel Teitelbaum, Marcus Jarboe
University of Michigan C.S. Mott Children's Hospital, Ann Arbor, MI, USA.

V6 ULTRASOUND-GUIDED LATERAL APPROACH TO INTERNAL JUGULAR CATHTER PLACEMENT

Marcus Jarboe MD, K Elizabeth Speck, MD.
University of Michigan, Ann Arbor, MI, USA..

PROGRAM IN DETAIL

Sunday, June 1, 2014 **SCIENTIFIC SESSION V**

8:00 a.m. – 9:15 a.m. **Scientific Session V** *Grand Sonoran Salons F/G*

Miscellaneous Surgery
Moderators:
Kenneth W. Gow, MD; Michael D. Klein, MD

Learning Objectives
At the conclusion of this session, participants will be able to:
- Describe how an electronic medical record can be leveraged for surgical quality improvement
- Identify the role of diaphragmatic pacers in pulmonary disease
- Explain the management of recurrent intussusceptions

36 MYPOD: AN EMR-BASED TOOL THAT FACILITATES QUALITY IMPROVEMENT AND MAINTENANCE OF CERTIFICATION

Loren Berman, MD, Brian J. Duffy, MD, Charles D. Vinocur, MD.
A.I. duPont Hospital for Children, Wilmington, IL, USA.

37 THORACOSCOPIC PLACEMENT OF DIAPHRAGMATIC PACERS FOR ONDINE'S CURSE

Kristina J. Nicholson, BS[1], Lauren B. Nosanov, BA[1], Kanika A. Bowen, MD[2], Iris A. Perez, MD[2], Thomas G. Keens, MD[2], Cathy E. Shin, MD[2].
[1]University of Southern California Keck School of Medicine Los Angeles, CA, USA, [2]Children's Hospital Los Angeles, Los Angeles, CA, USA.

38 MANAGEMENT OF RECURRENT INTUSSUSCEPTION IN THE AIR CONTRAST ENEMA ERA: A REVIEW OF 716 PATIENTS

Jeremy G. Fisher, MD, Eric A. Sparks, MD, Christopher GB Turner, MD, Justin D. Klein, MD, Elliot Pennington, MD, Faraz Khan, MD, David Zurakowski, PhD, Dario O. Fauza, MD, PhD, Biren P. Modi, MD.
Department of Surgery, Boston Children's Hospital, Boston, MA, USA.

39 COMBINED LAPAROSCOPIC/FLUOROSCOPIC PRIMARY GASTROJEJUNOSTOMY BUTTON TUBE PLACEMENT: DESCRIPTION OF TECHNIQUE AND REVIEW OF INITIAL CLINICAL EXPERIENCE

Mariya Skube, MD, Elizabeth Berdan, MD, Robert D. Acton, MD, Daniel A. Saltzman, MD, PhD, Bradley J. Segura, MD, Donavon J. Hess, MD, PhD.
University of Minnesota, Minneapolis, MN, USA.

40 H-TYPE TRACHEOESOPHAGEAL FISTULAS: A MULTICENTER REVIEW OF OUTCOMES IN A RARE DISEASE

Sara C. Fallon, MD[1], Shawn D. St. Peter, MD[2], Jacob C. Langer, MD[3], Kuojen Tsao, MD[4], Caroline Kellagher, BA[4], Dave R. Lal, MD[5], Jill S. Whitehouse, MD[5], Diana L. Diesen, MD[6], Michael D. Rollins, MD[7], Elizabeth M. Pontarelli, MD[8],

Jeffrey S. Upperman, MD[8], Charles M. Leys, MD[9], Mark L. Wulcan, MD[10], Sarah J. Hill, MD[10], Martin L. Blakely, MD[11], Corey W. Iqbal, MD[12], Timothy D. Kane, MD[13], David E. Wesson, MD[1].

[1]Division of Pediatric Surgery, Michael E. DeBakey Department of Surgery, Baylor College of Medicine, Houston, TX, USA, [2]Department of Surgery, Children's Mercy Hospital and Clinics, Kansas City, MO, USA, [3]Division of Pediatric Surgery, The Hospital for Sick Children, Toronto, ON, Canada, [4]Departments of Pediatric Surgery and Surgery and the Center for Surgical Trials and Evidence-based Practice at the University of Texas Medical School at Houston, Houston, TX, USA, [5]Department of Surgery, Division of Pediatric Surgery, Medical College of Wisconsin and Children's Hospital of Wisconsin, Milwaukee, WI, USA, [6]Children's Medical Center Dallas, UT Southwestern Medical Center, Dallas, TX, USA, [7]Division of Pediatric Surgery, Primary Children's Medical Center, University of Utah, Salt Lake City, UT, USA, [8]Department of Pediatric Surgery, Children's Hospital Los Angeles, Los Angeles, CA, USA, [9]Department of Surgery, Indiana University Medical Center, Indianapolis, IN, USA, [10]Emory University School of Medicine, Atlanta, GA, USA, [11]Department of Surgery, Vanderbilt University Medical Center, Nashville, TN, USA, [12]Division of Pediatric Surgery, University of California, San Francisco, San Francisco, CA, USA, [13]Department of Surgery, The George Washington University School of Medicine & Health Sciences, Washington, DC, USA.

41 **PATIENTS' SELF-REPORTED OUTCOME AFTER UNDERGOING ELECTIVE LAPAROSCOPIC APPENDECTOMY FOR THE TREATMENT OF CHRONIC RIGHT LOWER QUADRANT PAIN**

Jose S. Lozada, MD[1], A. Daniel Guerron, MD[1], Oliver Soldes, MD[2], Lori Mahajan, MD[1], Federico G. Seifarth, MD[1].

[1]Cleveland Clinic, Cleveland, OH, USA, [2]Akron Children's Hospital, Cleveland, OH, USA.

42 **INFANT GASTROSTOMY TUBE OUTCOMES BASED ON TUBE CHARACTERISTICS**

Naomi-Liza Denning, Danielle N. Leranth, PA-C, John C. Densmore, MD.

Medical College of Wisconsin, Wauwatosa, WI, USA.

9:15 a.m. – 10:15 a.m. **COG Surgeon Update** *Grand Sonoran Salons F/G*

New Concepts for Neuroblastoma Surgery, Spinal Tumors and Understanding GIST Tumors

Moderators:

Michael P. LaQuaglia, MD; Andrea A. Hayes-Jordan, MD

PROGRAM IN DETAIL

Sunday, June 1, 2014 (cont.) **COG SURGEON UPDATE**

Learning objectives
At the conclusion of this session, participants will be able to:
- Describe the clinical presentation and management of GIST tumors
- Cite evidence demonstrating that complete resection improves survival for Stage IV Neuroblastoma
- Identify the key imaging and technical considerations when operation on tumors near the spinal cord or brachial plexus

Getting the GIST of Gastrointestinal Stromal Tumors
Michael P. LaQuaglia, MD

Neuroblastoma Update — Complete Resection Really Does Matter — The Key Evidence
Daniel von Allmen, MD

Imaging and Technical Concerns for Tumors Around the Spinal Cord
Eugene S. Kim, MD

10:30 a.m. – Noon	**Pediatric Surgery Case Debates and Controversies**	*Grand Sonoran Salons F/G*

Moderator:
Carroll M. Harmon, MD; Todd A. Ponsky, MD

Learning Objective
Participants in this session will debate treatment options for difficult pediatric surgical cases.

Noon	Annual Meeting Concludes

POSTER SESSION I

Poster Session I
Clinical, Fetal and Trauma Surgery
Thursday, May 29, 4:30 p.m. – 6:15 p.m.

P1

THYMECTOMY FOR MYASTHENIA GRAVIS IN CHILDREN: A COMPARISON OF OPEN AND THORACOSCOPIC APPROACHES

Seth D. Goldstein, MD, Nicholas Culbertson, BS, Deiadra Garrettt, MD, Kimberly McIltrot, DNP, Michelle Felix, CRNP, Jose H. Salazar, MD, Kyle Van Arendonk, MD, PhD, Fizan Abdullah, MD, PhD, Thomas Crawford, MD, Paul Colombani, MD, MBA.
Johns Hopkins Hospital, Baltimore, MD, USA.

Purpose:
Thymectomy is an accepted component of treatment for juvenile myasthenia gravis (MG), but optimal timing and surgical approach have not been determined. Though small series have reported the feasibility of thoracoscopic resection, some studies have suggested that minimally invasive methods are suboptimal due to incomplete clearance of thymic tissue. Herein, we report the largest series of thymectomies for pediatric myasthenia gravis in the literature to date.

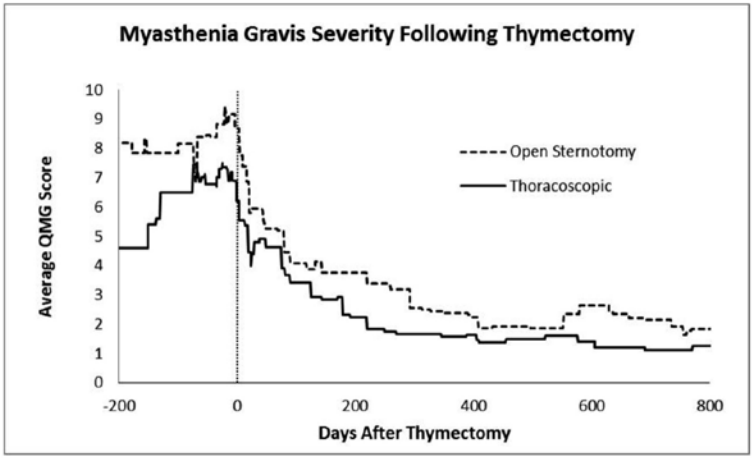
Methods:
A prospectively recorded database of 28 patients undergoing thymectomy for MG between 1993 and 2013 in a tertiary referral hospital was reviewed. Twelve patients who underwent thoracoscopic thymectomy were compared to 16 patients who underwent open thymectomy via median sternotomy. Outcomes were assessed in consultation with the treating pediatric neurologist and graded according to the Myasthenia Gravis Foundation of America (MGFA) research recommendations.

Results:
Compared to open surgeries, thoracoscopic resections were performed on patients earlier in disease progression and resulted in shorter inpatient hospital stays (1.8 vs. 8.0 days, $p=0.045$) with fewer perioperative complications (8% vs. 50%, $p=0.039$). Both groups experienced a decrease in disease severity with the pooled mean quantitative MG score falling from 9.8 to 2.0 after surgery ($p<0.0001$). At 18 months after thymectomy, quantitative MG scores were similar between the thoracoscopic and open groups (1.3 and 2.4, respectively, $p=0.24$). Overall median follow-up was 30 months.

Conclusions:
This analysis suggests that thoracoscopic thymectomy is efficacious for myasthenia gravis and can be considered early in the sequence of potential treatment options. Minimally invasive resection does not appear inferior to median sternotomy in terms of disease control, while decreases in morbidity

POSTER SESSION I (CONT.)

and hospital length of stay make it an attractive option in centers with sufficient medical and surgical experience.



NOTES:

POSTER SESSION I (CONT.)

P2

PEDIATRIC SURGICAL COMPLICATIONS OF MAJOR GENITOURINARY RECONSTRUCTION IN THE EXSTROPHY-EPISPADIAS COMPLEX

Dylan Stewart, MD, **Brian M. Inouye, MD**, Ali Tourchi, MD, Seth D. Goldstein, MD, Eric Z. Massanyi, MD, Heather N. Di Carlo, MD, Adam J. Kern, MD, Bhavik B. Shah, MD, Nima Baradaran, MD, John P. Gearhart, MD.

Johns Hopkins Hospital, Baltimore, MD, USA.

Purpose:
Urinary continence is the goal of reconstruction for children with anomalies in the exstrophy-epispadias complex (EEC). Patients may require a continent urinary diversion (CUD) if they are a poor candidate for bladder neck reconstruction or are receiving an augmentation cystoplasty (AC) or neobladder (NB). This study was designed to identify the incidence of surgical complications among various bowel segments typically used for CUD.

Methods:
A prospectively kept database of 1046 patients with EEC at a tertiary referral center from 1980 to 2012 was reviewed for major genitourinary reconstruction. Patient demographics, surgical indications, perioperative complications, and outcomes were recorded

Results:
Among all EEC patients reviewed, 134 underwent CUD (81 male, 53 female). Concomitant AC was performed in 106 patients and NB in 11. Median follow up time after initial diversion was 5 years (range: 6 months – 20 years). The most common bowel segments used for these procedures were appendix and tapered ileum. Ninety-eight percent are currently continent of urine via their stoma. The most common surgical complications after CUD were small bowel obstruction (5%), post- operative ileus (4%), and intraabdominal abscess (3%). There was a significantly increased risk in the occurrence of pelvic or abdominal abscess when colon was used as a conduit compared to all other bowel segments (OR = 16.7, 95% CI: 1.16 – 239) and following NB creation compared to AC (OR = 39.4, 95% CI: 3.66 – 423).

Conclusions:
We report the largest series to date examining CUD in the exstrophy population. The increased risk of abdominal and pelvic abscesses in patients who receive a colon CUD and undergo NB instead of AC indicates that while surgical complications following major genitourinary reconstruction are rare, they are possible. Practitioners must be wary of potential complications that are best managed by a multi -disciplinary team approach.

NOTES:

POSTER SESSION I (CONT.)

P3

IDENTIFYING STRATEGIES TO DECREASE INFECTIOUS COMPLICATIONS OF GASTROSCHISIS REPAIR

Rachel K. Lemke, Kenneth S. Azarow, MD, Andrea Green, MD, Meera Varman, MD, Shahab F. Abdessalam, MD, Stephen C. Raynor, MD, Robert A. Cusick, MD.
University of Nebraska Medical Center and Children's Hospital - Omaha, NE, Omaha, NE, USA.

Purpose:
We describe the infectious complications of gastroschisis in order to identify modifiable factors to decrease these complications.

Methods:
Data were collected from a prospective database and chart review of 155 gastroschisis patients born from August 2001 to June 2013 was completed. Complicated gastroschisis patients, defined as intestinal atresia, necrotic bowel, or perforation, were excluded, leaving 129 patients for review. Patient demographics, surgical details, postoperative infections and complications, and length of stay were reviewed. We used CDC definitions of infectious complications. Comparisons were conducted using the Mann-Whitney and Fisher's Exact tests.

Results:
The average gestational age of patients was 35.97 weeks. Silos were used in 46% of patients (n=59) for an average of 7.4 days. Thirty-one patients (24%) acquired an infection within the first 60 days of life, the most prevalent infections being sepsis (n=11), surgical site infection (n=11), and central line associated blood stream infection (n=8). Patients who developed infection were born earlier in gestation (P=0.02), weighed less (P=0.01), required silos more often (P=0.01), and received a sutured repair (P=0.05). At 30 days of life, 69% of silo patients were infection free as opposed to 97% of primary closure patients. The length of stay of patients who acquired an infection was longer than for those without infection (P=0.01).

Conclusions:
Infectious complications following gastroschisis repair are common and are associated with a significant increase in length of hospital stay. Factors increasing risk of infection include use of a silo, preterm delivery, low birth weight, and sutured repair. Strategies to avoid complications in gastroschisis patients include avoidance of silo usage when appropriate, consideration of a sutureless closure, and avoidance of preterm deliveries.

POSTER SESSION I (CONT.)

Infection vs. No Infection
Infection (n=31) No Infection (n=98) P= Odds Ratio

IUGR	23% (7) 11% (11)	0.14 2.33
Delivery Method	65% (20) Cesarean 73% (72) Cesarean	0.34 1.52
Birth weight	2271 ± 539.6 g 2591 ± 467.4 g	0.01

Gestational Age	35.2 ± 1.85 weeks	36.2 ± 1.78 weeks	0.02
To Term	23% (7) Yes	42% (41) Yes	0.06 2.47
Method of Closure 74% (23) Silo	37% (36) Silo	0.01 4.95	
Sutureless Repair	0% (0) Yes	29% (21) Yes	0.05 16.67
Length of Stay	70.8 ± 48.3 days	37.5 ± 19.9 days	0.01

NOTES:

POSTER SESSION I (CONT.)

P4

METABOLIC BONE DISEASE IN PEDIATRIC INTESTINAL FAILURE PATIENTS: PREVALENCE AND RISK FACTORS

Faraz A. Khan, M.D., Sigrid Bairdain, M.D., M.P.H, Jeremy G. Fisher, M.D, Eric Sparks, M.D., David Zurakowski, PhD., Biren P. Modi, M.D., Tom Jaksic, M.D., Ph.D.
Boston Children's Hospital, Boston, MA, USA.

Purpose:
Patients with intestinal failure (IF) are known to have impaired absorption of nutrients required for growth and maintenance of skeletal mass. Prevalence of low bone mineral density (BMD) and its risk factors are largely unknown in pediatric IF patients. This study examines the prevalence of low BMD and fractures and evaluates potential risk factors impacting these clinical outcomes.

Methods:
Following IRB approval, patients with IF managed in a multidisciplinary intestinal rehabilitation program were reviewed. DEXA scans, laboratory, clinical and nutritional intake variables were recorded. Low BMD was defined by a Z-score of < -2.0. 12 candidate variables were evaluated. Continuous variables were analyzed using the Student's t - test and categorical variables were compared using the Fisher's exact test.

Results:
65 patients underwent routine DEXA scans. Median age at the time of scan was 8.3 years (range 4-26 years). Median duration of PN was 1,243 days (range 60-5760 days) and 26 (40%) were on PN at the time of the scan. 17 (26%) had low BMD and 16 (25%) had history of at least one fracture. Lower weight for age z-score was associated with an increased likelihood of BMD z-scores < -2.0 (odds ratio 2.5, 95% CI: 1.2-5.1, $p<0.01$). Older age at diagnosis leading to IF was associated with an increased rate of fractures ($p<0.05$). The other evaluated variables were not related to rate of low BMD or fracture.

Conclusions:
The incidence of low bone mineral density in children with intestinal failure was 26% and 25% had at least one fracture. Prospective longitudinal studies are warranted to further define risk factors for osteoporosis and to elucidate possible preventative strategies.

NOTES:

POSTER SESSION I (CONT.)

P5

VACTERL ASSOCIATIONS IN CHILDREN WITH TRACHEO-ESOPHAGEAL FISTULA/ESOPHAGEAL ATRESIA AND ANORECTAL MALFORMATIONS

Timothy B. Lautz, M.D.[1], Ankur Mandelia, MBBS, MCh[1], Jayant Radhakrishnan, M.D. [2].
[1]Lurie Children's Hospital of Chicago, Chicago, IL, USA, [2]University of Illinois, Chicago, Chicago, IL, USA.

Purpose:
The aim of this study was to determine the frequency of VACTERL associations among children who underwent surgery for tracheo-esophageal fistula /esophageal atresia (TEF -EA) and anorectal malformation (ARM).

Methods:
We identified all children who underwent surgery for TEF-EA and/or ARM at hospitals participating in the Pediatric Health Information System (PHIS) database from 2004-2012. PHIS is an administrative database of free -standing children's hospitals managed by the Child Health Corporation of America that contains patient-level care data from 43 hospitals. The complete records of patients in this cohort were cross-referenced across all encounters for diagnoses of vertebral, cardiac, renal and limb anomalies.

Results:
2689 children underwent repair of TEF-EA. Associated VACTERL diagnoses included vertebral anomaly in 686 (25.5%), ARM in 312 (11.6%), congenital heart disease in 1588 (59.1%), renal disease in 587 (21.8%) and limb defect in 192 (7.1%). 899 (33.4%) had 3 or more anomalies and met criteria for a VACTERL diagnosis. 4962 children underwent repair of ARM. Associated VACTERL diagnoses included vertebral anomaly in 1562 (31.5%), congenital heart disease in 2007 (40.4%), TEF-EA in 348 (7.0%), renal disease in 1723 (34.7%) and limb defect in 359 (7.2%). 1795 (36.2%) had 3 or more anomalies and met criteria for a VACTERL diagnosis. Noteworthy findings occurring in >5% of patients included ASD in 46.6% and 33.7%, VSD in 21.2% and 13.6%, renal agenesis in 4.8% and 9.4%, obstructive uropathy in 9.4% and 15.2%, and vesicoureteral reflux in 7.9% and 16.0% of TEF-EA and ARM, respectively.

Conclusion:
Although first described 40 years ago, prior data on the frequency of VACTERL associations has been extremely limited. This comprehensive analysis of the frequency of these relatively common associations in children with TEF and ARM may help guide diagnostic workup and improve prenatal consultations for parents of these children.

NOTES:

POSTER SESSION I (CONT.)

P6

CLINICAL FEATURES AND OCCURRENCE OF HIRSCHSPRUNG'S DISEASE IN THE PREMATURE NEWBORN

Earl C. Downey, MD , Elizabeth Hughes, Angelica Putnam, MD, Henry Baskin, MD, Michael D. Rollins, MD.
University of Utah, Salt Lake City, UT, USA.

Purpose:
The clinical features and occurrence of Hirschsprung's disease (HD) in premature babies (PHD) are not reported. We have sought in this study to describe these characteristics of PHD in a stable referral population.

Methods:
Patients with HD 1970-2011 treated at a tertiary care children's hospital were identified. PHD with biopsy confirmed HD and gestational age < 37 weeks were selected for review. Clinical features of PHD were assessed to include prenatal and birth parameters, clinical signs, and radiologic and pathologic data. Operative procedures and early outcomes were also examined. Demographic data of PHD were examined by first identifying the birthplace of each patient. For data consistency, only patients from the state with the majority of patients were selected for demographic observations. Using data for 1997-2011, the occurrence of PHD was calculated.

Results:
404 patients with HD from 1970-2011 were treated. 27 (6.7%) patients were premature. Mean birth weight in PHD was 2196 grams with a mean gestational age of 34 weeks (range 29-36). Associated anomalies were present in 15 (56%): 8 chromosomal and 7 non-chromosomal. Median time to diagnosis was 49.7 days (range 5-240 days). Most common presenting symptoms were abdominal distension and bilious emesis. Clinical presentation, radiographic findings, transition zone, and enterocolitis were similar to reported observations for term infants. The incidence of HD for term births was 0.023% and was 0.027% for premature births. The average occurrence of PHD among those with HD per year was 9.7% (0 -18%).

Conclusions:
The occurrence and clinical features of Hirschsprung's disease in premature infants is similar to those reported for term infants. Diagnosis of Hirschsprung's disease is often delayed in premature newborns and these patients frequently have associated anomalies.

NOTES:

POSTER SESSION I (CONT.)

P7

DOES THORACOSCOPIC REPAIR OF CONGENITAL DIAPHRAGMATIC HERNIA AND ESOPHAGEAL ATRESIA CAUSE NEURODEVELOPMENTAL DELAY? FOLLOW-UP OF A RANDOMISED CONTROLLED TRIAL

Nurain Z. Sim[1], Mark Bishay[1], Angela Huertas [2], Joe Brierley [3], Kate MK Cross [3], Edward M. Kiely[3], Joe I. Curry[3], Paolo De Coppi[1], Agostino Pierro[4], **Simon Eaton [1].**

[1]UCL Institute of Child Health, London, United Kingdom, [2]University College London Hospitals, London, United Kingdom, [3]Great Ormond Street Hospital, London, United Kingdom, [4]Hospital for Sick Children, Toronto, ON, Canada.

Purpose:

Thoracoscopic repair of congenital diaphragmatic hernia (CDH) and esophageal atresia with tracheo-esophageal fistula (EA/TEF) may cause hypercapnia and acidosis. Our aim was to determine neurodevelopmental outcome in patients randomised to either open (laparotomy for CDH; thoracotomy for EA/TOF) or minimally invasive surgery (MIS; thoracoscopy).

Methods:

Following IRB approval, patients who had been enrolled (aged <1 month) in a pilot randomised controlled trial of MIS vs. open repair of CDH or EA-TEF were invited to attend a neurodevelopmental follow-up. Bayley III testing was performed by a trained observer blinded to surgical approach and intra -operative blood gases. Data are reported as median (range) and analysed by linear regression.

Results:

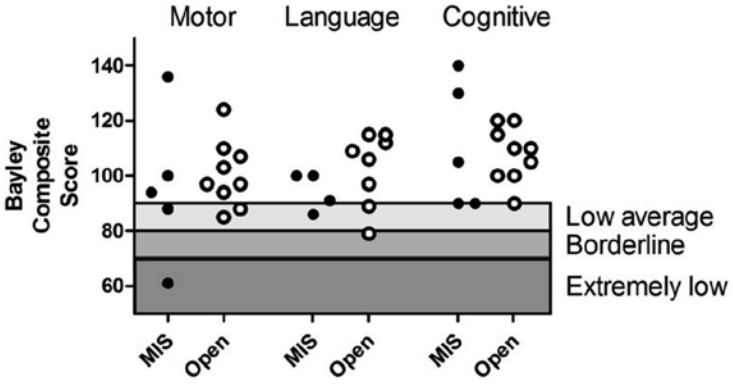
14 of the original cohort of 20 randomised patients attended follow-up at 33 (29-36) months. Their composite motor, language, and cognitive scores are shown (Figure); 2 language scores could not be done (English not first language). A score of 100 is the normal population mean. Two CDH patients had developmental delay (1MIS patient classified as ‘extremely low’ motor score, 1 open patient classified as ‘borderline’ language score). Both had experienced prolonged intra -operative acidosis and hypercapnia. However, other patients who also experienced intraoperative hypercapnia and acidosis had scores within the normal range, so there was no correlation between degree or duration of acidosis and hypercapnia with motor, language or cognitive scores. Overall, the scores were not significantly different between the MIS and open group, suggesting that there was not a marked systematic detrimental effect of MIS.

Conclusions:

There is no marked systematic adverse effect of thoracoscopy on 30 month neurovelopmental outcome. However, the single patient with marked motor delay was operated thoracoscopically and experienced acidosis and

POSTER SESSION I (CONT.)

hypercapnia. The 'low average' scores for both thoracoscopic and open surgery highlight the importance of neurodevelopmental follow-up in neonatal surgery.



NOTES:

POSTER SESSION I (CONT.)

P8

THREE YEAR CONSECUTIVE PROSPECTIVE STUDY CHARACTERIZING THE NORMAL ADAPTIVE RESPONSE AND FACTORS LEADING TO ENTERAL AUTONOMY IN NEONATAL SURGICAL PATIENTS ON TPN.

Kavita Deonarine, M.D., Misty Troutt, M.S., Samuel Kocoshis, M.D., Conrad Cole, M.D., Michael A. Helmrath, M.D.

Cincinnati's Children Medical Center, Cincinnati, OH, USA.

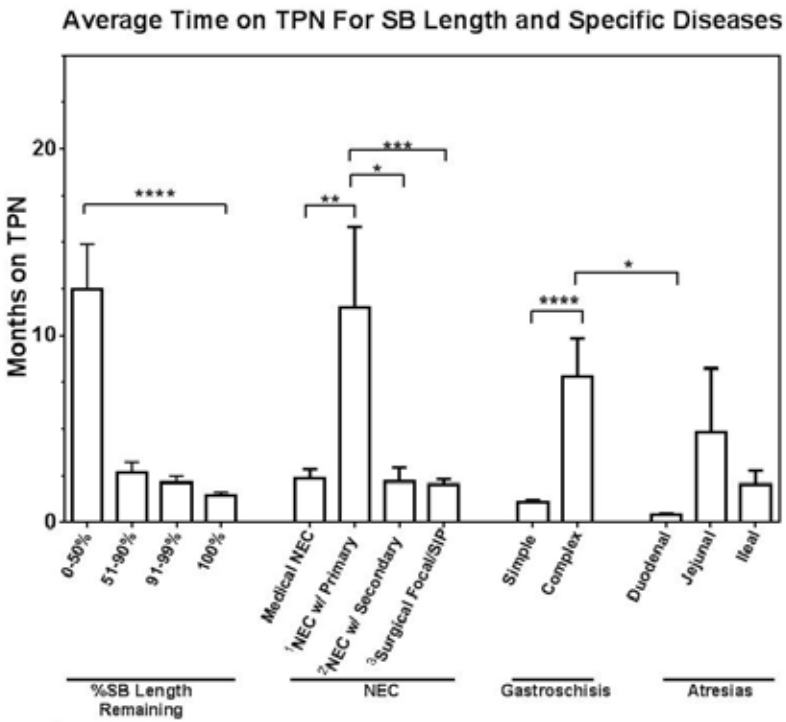
Purpose:
Characterize the timing to full enteral autonomy of all neonatal surgical patients with intestinal failure due to atresia, gastroschisis, medical and surgical NEC, and intestinal perforation. Determine the influence of factors contributing to weaning off Parenteral Nutrition (PN); Percent of small intestine remaining, proximal or distal bowel loss, gestational age, operative vs medical NEC, intestinal perforation (IP), presence of stoma and secondary surgical procedures.

Methods:
IRB approved prospective study of all neonatal surgical patients at risk for intestinal failure defined as requiring PN > 1 week (n=108) from 2010- July 2013. Intestinal loss was measured, location documented in all cases and the percent bowel remaining calculated based on published methods. Percent of enteral and parenteral nutrition and growth was document during inpatient and outpatient management. Statistics were one way ANOVA ($p < .05$ significant).

Results:
Excluded from the study were 2 patients receiving organ transplants (gastroschisis, atresia), one remains listed (complex gastroschisis) and 3 deaths (NEC). Follow up was 100%. 91% were weaned off PN; of those remaining, 42.3% were dependent for >1yr. Graph demonstrates time to wean TPN by diagnosis or length. Important significant observations include: 1.) Loss of bowel >50% significantly increases TPN time 2.) Medical NEC is similar to SIP and is not effected by secondary surgical procedures (for take down stoma, strictures) compared to primary resection at time of NEC 3.) Compex gastroschisis (with Atresia or NEC) is a significant risk factor compared to gastroschisis and isolated atresias.

Conclusion:
Understanding the adaptive history is heterogeneous based on disease. This data is informative for future prospective studies looking at this process.

POSTER SESSION I (CONT.)



NOTES:

POSTER SESSION I (CONT.)

P9

CONGENITAL HEART DISEASE AND NECROTIZING ENTEROCOLITIS IN VERY LOW BIRTH WEIGHT NEONATES: A PROSPECTIVE COHORT ANALYSIS

Jeremy G. Fisher, MD[1], Sigrid Bairdain, MD, MPH[2], **Eric Sparks, MD, MPH**[1], Faraz Khan, MD, MPH[1], Jeremy Archer, MD[3], Michael Kenny, MS[4], Biren P. Modi, MD[1], Scott Yeager, MD[5], Jeffrey Horbar, MD[4], Tom Jaksic, MD, PhD[1].

[1]Department of Surgery, Center for Advanced Intestinal Rehabilitation, Boston Children's Hospital, Boston, MA, USA, [2]Department of Surgery, Boston Children's Hospital, Boston, MA, USA, [3]Congenital Heart Center, University of Florida, Gainesville, FL and Billings Clinic, Billings, MT, Gainesville, FL, USA, [4]Vermont Oxford, Network, Burlington, VT, USA, [5]Division of Pediatric Cardiology, University of Vermont, Burlington, VT, USA.

Purpose:
Abnormal splanchnic blood flow has been implicated as an etiology of necrotizing enterocolitis (NEC) and infants with congenital heart disease (CHD) appear to be at increased risk for NEC. Predicting mortality in these complex patients is a challenge for healthcare providers. The aims of this study were to: (1) quantify the incidence and mortality of NEC among very low birth weight (VLBW) neonates with CHD, and (2) identify specific CHD diagnoses at the highest risk for developing NEC.

Methods:
Data were prospectively collected on 257,794 VLBW neonates born between January 2006 and December 2011 admitted to 941 participating U.S centers. Entries were coded for specific CHD and reviewed for veracity by pediatric cardiologists. Survival was defined as alive in-hospital at one year or discharge from hospital.

Results:
Of eligible VLBW neonates, 1,931 had CHD. Among CHD patients, 253 (13%) developed NEC. There were 20,989 without CHD who developed NEC (incidence 9%, P versus CHD <0.0001). Mortality for neonates with CHD and no NEC was 34%, compared with 55% for those with CHD and NEC (P<0.0001). Both groups of CHD patients had higher mortality than those with NEC without CHD, 28% (P<0.0001). While NEC mortality overall improves with increasing birth weight, mortality for NEC and CHD together does not. Among CHD diagnoses, infants with complete atrioventricular (AV) canal had the highest risk for developing NEC (OR=1.68, 95%CI 1.10 - 2.56).

Conclusions:
The incidence of NEC is significantly higher in VLBW neonates when CHD is present (13 vs. 9%). The mortality of CHD and NEC together is 55%, substantially higher than each disease alone. Infants with AV canal appear to be at highest risk for developing NEC. In addition to providing benchmark

POSTER SESSION I (CONT.)

incidence and mortality data, these findings may have utility in the further study of the pathophysiology of NEC.

NOTES:

POSTER SESSION I (CONT.)

P10

THE ROLE OF SURGERY FOR CHILDREN WITH PERIANAL CROHN'S DISEASE IN THE ERA OF ANTI -TNF THERAPY

Natashia M. Seemann, MD[1], Abdul Elkadri, MD[2], Thomas D. Walters, MBBS, MSc, FRACP[2], Jacob C. Langer, MD, FRCSC, FACS[3].

[1]Department of General Surgery, University of Toronto, Toronto, ON, Canada, [2]Department of Gastroenterology, The Hospital for Sick Children, Toronto, ON, Canada, [3]Department of General and Thoracic Surgery, The Hospital for Sick Children, Toronto, ON, Canada.

Purpose:
Anti-TNF therapy has been used increasingly in recent years for patients with perianal Crohn's disease, but pediatric data are lacking. The purpose of this study was to describe the spectrum of disease and role of surgery in this population.

Methods:
Retrospective chart review of all children having at least one surgical intervention for perianal Crohn's disease over 10 years at a major pediatric hospital.

Results:
57 patients aged 0.5 to 17 (median 13) years were identified (63% male). Mean age at diagnosis of Crohn's disease was 11.4 years, and perianal disease was 11.7 years. 26% had perianal disease preceding Crohn's diagnosis. Perianal disease consisted of skin tags (49%), superficial fistulae (49%), deep fistulae (37%), superficial abscesses (68%), deep abscesses (9%), skin breakdown (19%) and anal strictures (7%). 84% received anti-TNF therapy, with 27% of these subsequently treated with a second anti-TNF medication. 56% responded positively to anti-TNF medication, 33% transiently and 10% had no response. Minor surgical procedures, commonly done during anti-TNF therapy, included abscess drainage (67%) and seton placement (33%). Major surgical procedures, done almost exclusively after anti-TNF failure, included defunctioning ileostomy (23%), subtotal colectomy (9%), and total proctocolectomy with anus excision and plastic surgeon-assisted flap or graft reconstruction (9%). Follow -up ranged from 7-160 (median 54) months. 46% of the children had significant psychological issues related to their perianal disease with at least 65% of those improving post-surgery.

Conclusions:
Pediatric perianal Crohn's disease ranges in severity. Minor surgical intervention provides consistent drainage before and during anti-TNF therapy, while major surgery plays a role in medically refractory disease. Perianal Crohn's disease has a significant impact on psychological wellness and quality of life in children. Appropriate surgical intervention remains an important part of the treatment paradigm.

NOTES:

POSTER SESSION I (CONT.)

P11

PROCEDURAL MANAGEMENT OF CHOLELITHIASIS IN INFANTS UNDER ONE YEAR OF AGE

Cerine Jeanty, MD , S. Christopher Derderian, MD, Jesse Courtier, MD, Shinjiro Hirose, MD.
University of California, San Francisco, San Francisco, CA, USA.

Purpose:
Gallstones in infants under one year of age are rare and management is poorly defined. We examined risk factors, complications, and outcomes at our institution.

Methods:
We retrospectively reviewed infants with cholelithiasis diagnosed on ultrasound between 1997 and 2013. Patients were divided into conservatively and procedurally-managed groups. Symptoms, risk factors, imaging, and laboratory values were compared between groups using student's T-test and Chi-square analysis, with $p<0.05$ considered statistically significant.

Results:
Fifty patients were evaluated for cholelithiasis. Risk factors for development of gallstones included sepsis or antibiotics (72%), blood products (50%), parenteral nutrition (46%), diuretics (42%), cardiac surgery (30%), and phototherapy (16%). Ten (20%) patients had no risk factors, while 52% had 3 or more. Twelve (24%) patients underwent procedures at an average age of 4.6 months (range 0.2-8.3), including open (4) or laparoscopic (6) cholecystectomy, intraoperative cholangiogram (5), and ERCP alone (2) or in combination with cholecystectomy (2). Compared to conservative management, procedurally-managed patients more commonly had symptoms (11 vs 92%, $p<0.005$) including jaundice (9), emesis (5), acholic stools (3), and a right upper quadrant mass (1) as well as complications of cholelithiasis, including choledocholithiasis (6), cholecystitis (3), pancreatitis (1), cholangitis (1), and common bile duct perforation (1). Procedurally -managed patients more frequently had choledocholithiasis and biliary ductal dilation on imaging, though there were no differences in WBC count or total bilirubin. Of the 38 patients managed conservatively, 19 had follow-up ultrasounds with gallstone resolution in 21%. Patients with persistent cholelithiasis more commonly had risk factors for gallstone formation (93 vs 50%, $p=0.04$). One patient required cholecystectomy for postprandial abdominal pain which subsequently resolved, while the remainder of conservatively -managed patients remained asymptomatic.

POSTER SESSION I (CONT.)

Conclusions:
Infantile cholelithiasis has a variable course ranging from spontaneous resolution to choledocholithiasis or cholecystitis. Our findings support conservative management for less severe disease and cholecystectomy for infants with complicated cholelithiasis.

NOTES:

POSTER SESSION I (CONT.)

P12

CT -RELATED RADIATION EXPOSURE IN CHILDREN TRANSFERRED TO A LEVEL 1 PEDIATRIC TRAUMA CENTER

Adam S. Brinkman, MD [1], Kara G. Gill, MD[2], Carly M. Glarner, MD[1], Jocelyn Burke, MD[1], Andrew P. Rogers, MD[1], Mary J. Anderson, RN [3], Charles M. Leys, MD[1], Daniel J. Ostlie, MD[1], Ankush Gosain, MD, PhD[1].

[1]University of Wisconsin Department of Surgery, Division of Pediatric Surgery, Madison, WI, USA, [2]University of Wisconsin Department of Radiology, Division of Pediatric Radiology, Madison, WI, USA, [3]University of Wisconsin American Family Childrens's Hospital, Pediatric Trauma Program, Madison, WI, USA.

Purpose:
Pediatric trauma patients presenting to Referring Facilities (RF) often undergo computed tomography scans (CT) to identify injuries before transfer to a Level 1 Pediatric Trauma Center (PTC). The purpose of our study was to evaluate RF compliance with the American College of Radiology (ACR) guidelines to minimize ionizing radiation exposure in pediatric trauma patients and to determine the frequency of additional or repeat CT imaging after transfer.

Methods:
After IRB approval, retrospective review of all pediatric trauma admissions from January 2010-December 2011 at our American College of Surgeons-verified PTC was performed. Patient demographics and means of arrival were analyzed. Patients who underwent CT were grouped by means of arrival: those that were transferred from a RF versus those that presented primarily to the PTC. Compliance with ACR guidelines and need for additional or repeat CT scans were assessed for both groups.

Results:
697 children (<18yo) were identified with a mean age of 9.5 years. 321 (46%) patients presented primarily to the PTC. 376 (54%) were transferred from a RF, of which 90 (24%) patients underwent CT prior to transfer. CT radiation dosing information was available for 79/90 patients (88%); 61/79 (77%) received doses of radiation above ACR-recommended levels. After transfer, 9% (8/90) of children imaged at a RF required additional/repeat CT scans. In comparison, 98% (314/321) of patients who presented primarily to the PTC and underwent CT received appropriate pediatric radiation dosing. Mean radiation dose at PTC was approximately half of that at RF ($p<0.01$).

POSTER SESSION I (CONT.)

Conclusions:
Pediatric trauma patients transferred from RF often undergo CT scanning with higher than recommended radiation doses, potentially placing them at higher carcinogenic risk. Fortunately, few RF patients required additional CT scans after PTC transfer. Finally, compliance with ACR radiation dose limit guidelines is better achieved at a PTC compared to a RF.

NOTES:

POSTER SESSION I (CONT.)

P13

THE EPIDEMIOLOGY AND TEMPORAL TRENDS IN TREATMENT AND OUTCOMES FOR NEUROBLASTOMA: AN ANALYSIS OF THE NCDB

Brian C. Gulack, MD , Brian R. Englum, MD, Asvin M. Ganapathi, MD, Paul J. Speicher, MD, Timothy A. Driscoll, MD, Susan G. Kreissman, MD, Henry E. Rice, MD.
Duke University, Durham, NC, USA.

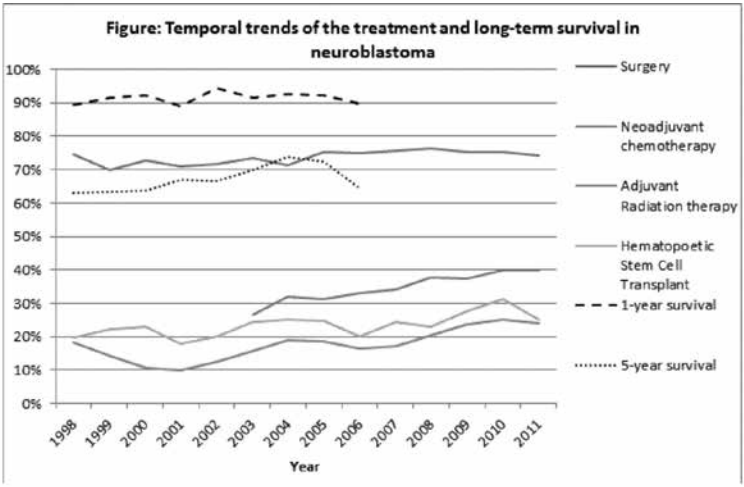
Purpose:
Neuroblastoma (NB) is a rare and complex tumor with a complicated management due to wide ranges of tumor stages and activity. The purpose of this study is to provide epidemiologic, treatment, and outcome data for pediatric neuroblastoma using a large national dataset.

Methods:
We performed a retrospective review of the National Cancer Data Base (NCDB) of all patients under 18 years of age with a diagnosis of neuroblastoma from 1998-2011. Data collected included demographics, tumor specific characteristics, treatment regimens, and outcomes. Analysis was performed using Pearson's chi-squared and Cochran -Armitage trend tests.

Results:
The NCDB dataset included 6,137 patients with NB. 5,209 (88.1%) patients were less than 6 years old. The most frequent tumor locations were the adrenal/peri- adrenal region (62.8%), mediastinum (3.2%), and the kidney (2.2%). Poorly differentiated tumors were present in 65.4% of patients. Most patients (73.7%) underwent at least one type of surgical intervention ranging from biopsy (23.6%) to complete resection (38.1%). Among those undergoing surgery, 1,272 children (39.8%) received neoadjuvant chemotherapy, and 1,015 children (23.3%) received adjuvant radiation. 5-year survival was 69%, and higher in children who received surgery (73%) compared to children treated without surgery (56%, $p = <0.001$). Temporal changes in treatment strategies demonstrated recent increases in the use of neoadjuvant chemotherapy ($p<0.001$) and adjuvant radiation ($p<0.001$). 5-year survival has increased to over 70% in the mid -2000's and appears to be improving over time ($p<0.001$; Figure).

Conclusion:
This study confirms findings from previous neuroblastoma research, with a wide range of tumor characteristics, treatment regimens, and clinical outcomes. More aggressive treatment strategies have seen increasing utilization over the past decade, and long-term survival also appears to be improving. Use of large national datasets offers a rich source of clinical data to better understand the risk factors, natural history, and treatment options for this complicated disease.

POSTER SESSION I (CONT.)



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POSTER SESSION I (CONT.)

P14

PRENATAL SILDENAFIL AND DEXAMETHASONE RESPECTIVELY IMPROVE OXYGENATION AND VENTILATION IN THE NITROFEN MODEL OF CONGENITAL DIAPHRAGMATIC HERNIA (CDH)

Carmen Mesas Burgos, Pablo Laje, Huimin Jia, Erik Pearson, Marcus G. Davey, Alan W. Flake, William H. Peranteau.

The Children's Hospital of Philadelphia, Philadelphia, PA, USA.

Purpose:
To evaluate the effect of prenatal pharmacologic therapies on postnatal lung function in the nitrofen model of CDH.

Methods:
Pregnant Sprague -Dawley rats were randomized into 4 groups: control, nitrofen, nitrofen+antenatal dexamethasone, and nitrofen+antenatal sildenafil. Nitrofen (100mg) dissolved in 1 ml olive oil was orally administered to dams on embryonic day (E) 9.5; control animals received olive oil only. Dexamethasone (DM) (0.25 mg/kg) was administered intraperitoneally on E18.5 and E19.5. Sildenafil (100 mg/kg/d) was administered daily from E11.5 to E20.5 by subcutaneous injection. Laparotomy/hysterotomy were performed on E21.5 and fetuses were intubated (24G catheter) while on placental support. After ligation of the umbilical cord, intubated pups were ventilated (FiO2 0.6, 120 breaths/min, I: E ratio 1:2, PEEP 1 cm H2O) while maintaining the peak inspiratory pressure (PIP) constant at 20mmH 20. After 30 minutes, a blood sample was obtained to assess gas exchange.

Results:
Prenatal treatment with dexamethasone increased stroke volume while reducing blood pCO2 levels; no improvement in oxygenation was observed. Prenatal treatment with sildenafil improved oxygenation as evidenced by higher pO2 and oxygen saturation levels compared to those of untreated CDH pups.

Conclusion:
Prenatal treatment with dexamethasone increases lung compliance and stroke volume in CDH rat pups leading to improved gas exchange. While the mechanisms by which prenatal sildenafil improve oxygenation in CDH rat pups is unknown, we speculate that changes in pulmonary vascular structure, including a reduction in pulmonary artery hypermuscularization, may be responsible. Further studies using combined pharmacologic therapies and translation of these therapies into large animal models are required to assess potential optimization of prenatal management of infants with CDH.

POSTER SESSION I (CONT.)

	Stroke Volume	pH	pCO2	pO2	% Saturation
control (n=14-stroke volume; n=5-blood gas)	170.5±15.3	7.5±0.04	31.44±2.8	182.2±1.8	100
nitrofen non-CDH (n=19-stroke volume; n=9-blood gas)	155.9±6	7.28±0.02	47.8±4.7	105±8.8	96.2±1
CDH (n=12-stroke volume; n=5-blood gas)	144.1±6.1	7.1±0.09	85.72±18.5	57±8.5	73±1.8
CDH+sildenafil (n=5-stroke volume; n=5-blood gas)	144±6.1	7.1±0.01	77.6±4.1	105.7±25	93.5±2.8
CDH+dexamethasone (n=5-stroke volume; n=4-blood gas)	157.9±8	7.5±0.05	32.8±5.8	32.5±4.55	70±5.65

NOTES:

POSTER SESSION I (CONT.)

P15

A COMPARISON OF PEDIATRIC AND ADULT TRAUMA CENTERS IN THE TREATMENT OF 15-17 YEAR OLD PATIENTS

James M. DeCou, MD[1], **Jeremy C. Bushman, MD[2]**, Erik Akopian[3], Derek Axibal[3], David J. Hobbs, MD[2], Alan T. Davis, PhD. [2], Todd A. Nickoles, RN [1]. [1]Helen DeVos Children's Hospital, Grand Rapids, MI, USA, [2]GRMEP and MSU Dept of Surgery, Grand Rapids, MI, USA, [3]

Michigan State University, Grand Rapids, MI, USA.

Purpose:
The age at which a trauma patient goes from pediatric to adult is not well defined, but usually ranges from 14-19 years. Our aims are to evaluate the outcomes of older adolescent patients at pediatric trauma centers (PTC) and adult trauma centers (ATC), and to evaluate actual and optimal age cutoffs for pediatric trauma.

Methods:
After IRB approval, we reviewed 2011 National Trauma Data Bank (NTDB) data on 15-17 year-olds, comparing PTC and ATC patients. Demographics, mechanisms, injury severity scores (ISS), and outcomes were statistically compared, including logistic regression analysis of mortality. Also, pediatric and adult trauma surgeons (PTS, ATS) were surveyed regarding actual age cutoffs used for pediatric trauma and their opinions on the optimal age cutoff.

Results:
Of 29,645 15-17 year old patients with evaluable NTDB data, 85.8% were treated at ATC and 14.2% at PTC. ATC patients had higher ISS (9.0 vs. 6.7), more penetrating injuries (14.2% vs. 10.0%), longer lengths of stay (3.7 vs. 3.1 days), and higher mortality rates (2.1% vs. 0.5%) (all $p<0.001$). Controlling for ISS, transfer status, penetrating mechanism, age, and gender, patients treated at an ATC were 1.7 times more likely to die ($p<0.05$). The survey response rate was 38.5% (495/1287). The actual age cutoff for pediatric trauma was reported as 12.1 years by ATS and 15.9 years by PTS ($p<0.001$). Optimal age cutoffs, as selected by the survey respondents, were 14.4 years for ATS and 15.9 years for PTS ($p<0.001$).

Conclusions:
Most injured 15-17 year-olds are treated at ATC and are more severely injured. However, controlling for ISS and other variables, mortality appears to be decreased for older adolescent trauma patients when treated at pediatric hospitals. Survey results suggest that both PTS and ATS currently treat older adolescents, and that both groups are interested in caring for these patients.

NOTES:

POSTER SESSION II

Poster Session II
Basic Science, Quality Improvement, Critical Care and Oncology
Thursday, May 29, 4:30 p.m. – 6:15 p.m.

P16

A NOVEL SMALL BOWEL MODEL OF INFLAMMATORY BOWEL DISEASE

Jennifer L. Knod, MD , Mary Dusing, Kelly Crawford, Artur Chernoguz, MD, Jason S. Frischer, MD.

Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA.

Purpose:
We propose an unreported, murine model of small bowel inflammation that mirrors that of human inflammatory bowel disease.

Methods:
Ileitis was induced in GM-CSF KO and wild type (C57BL/6) mice (n=5-20/group) with piroxicam or regular chow for 14 or 28 days. Intestine was analyzed by H&E and immunohistochemistry (Meca -32) then scored for inflammation and microvessel density (MVD). Bacterial metagenomic stool analysis was performed on C57BL/6 mice in clean and conventional housing (n=10-14/group). Results expressed as mean±SEM were analyzed for significance (P=0.05) by Student's t -test.

Results:
Ileal inflammation with piroxicam administration was significantly elevated in C57BL/6 compared to GM-CSF KO groups (day 14, P=0.001; day 28, P=0.003), while both strains were similar at baseline (day 14, P=0.544; day 28, P=0.3). At necropsy, both strains exhibited intestinal adhesions and mucosal ulcerations. The MVD increased after piroxicam administration in all groups, but C57BL/6 mice exhibited a greater gain in MVD over the GM-CSF KO by 10% at day 14 and 26% at day 28. Bacterial flora in C57BL/6 clean compared to conventionally housed mice demonstrated increased Proteobacteria at days 14 and 28 (P=0.001, P=0.003 respectively) and decreased Firmicutes at days 14 and 28 (P<0.001, P=0.003 respectively).

POSTER SESSION II (CONT.)

	Inflammation Score				**Microvessel Density (µm2)**	
C57BL/6	C57BL/6	GM-CSF KO	*P value*	C57BL/6	GM-CSF KO	*% change after piroxicam*
Day 14 No Piroxicam	4.62±0.47	3.83±0.50	0.544	10,883±760	15,018±,673	52% C57BL/6 vs.
Day 14 With Piroxicam	11.21±1.07	5.78±0.48	***0.001**	16,546±1,375	21,422±2,055	42% GM-CSF KO
Day 28 No Piroxicam	5.67±0.75	4.19±0.44	0.3	8,815±517	14,672±1,449	64% C57BL/6 vs.
Day 28 With Piroxicam	10.25±1.10	5.60±0.50	***0.003**	14,455±1,284	20,312±1,225	38% GM-CSF KO
	Stool Proteobacteria (%)				**Stool Firmicutes (%)**	
C57BL/6 Clean	C57BL/6 Clean	C57BL/6 Conventional	*P value*	C57BL/6 Clean	C57BL/6 Conventional	*P value*
Day 14	0.81±0.04	13.95±2.74	***0.001**	58.74±6.55	25.08±3.62	***<0.001**
Day 28	2.20±0.41	14.60±3.31	***0.003**	47.70±2.50	32.32±2.86	***0.003**

Table:
Ileal inflammation & microvessel density in GM-CSF KO & C57BL/6 mice with stool dysbacteriosis

POSTER SESSION II (CONT.)

Conclusion:
Following piroxicam administration, ileitis and percent increase in angiogenesis are more pronounced in wild type compared to the known model of small bowel inflammation (GM-CSF knockout). The dysbacteriosis exhibited in conventionally housed C57BL/6 mice shifted from Firmicutes to Proteobacteria. These characteristics parallel human inflammatory bowel disease data. We describe a novel model of experimental ileitis, who's immunocompetent and inducible features produce a tool primed to evaluate etiology and potential therapies of inflammatory bowel disease.

NOTES:

POSTER SESSION II (CONT.)

P17

TISSUE INHIBITOR OF MATRIX METALLOPROTEINASES-2 INHIBITS THERMAL INJURY INDUCED HYPERPERMEABILITY IN MICROVASCULAR ENDOTHELIAL CELLS

Katie Wiggins-Dohlvik, MD , Min S. Han, BA, Hayden W. Stagg, MD, Dhriti Mukhopadhyay, MD, Lena Perger, MD, Himakarnika Alluri, MS, Matthew L. Davis, MD, Binu Tharakan, PhD.

Scott and White Memorial Hospital, Temple, TX, USA.

Purpose:

Burns induce intense systemic inflammatory reactions and microvascular hyperpermeability. The mechanisms that regulate this process are unclear but it is known that the breakdown of endothelial cell adherens junctions is integral. We hypothesized that matrix metalloproteinases (MMPs) are important in burn induced pathophysiology and that burn induced junctional damage and hyperpermeability could be attenuated with the use of tissue inhibitors of metalloproteinase -2 (TIMP-2), an endogenous regulator of MMPs.

Methods:

After IACUC approval, serum was collected from Sprague Dawley rats in either sham or burn groups (30% total body surface area). Burn serum is known to increase permeability and was used to treat rat lung microvascular endothelial cells (RLMEC) grown as monolayers. Wells were divided into four groups (n=six) and treated as follows:

1. Sham serum
2. Burn serum
3. TIMP -2 plus sham serum
4. TIMP -2 plus burn serum

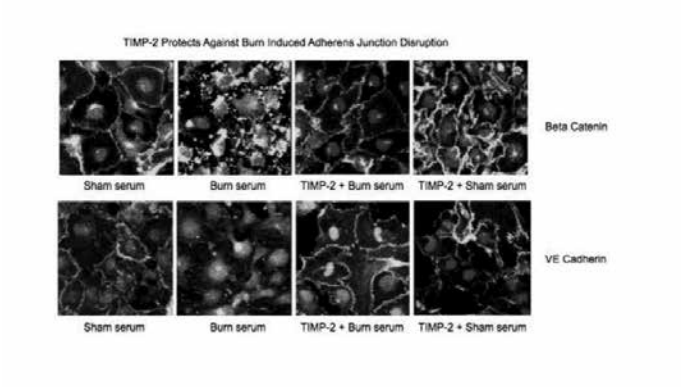
FITC albumin flux across the Transwell was obtained and permeability was measured. RLMEC cells were grown on chamber slides and divided into the experimental groups listed above. Immunofluorescence staining of adherens junction proteins ß-catenin and VE-Cadherin, and staining of F -actin was performed. Images were obtained. Statistical analysis was conducted using Student's t -test ($p< 0.05$).

Results:

Monolayer permeability was increased with burn serum when compared with sham ($p=0.001$). However, this increase in permeability was attenuated with TIMP -2 treatment ($p=0.002$). Immunofluorescence staining showed damage of rat lung microvascular endothelial cell adherens junctions and actin stress fiber formation with exposure to burn serum and restoration of integrity with TIMP -2 treatment (Figure 1).

POSTER SESSION II (CONT.)

Conclusion:
We conclude Tissue Inhibitor of Metalloproteinases-2 attenuates thermal injury induced microvascular hyperpermeability and decreases damage to endothelial adherens junctions. These data highlight the role of matrix metalloproteinases in the pathophysiology of burn induced microvascular hyperpermeability and pave the way for better understanding and treatment of this process.



NOTES:

POSTER SESSION II (CONT.)

P18

ECMO IN POST-TERM INFANTS: IS BIGGER ALWAYS BETTER?

Elizabeth M. Pontarelli, MD , Philippe Friedlich, MD, MSEpi, MBA, James E. Stein, MD, MS.

Children's Hospital Los Angeles, Los Angeles, CA, USA.

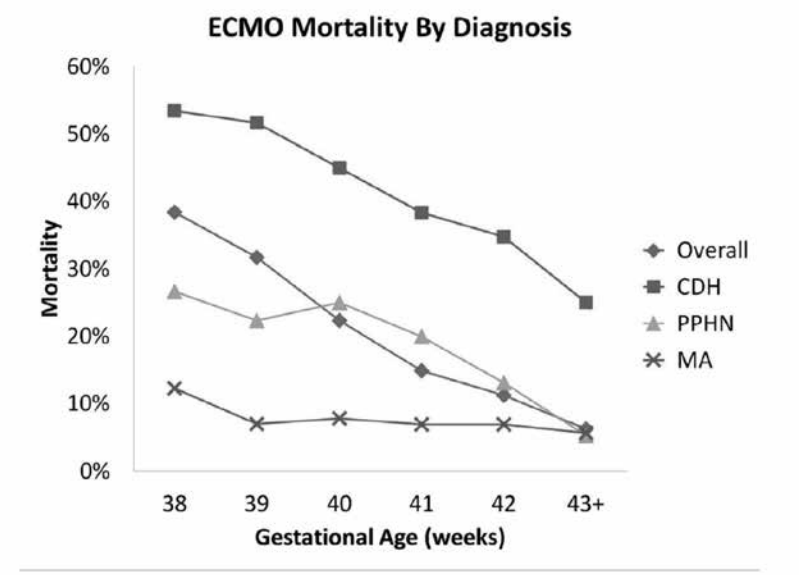
Purpose:
Several studies have reported that infants born after 39 weeks have better outcomes on Extracorporeal Membrane Oxygenation (ECMO). However, survival investigations have shown an increased morbidity and mortality in babies born after 41 weeks. We aimed to evaluate ECMO use in post-term infants and compared their outcomes to full -term infants.

Methods:
We reviewed neonatal ECMO runs from the Extra-corporeal Life Support Organization registry between 1990 and 2011. We stratified infants based on their gestational age (GA) at birth. First ECMO run data from patients with PPHN, CDH, and Meconium Aspiration (MA) were used.

Results:
9,998 patients met inclusion criteria. Gender distributions were similar among groups, but racial distribution showed a decrease in Caucasian infants and an increase in Black and Hispanic infants as gestational age increased. Post-term infants were more likely to be delivered by emergency C-section. Primary diagnosis differed among groups with higher rate of MA, and lower rate of CDH with increased GA. The type of ventilation was similar among groups. Overall mortality decreased with increasing GA, however, when stratified by diagnosis, infants with meconium aspiration had the same mortality regardless of GA. Overall, the median number of complications per ECMO run decreased with GA, except in infants with MA who had similar complication rates throughout. Specific complication types showed no difference except for neurologic complications which increased with GA.

Conclusions:
While post-term infants have an overall lower mortality rate on ECMO compared full -term infants, this benefit is not present in patients treated for meconium aspiration. Post-term infants with MA also have higher complications rates on ECMO, especially neurologic complications. This is consistent with investigations showing a higher rate of spontaneous neurologic problems in infants born after 41 weeks. Understanding this patient population will help improve treatment decisions and family counseling of post-term babies undergoing ECMO.

POSTER SESSION II (CONT.)



NOTES:

POSTER SESSION II (CONT.)

P19

DIAGNOSTIC AND CLINICAL UTILITY OF COMMON LABORATORY TESTS IN CHILDREN WITH COMPLICATED APPENDICITIS: DO THEY HELP GUIDE MANAGEMENT?

Feroze Sidhwa, MD, MPH, Christina Feng, MD, Seema Anandalwar, BS, Shawn Rangel, MD, MSCE.

Children's Hospital Boston, Boston, MA, USA.

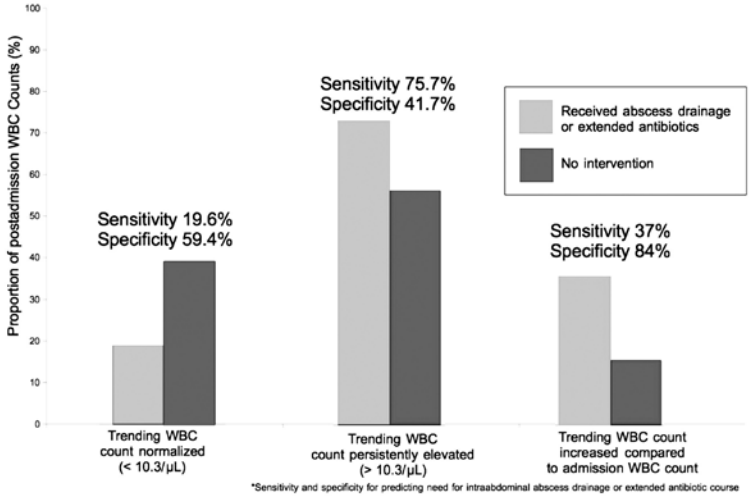
Purpose:
Postadmission fever, dysuria, and diarrhea are common in patients with complicated appendicitis, although the diagnostic utility of laboratory tests in evaluating these findings is unknown. We sought to characterize the diagnostic yield of "symptom-initiated" laboratory tests, and the utility of "trending" WBC counts in predicting the presence of actionable intraabdominal infection.

Methods:
We reviewed all cases of complicated appendicitis at one Children's Hospital from 1/1/2009 -6/12/2013 for postadmission blood cultures, urinalyses, urine cultures, and Clostridium difficile tests. Admission and postadmission WBC counts were compared. Sensitivity and specificity for predicting need for intervention (abscess drainage or extended antibiotics) were calculated based on whether the postadmission WBC counts normalized (< 10.3/μL), remained elevated (> 10.3/μL), or increased above the admission WBC count.

Results:
433 patients had 330 symptom-initiated tests, of which 0 were positive (0/125 urinalyses, 0/71 urine cultures, 0/76 blood cultures, 0/58 C. difficile tests). 233 (53.8%) patients had a trending WBC count, of which 46 (19.7%) of these patients received a subsequent intervention. Of those requiring an intervention, the WBC count normalized in 9 (19.6%), remained elevated in 28 (75.7%), and increased in 17 (37%). Of 187 patients not requiring an intervention, the WBC count normalized in 76 (40.6%), remained elevated in 95 (58.3%), and increased in 30 (16%). Sensitivity and specificity for predicting the need for intervention was 19.6% and 59.4% for a normalized WBC count, 75.7% and 41.7% for a persistently elevated WBC count, and 37% and 84% for an increased WBC count.

Conclusion:
Laboratory tests obtained in response to fever, dysuria, and diarrhea are rarely abnormal, and the practice of trending WBC counts is neither sensitive nor specific enough to predict the need for intervention for intraabdominal infections. Clinical guidelines to reduce low-yield laboratory testing may reduce unnecessary venipuncture and urethral catheterization.

POSTER SESSION II (CONT.)



NOTES:

POSTER SESSION II (CONT.)

P20

DEFINING PREDICTORS OF ENTERAL AUTONOMY IN PEDIATRIC SHORT BOWEL SYNDROME AFTER 12 MONTHS OF PARENTERAL NUTRITION

Farokh R. Demehri, MD, Lauren Stephens, BS, Brady West, MA, Ann Mehringer, MS, Meghan A. Arnold, MD, Pamela Brown, MD, Daniel H. Teitelbaum, MD.

University of Michigan, Ann Arbor, MI, USA.

Objective:
To determine predictors of achieving enteral autonomy in pediatric short bowel syndrome (SBS) patients at diagnosis and post-1 year of parenteral nutrition
(PN).

Background:
Pediatric SBS studies demonstrate that most successfully wean off PN within the first year. Little prognostic information is currently available for those remaining on PN.

Methods:
Retrospective single -institution analysis of 171 pediatric SBS patients. Inclusion criteria included SBS onset (defined =50% small bowel (SB) length loss or =60 days of PN) before 6 weeks of age. Patients with intestinal failure without SBS were excluded (e.g., dysmotility and malabsorption). Multivariate Cox proportional hazards analysis was conducted, with subgroup analysis of patients requiring PN for =1 year (n=59). Primary outcome was successful wean off PN. $P<0.05$ was considered significant.

Results:
Over a mean follow-up of 4.1±4.8 years, 64.3% of children weaned from PN. Mortality was 15.2%, and 2.9% required intestinal transplant. Ileocecal valve (ICV) presence predicted weaning (hazard ratio [HR]=2.82, $p<0.001$). Children with <10% expected SB length were less likely to wean (HR=0.156, $p=0.002$). Overall, 32.7% achieved enteral autonomy within 1 year. Of those on PN beyond 1, 2, 3, and 4 years, the rates of eventual weaning were 50.8%, 41.9%, 42.1%, and 37.5%, respectively. For children >1 year post-SBS diagnosis, ICV no longer predicted weaning ($p=0.153$). Successful weaning predictors in this group included: diagnoses of intestinal atresia (HR=4.26, $p=0.011$) and necrotizing enterocolitis (NEC, HR=2.84, $p=0.025$). SB length <10% of expected continued to predict failure to wean (HR 0.121, $p=0.010$).

Conclusions:
Children with SBS are more likely to achieve enteral autonomy with an ICV and >10% expected SB length. For children on PN >1 year, ability to wean

POSTER SESSION II (CONT.)

continues, though at a lower rate. In this group, having <10% SB length continues to predict failure to wean while children with NEC or atresia are more likely to achieve enteral autonomy.

NOTES:

POSTER SESSION II (CONT.)

P21

NUTRITION IN NEONATAL AND PEDIATRIC EXTRACORPOREAL LIFE SUPPORT: A SURVEY OF CURRENT PRACTICE

Thomas J. Desmarais, BS[1], Yan Yan, MD, PhD[2], Martin S. Keller, MD[2], **Adam M. Vogel, MD [2]**. [1]Geisel School of Medicine at Dartmouth, Hanover, NH, USA, [2]Washington *University School of Medicine in Saint Louis, St Louis, MO, USA.*

Purpose:
Although there are clear benefits of enteral nutrition (EN) in critical care, several barriers may exist for providing EN during extracorporeal life support (ECLS) in neonates and children.

Methods:
A survey was sent to ECLS directors and coordinators from the Extracorporeal Life Support Organization who provide care to neonatal or pediatric patients. The questionnaire addressed the use of EN and factors that may influence the implementation of EN while on ECLS such as mode, diagnoses, vasopressor support, and pharmacologic paralysis.

Results:
Surveys were sent to 521 individuals from 187 institutions. 122 responses (23.4%) were received representing 96 unique institutions (51.3%). 78 institutions were represented by one response, 15 had two, and 3 had three. Of the 122 responses, only 115 provided neonatal or pediatric ECLS and 84.2% reported utilizing EN during ECLS, while 15.8% reported that they did not. During venoarterial ECLS, 55% reported providing EN 'often' or 'always', while 71% did the same during venovenous ECLS. EN was reported as given 'often' or 'always' by 24% with increased vasopressor support, 53% with "stable" vasopressor support, and 60% with weaning of vasopressor support. Diagnoses favored by respondents for providing EN include respiratory distress syndrome, pneumonia, asthma, trauma/post-operative, pulmonary hemorrhage, and infectious cardiomyopathy. As compared to ECLS mode and use of pharmacologic paralysis, vasopressor requirement and underlying diagnosis were considered the primary or secondary determinant of whether to provide EN 81% and 72% of the time. Finally, 38% of respondents reported no established protocol for providing EN.

Conclusion:
EN support is common among neonatal and pediatric patients receiving ECLS. Mode, vasopressor status and underlying diagnosis play an important role in the decision to provide enteral support. Additional research is needed to evaluate these preferences on the delivery of EN and its impact on outcome in this critically ill patient population.

NOTES:

POSTER SESSION II (CONT.)

P22

COLLAGEN DEPOSITION IS CRUCIAL TO THE DEVELOPMENT OF PULMONARY HYPERTENSION IN SLIT3 KNOCKOUT MODEL OF CONGENITAL DIAPHRAGMATIC HERNIA

Michael R. Phillips, MD , Scott Moore, MD, Sean E. McLean, MD.
University of North Carolina School of Medicine, Chapel Hill, NC, USA.

Purpose:
The mechanisms and timing of the development of pulmonary arterial hypertension (PAH) in congenital diaphragmatic hernia (CDH) are not understood. We hypothesize that increased perivascular collagen leads to PAH in CDH. Alterations in vessel collagen content may be crucial to the development of PAH in CDH.

Methods:
Slit3 wild type (WT) and knockout (KO) mice were harvested at 2 and 12 weeks of age. Right ventricular (RV) pressures were measured by cardiac puncture. Lung tissues were stained with Masson's Trichrome for histologic examination of vascular wall thickness (VWT) and perivascular collagen diameter (CD) and collagen thickness (CT). Statistical analysis was performed with significance set to $p<0.05$.

Results:
At 2 weeks WT and KO mice with CDH had similar RV pressures. Adult Slit3 KO mice showed significantly elevated RV pressures. In adult KO mice there was significantly increased arterial VWT (8.4 vs 4.9um), venous VWT (6.5 vs 2.9um), and CD around arteries (163.7 vs 107.3um) and veins (235.5 vs 93.7um). CT was also significantly increased. However, in tissue analysis of 2 week mice there was significantly increased venous VWT (8.0um vs 2.2um) and no difference in arterial VWT (4.2 vs 3.7um). Additionally, the CD in 2 week mice was similar for arteries and veins, while CT was increased in veins but not arteries.

Conclusion:
The Slit3 KO mouse model for CDH develops PAH. We demonstrate that the development of PAH occurs between 2 and 12 weeks of life (period of murine alveologenesis) with increasing vessel wall remodeling and vessel wall collagen content. We show that vessel remodeling occurs first in pulmonary veins. We conclude that collagen and vessel remodeling in the period of alveologenesis may play an important role in the development of PAH. Preventing excessive collagen deposition in the vessel wall may be a therapeutic target for the treatment of PAH in CDH.

POSTER SESSION II (CONT.)

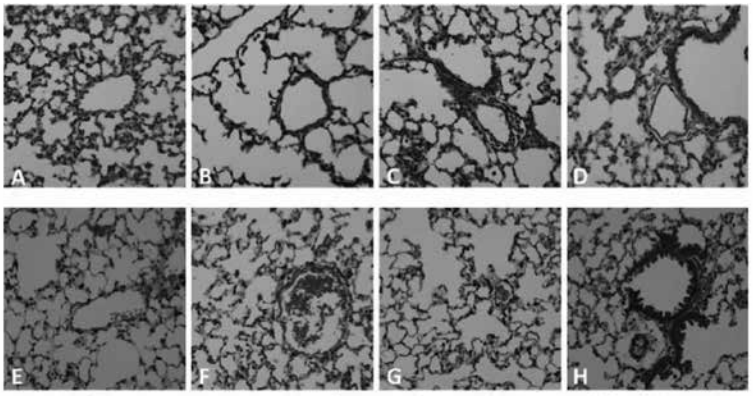


Figure A-D) Representative tissue sections from mice harvested at 2 weeks of life. A) Slit3 WT vein B) Slit3 KO vein with thickened vascular wall and minimal perivascular collagen C) Slit3 WT artery D) Slit3 KO artery with similar features. E-H) Representative tissue sections from mice harvested at 12 weeks of life E) Slit3 WT vein F) Slit3 KO vein with increased vascular wall thickness and perivascular collagen deposition G) Slit3 WT artery H) Slit3 KO artery with thickened vessel wall and increased perivascular collagen deposition.

NOTES:

POSTER SESSION II (CONT.)

P23

THE ESOPHAGEAL ANASTOMOTIC STRICTURE INDEX (EASI) AS A MANAGEMENT TOOL AFTER ESOPHAGEAL ATRESIA REPAIR

Linda Yi-Chan Sun, Jean-Martin Laberge, MD, Yasmine Yousef, **Robert Baird**.
McGill University, Montreal, QC, Canada.

Purpose:
Anastomotic stricture is the most common complication following esophageal atresia (EA) repair. An Esophageal Anastomotic Stricture Index (EASI) derived from an early post-operative esophagram may identify patients at high risk of stricture formation, although it is unclear whether it should be based on the upper or lower esophageal pouch.

Methods:
Digitized images of early post-operative esophagrams from 2005-2013 were assessed at a single institution, which are routinely performed 5-10 days after anastomosis. Demographics and outcomes, including dilations were prospectively collected as part of a multidisciplinary clinic. Upper and lower esophageal pouch ratios were generated using the smallest stricture diameter divided by the maximal respective pouch diameter, the EASI was calculated from the average of the antero-posterior and lateral projection (figure). Score performances were evaluated with area under the receiver operator curves (AUC) and the Fischer's exact test for single and multiple (>3) dilatations after testing multiple cut-off points. Intra-rater and Inter-rater agreement in measuring the EASI was evaluated using intraclass correlation coefficients (ICC) of blinded serial measurements.

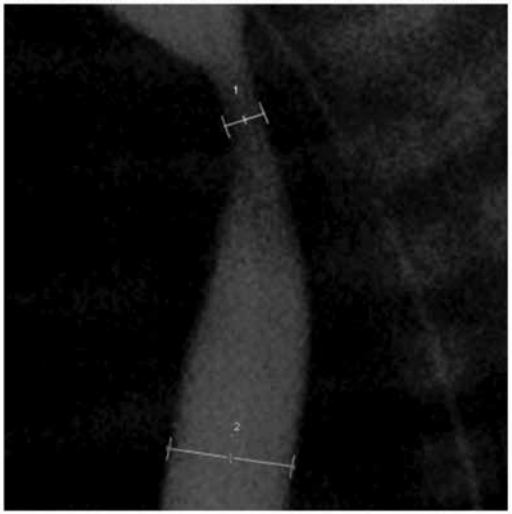
Results:
Forty-five patients had esophagrams suitable for analysis. Twenty-eight (62%) patients required dilatation and 19 received > 3 dilatations (42%). EASI scores ranged from 0.17 -0.70; the EASI based on the lower pouch measurements outperformed the upper pouch EASI, see table. All patients with a lower EASI of < 0.30 (n=8) required multiple esophageal dilatations. Serial blinded measurements yielded near perfect agreement in EASI of the lower pouch.

Summary of performance of upper and lower Esophageal Atresia Stricture Index (EASI) Parameter	Upper EASI	Lower EASI
Area Under ROC curve for requiring 1 dilatation	0.56	0.66
Area Under ROC curve for requiring >3 dilatation	0.67	0.65
Discriminates patient requiring multiple dilatation at cut-off of <0.30 63%*	100%*	*p=0.006
InterClass Coefficient of inter-rater agreement	0.87	0.91
InterClass Coefficient of intra-rater agreement	0.70	0.88

POSTER SESSION II (CONT.)

Conclusions:
The EASI using the lower esophageal pouch is a simple, reproducible tool in predicting the development and severity of anastomotic stricture after esophageal atresia repair and can direct postoperative surveillance and caregiver counseling.

correlation coefficients (ICC) of blinded serial measurements.



NOTES:

POSTER SESSION II (CONT.)

P24

AIRWAY FOREIGN BODIES IN PEDIATRIC PATIENTS: IN-HOSPITAL MORTALITY AND CORRELATION OF ANATOMIC LOCATION OF FOREIGN BODY WITH OUTCOME

Kevin N. Johnson [1], David Notrica, MD[2]. [1]Mayo Clinic, Arizona, Phoenix, AZ, USA, [2]Phoenix

Children's Hospital, Phoenix, AZ, USA.

Background:
Airway foreign bodies (FB) are a common medical emergency in the pediatric population. While deaths are not uncommon, the in-hospital mortality rates and correlation with anatomic location of the airway foreign body have not been previously reported.

Methods:
The KID database was reviewed for 2003, 2006, and 2009 for patients with a discharge diagnosis of airway foreign body using ICD-9 codes (933.1, 934.x).

Results:
8,653 patients, ages 0-17, were found to have an airway FB. Patients admitted for airway FB were more likely to be male (57%, $p<0.01$). Mechanical ventilation was required 19.3% during the same hospitalization, and the overall mortality rate was 2.5%. Mean age of patients varied by location of the airway FB (laryngeal 2.2 years, tracheal 3.2 years, mainstem bronchus 4.6 years, lower respiratory tract 5.5 years ($p<0.01$). Use of mechanical ventilation was dependent on the location of the airway FB (see table), hospital transfer status (OR 2.64, $p<0.01$), as well as weekend admission (OR 1.43, $p<0.01$). Univariate analysis demonstrated differences in hospital mortality based on anatomic location (see table, $p<0.01$), requirement for mechanical ventilation during hospitalization (OR 27.0, $p<0.01$), and transfer from another hospital (OR 2.57, $p<0.01$).

Conclusions:
The in-hospital mortality rate for airway foreign bodies is 2.5%. The anatomic location of airway FB in pediatric patients is related to age, and affects the frequency of complications, including respiratory failure and mortality. Other factors associated with complications included transfer of care from another hospital, and hospital admission on a weekend also affect outcomes.

POSTER SESSION II (CONT.)

Outcomes based on location of airway foreign body				
Mechanical Ventilation		Percentage (n)	Odds Ratio	P-value
- by location	Laryngeal FB	14.1% (611/4317)	-	Reference Value
	Tracheal FB	33.0% (169/512)	2.98	<0.001
	Bronchial FB	21.9% (409/1863)	1.70	<0.001
	Lower Airway FB	27.4% (261/951)	2.29	<0.001
In-hospital mortality				
- by location	Laryngeal FB	1.9% (82/4314)	-	Reference Value
	Tracheal FB	2.7% (14/512)	1.45	0.20
	Bronchial FB	2.8% (53/1861)	1.51	0.02
	Lower Airway FB	3.6% (35/951)	1.97	0.001

NOTES:

POSTER SESSION II (CONT.)

P25

HEALTH DISPARITIES IMPACT OUTCOME IN CHILDREN WITH CANCER

Mary T. Austin, MD, MPH[1], Hoang Nguyen, PhD[1], Jan M. Eberth, PhD[2], Andras Heczey, MD[3], Dennis P. Hughes, MD, PhD[1], Kevin P. Lally, MD, MS[4], Linda S. Elting, DrPh [1].

[1]The University of Texas MD Anderson Cancer Center, Houston, TX, USA, [2]University of South Carolina, Columbia, SC, USA, [3]Baylor College of Medicine, Houston, TX, USA, [4]The University of Texas Medical School at Houston, Houston, TX, USA.

Purpose:
To identify barriers to health care in children with solid tumors and examine their impact on disease presentation and outcome.

Methods:
We examined all children (age < 18 years) diagnosed with a non-CNS solid tumor malignancy and enrolled in the Texas Cancer Registry between 1995 and 2009 (n=4,603). Geocoded information was used to calculate the driving distance between a patient's home address and the nearest pediatric cancer treatment center. Socioeconomic status (SES) was determined using the Agency for Healthcare Research and Quality (AHRQ) formula and 2007-2011 US Census block group data. Logistic regression was used to determine factors associated with advanced-stage disease. Life table methods and Cox regression were used to estimate survival probability and hazard ratios. Statistical significance was defined as $p<0.05$ and results are reported as odds ratios or hazard ratios with 95% confidence intervals (CI).

Results:
Children with advanced-stage non-CNS solid tumor malignancies were more likely to be male, < 10 years old, and Hispanic or non-Hispanic Black (all $p<0.05$). The adjusted odds ratios of presenting with advanced-stage disease were higher in children age 1-10 years compared to children > 10 years (OR 1.55, 95%CI 1.36,1.76), and in Hispanics (OR 1.01, 95%CI 1.01,1.36), and non-Hispanic Blacks (OR 1.32, 95%CI 1.05,1.62) compared to non-Hispanic Whites. Distance to treatment and SES did not impact stage of disease at presentation. However, Hispanic and non-Hispanic Blacks and patients in the lowest SES quartile had the worst 1- and 5-year survival probability (all $p<0.05$). The adjusted overall survival differed by age, race, and stage, but not SES or distance to the nearest treatment facility.

Conclusions:
Geographic and socioeconomic disparities fail to explain significant racial/ethnic differences in disease presentation and survival for children with non-CNS solid tumors. Future studies should be directed at identifying and addressing modifiable health disparities in pediatric cancer.

NOTES:

POSTER SESSION II (CONT.)

P26

DEFINING THE ROLE OF PROTEIN KINASE A AND APOPTOSIS IN NECROTIZING ENTEROCOLITIS

Catherine J. Hunter, M.D., Douglas Wood, BS.
Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL, USA.

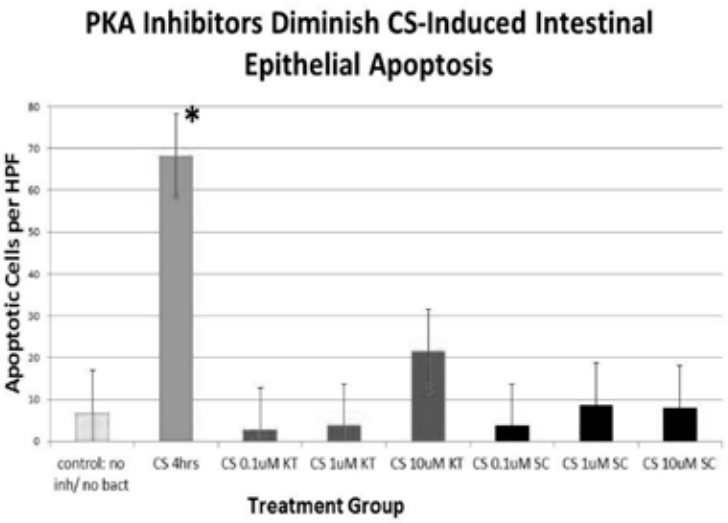
Purpose:
Necrotizing enterocolitis (NEC) is a deadly intestinal disease that typically affects premature infants. Cronobacter sakazakii (CS) has been associated with outbreaks of NEC. We hypothesized that protein kinase A (PKA) mediated signaling may contribute to epithelial cell death in NEC.

Methods:
After IRB approval human intestinal segments were obtained from infants undergoing bowel resection for NEC (September 2012-September 2013), NEC strictures, or ostomy closures (controls). Samples were collected in the operating room and preserved in formalin and cryomoulds. Protein was extracted for western blot analysis with antibodies for markers of apoptosis and PKA. Rat intestinal epithelial cells (IEC-6) were grown to 90% confluence and exposed to CS *in vitro*. PKA inhibitors (KT -5720 & SC-3010) were added at doses of 0.1uM, 1uM and 10uM prior to CS infection. IEC-6 cell apoptosis was assayed by western blot analysis of caspases, and by TUNEL staining using the ApoTag red kit. Differences were analysed with students T-test where appropriate.

Results:
Activated protein kinase A was identified by Western blot analysis in human specimens with NEC (n=4), as compared with controls (n=6) $p<0.005$. Additionally increased caspase 3 activation was seen in patients with NEC as compared with controls. CS induces capase 3 activation after 4 hours of co-culture in IEC-6 cells ($P<0.005$). PKA is present in IEC-6 and appears to be activated by 4 hours of infection with CS. The addition of a PKA inhibitor prior to IEC-6 infection with CS prevents CS-induced apoptosis (Figure 1) $p<0.005$.

Conclusion:
We conclude that PKA mediated signaling may play an important role in CS-induced intestinal epithelial apoptosis. The prospect of PKA inhibitors presents an interesting potential therapeutic line of investigation.

POSTER SESSION II (CONT.)



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POSTER SESSION II (CONT.)

P27

HYPOXIA ENHANCES AN ALTERNATIVE DNA REPAIR PATHWAY IN NEUROBLASTOMA CELLS

Lindsey Gaston, Daniela Bashllari, BS, Fujia Lu, PhD, Anthony Opipari, MD, PhD, Valerie Castle, **Erika Newman, MD**.
The University of Michigan, Ann Arbor, MI, USA.

Introduction:
Neuroblastoma (NB) is an embryonic cancer of neural crest origin. Our overarching hypothesis is that error-prone alternative nonhomologous end-joining (alt-NHEJ) mediated by DNA Ligase III (Lig III) is a novel mechanism of pathogenicity in NB. Lig III is highly expressed in both undifferentiated human neural crest stem cells and in tumorigenic MYCN -amplified NB cell lines. Hypoxia has been shown to dedifferentiate NB cells to an aggressive, neural-crest like state, and clinical studies have associated neuroblastic tumor induction with poor fetal oxygenation. We further hypothesized that hypoxia induces Lig III expression in NB cells.

Methods:
S -type NB cells (SHEP and SHEP-MYCN) were cultured for 1) 72 hrs at normal oxygen tension (22% O2), 2) 72 hrs at 5% oxygen tension, and 3) 72 hrs at 5% oxygen followed by 24 h reperfusion. Cells were fixed and stained for Lig III and HIF-1a using immunofluorescence. Fluorescent intensity was quantified in randomly selected regions of interest (n=6) using Image J software. Mean fluorescent intensity was reported in arbitrary fluorescence units (afu) and analyzed with ANOVA.

Results:
SHEP cells expressed low levels of Lig III (0.345±0.058 afu) that increased nearly 6-fold following hypoxia (2.03±0.058 afu) and returned to baseline with reperfusion (0.603±0.082 afu; $p<.0001$). SHEP-MYCN cells expressed higher levels of Lig III at normal oxygen tension compared to SHEP cells (2.08±0.505 afu) that rose over 2.5- fold following hypoxia (5.37±1.32 afu) and decreased with reperfusion (2.12±0.424 afu; $p<.0001$). In all cells, HIF-1a was induced with hypoxia and returned to normoxic levels following reperfusion, though expression was higher in SHEP-MYCN cells in all conditions.

Conclusions:
DNA Ligase III is induced under hypoxic conditions in both SHEP and more tumorigenic SHEP-MYCN NB cells. Future work characterizing the role of hypoxia in genetic instability via an erroneous DNA repair pathway may yield insight into NB tumorigenesis.

NOTES:

POSTER SESSION II (CONT.)

P28

DIFFERENTIAL EXPRESSION OF AN ALTERNATIVE END-JOINING PATHWAY PROVIDES A NOVEL THERAPEUTIC STRATEGY IN HIGH-RISK NEUROBLASTOMA

Fujia Lu, PhD, Daniela Bashllari, BS, Anthony Opipari, MD, PhD, Valerie Castle, MD, **Erika Newman, MD**.

The University of Michigan, Ann Arbor, MI, USA.

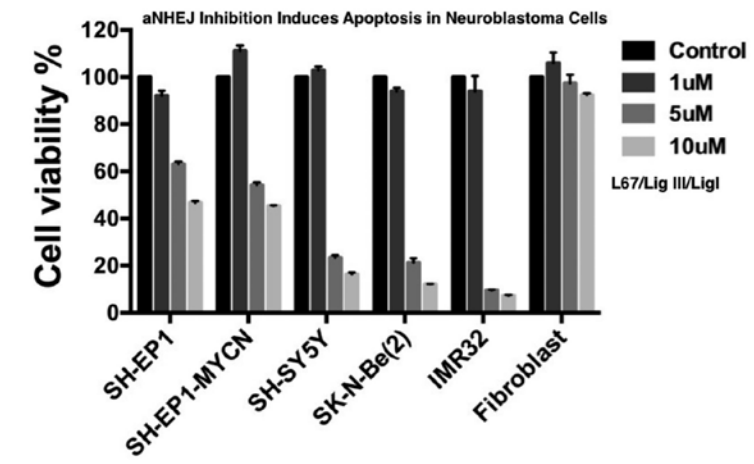
Purpose:
Neuroblastoma (NB) is an embryonic cancer of neural crest lineage and acquires genomic aberrations that correlate with clinical outcomes. Double-strand breaks (DSB) are the most serious threat to genome integrity. The nonhomologous end-joining (NHEJ) pathway protects chromosomal integrity when DSB arise. Recent evidence has suggested that in contrast to canonical NHEJ, an alternative NHEJ (aNHEJ) pathway is functional and more prone to deletions and translocations. We recently found that high-risk NB cell survival is reliant upon an aNHEJ mechanism that is error-prone. We hypothesized that the major aNHEJ mediators PARP1, DNA Ligase III (Lig III) and DNA Ligase I (Lig I), are novel therapeutic targets in high-risk NB.

Methods:
Neuroblastic (N-type) and Schwanninan (S-type) NB cells and fibroblasts were cultured. Lysates were analyzed for protein expression of PARP1, Lig III, and Lig I. Plasmid end-joining assays were used to determine end-joining efficiency and fidelity. We examined the effects of aNHEJ inhibition on cellular proliferation and apoptosis using DNA Ligase III siRNA knockdown, DNA Ligase III/I inhibitors, and PARP1 inhibitors. Correlative gene expression data was obtained from Affymetrix micro-array analysis of 88 NB tumor samples.

Results:
N-type cells uniformly express higher levels of PARP1, Lig III, and Lig I (DNA ligase III, ca. 4-fold elevation) and are highest in cells with MYCN overexpression. NB cells display increased end- joining activity that is efficient but error-prone. aNHEJ inhibition results dose -dependent accumulation of DSB and apoptosis in high-risk NB cells. High expression of PARP1, Lig III, and Lig I is associated with poor overall survival probability ($p<0.01$).

Conclusion:
aNHEJ is a cell survival mechanism that inversely correlates with overall survival probability in NB patients. aNHEJ inhibition leads to DSB accumulation and induces apoptosis in high-risk NB phenotypes. These data support further translational studies examining the use of PARP1 and aNHEJ ligase inhibitors for therapy-resistant NB tumors.

POSTER SESSION II (CONT.)



NOTES:

POSTER SESSION II (CONT.)

P29

PROGNOSTIC FACTORS IN FIBROLAMELLAR HEPATOCELLULAR CARCINOMA IN YOUNG PEOPLE

David G. Darcy, MD, Marcus M. Malek, MD, **Michael P. La Quaglia, MD**.
Memorial Sloan -Kettering Cancer Center, New York, NY, USA.

Purpose:
Fibrolamellar hepatocellular carcinoma (FLC) is a rare hepatoma that arises in adolescent patients without cirrhosis. There are few reports focusing on this entity, and reported complete (R0) resection rates range from 20-42% in pediatric cooperative group studies. We reviewed our experience to document the rate of R0 resection and evaluate the impact of resection, nodal status, and PRETEXT stage on survival.

Methods:
With IRB approval, we retrospectively reviewed the medical records of 25 consecutive pediatric patients with FLC treated at our institution from 1981 to 2011. Variables analyzed for association with overall survival included: PRETEXT stage, nodal involvement, and R0 resection status. Standard statistical analysis was done.

Results:
The median age at diagnosis was 17.1 years (range, 11.6 -20.5 years), and the median follow-up interval was 2.74 years (range, 5 months-9.5 years). PRETEXT stage distribution was 5 (28%) for stage 1, 10 (56%) for stage 2, 2 (11%) for stage 3, and 2 (11%) for stage 4. AJCC stage distribution was 5 (20%) stage I, 1 (4%) stage II, 1 (4%) stage III, and 18 (72%) stage IV. Seventeen patients (68%) had N1 disease and 7 (28%) had parenchymal metastases at diagnosis. R0 resection was achieved in17 (80.9%) of 21 patients who underwent resection with intent to cure. The overall 5-year survival was 42.6% (95% CI 20-65.2%). Survival was positively correlated with R0 resection ($p=0.003$), and negatively associated with positive regional lymph nodes ($p=0.044$) and increasing PRETEXT stage ($p < 0.001$).

Conclusions:
In pediatric patients with FLC, lower PRETEXT stage was a useful predictor of long-term survival, positive lymph nodes were a poor prognosticator, and an R0 resection was significantly associated with prolonged survival. These data support aggressive attempts at R0 resection and regional lymphadenectomy in patients with fibrolamellar hepatocellular carcinoma.

NOTES:

POSTER SESSION II (CONT.)

P30

RAPID SCREENING FOR PIK3CA MUTATIONS IN LYMPHATIC MALFORMATIONS

Alexander Osborn, MD PhD, Peter Dickie, PhD, Anita Gupta, MD, Denise Adams, MD, Belinda Hsi Dickie, MD PhD.
Cincinnati Children's Hospital, Cincinnati, OH, USA.

Purpose:
It has been shown that the PI3 kinase (PI3K) pathway is abnormally activated in some lymphatic anomalies (LA) in children. We have isolated lymphatic endothelial cells (LEC) from lesions, followed by genomic sequencing, and confirmed the presence of common PIK3CA activating mutations in some cells. However, the number and type of lymphatic anomalies with such mutations is unknown. Amplification refractory mutation system (ARMS) PCR is a rapid and cost efficient means of detecting PIK3CA mutations in cancer. Its applicability in the genetic analysis of LAs was explored to potentially guide future management regimens.

Methods:
Lymphatic anomalies (lymphatic malformations (LM) and combined malformations with a lymphatic component (Capillary Lymphatic Venous (CLVM), Venolymphatic (VLM)) from the Vascular Tissue Repository were obtained - 21 tissue samples, 10 cultured LEC lines obtained from LAs. Known mutations of PI3K (E542K, E545K, E545A, H1047L, and H1047R) were screened for using ARMS PCR and correlated with direct sequencing of the PIK3CA locus.

Results:
7 of 10 cell lines, and 13 of 21 tissue samples were positive for activating PIK3CA mutations by ARMS PCR: 4/31 (13%) E542K, 7/31 (23%) E545K, 1/31 (3%) E545A, 1/31 (3%) H1047L, and 7/31 (23%) H1047R. PIK3CA mutations were found in LMs (13/19) and CLVM (7/8) but not VLM (0/4). The technique requires approximately 25 mg of tissue and can be completed in less than 24 hours. As little as 0.5% mutant DNA in 20 ng can be reliably detected.

Conclusions:
ARMS PCR provides a rapid and economical means of detecting the presence of PIK3CA mutations in LAs (LM and CLVM). Stratification of patients with respect to PIK3CA mutations may help direct treatment for LAs. Our results suggest that this technique, when used as a first screening step, will immediately stratify at least half of all patients. Screening for more mutations in the future will likely capture more patients.

NOTES:

SCIENTIFIC SESSION I

Scientific Session I
Basic Science, Fetal and Development Biology
Friday, May 30, 7:30 a.m. – 9:00 a.m.

1

THE MACROPHAGE INHIBITOR CNI-1493 PREVENTS LUNG METASTASES IN EWING'S SARCOMA

Anthony J. Hesketh, MD, MS[1], Christopher A. Behr, MD[1], Morris Edelman, MD[2], Richard D. Glick, MD[2], Yousef Al-Abed, PhD[1], Marc Symons, PhD[1], Bettie M. Steinberg, PhD[1], Samuel Z. Soffer, MD[2].

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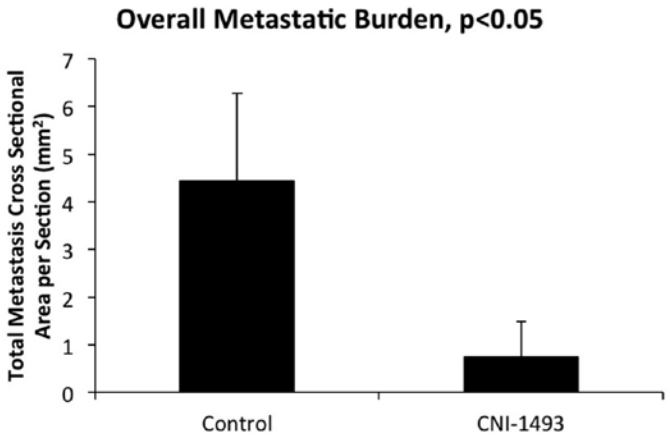
Purpose:
Metastatic Ewing's Sarcoma (ES) carries a poor prognosis. Recent evidence demonstrates that tumor -associated macrophages in ES are associated with more advanced disease. While some macrophage phenotypes (M1) exhibit anti-tumor activity, distinct phenotypes (M2) may contribute to malignant progression and metastasis. We hypothesized that inhibition of tumor -associated macrophages with the macrophage inhibitor CNI-1493 may decrease metastatic burden in ES.

Methods:
In vivo, human ES cells (SK-NEP1) were surgically implanted into the left kidney of athymic mice. Mice were treated for 7 weeks with CNI-1493 or vehicle. Lung parenchyma was assessed for metastases utilizing both H&E and immunohistochemistry for the ES-specific CD99 and endothelial-specific CD31 markers. *In vitro*, primary macrophages isolated from human blood were polarized to M1 or M2 phenotypes by exposure to GM-CSF or M-CSF and activated with IFN-? And LPS or IL-4. Cells were co-cultured with polarized macrophages and underwent proliferation and invasion assays in the presence or absence of CNI-1493.

Results:
In vivo, overall metastatic tumor burden was significantly decreased in CNI-1493-treated mice ($p<0.05$). Primary tumor size was not affected in CNI-1493- treated mice versus control (5.7±3.3g vs. 7.0±5.2g, $p=0.54$). Immunohistochemistry of lung tissue revealed micrometastases confined to the vasculature with CNI-1493 treatment, compared to larger metastases with extensive parenchymal invasion in controls. *In vitro*, ES cellular invasion was significantly enhanced in the presence of M2 ($p<0.01$), but not M1 macrophages and this effect was strongly decreased by CNI-1493 treatment ($p<0.01$). ES cellular proliferation was inhibited in the presence of M1 ($p<0.01$), but not M2 macrophages and was unaffected by CNI-1493 treatment.

SCIENTIFIC SESSION I (CONT.)

Conclusion:
Macrophages expressing the pro-tumor M2 phenotype induce ES cellular invasion. Treatment with the macrophage inhibitor CNI-1493 decreases ES invasion *in vitro* and *in vivo*, resulting in less invasive metastatic tumors. CNI-1493 may be useful as a novel adjunct in the treatment or prevention of metastatic ES.



NOTES:

SCIENTIFIC SESSION I (CONT.)

2

OVEREXPRESSION OF HB -EGF PROMOTES SURVIVAL AND DIFFERENTIATION OF ENTERIC NEURAL STEM CELLS AFTER TRANSPLANTATION IN MOUSE DYSGANGLIONIC COLON

Yu Zhou, MD, PhD, Gail E. Besner, MD.
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Purpose:
Neural stem cell (NSC) transplantation can replace defective or missing neurons in bowel afflicted with intestinal innervation disorders including Hirschsprung's Disease and hypoganglionosis, leading to improved intestinal motility. We have previously shown that heparin binding-EGF like growth factor (HB-EGF) knockout (KO) mice have defects in neural colonization of the distal gut, and decreased intestinal motility. In addition, HB -EGF promotes the survival and differentiation of NSC. The goals of this study were to investigate whether the over-expression of HB -EGF in NSCs could promote the survival, engraftment, and differentiation of transplanted NSC in hypoganglionic bowel.

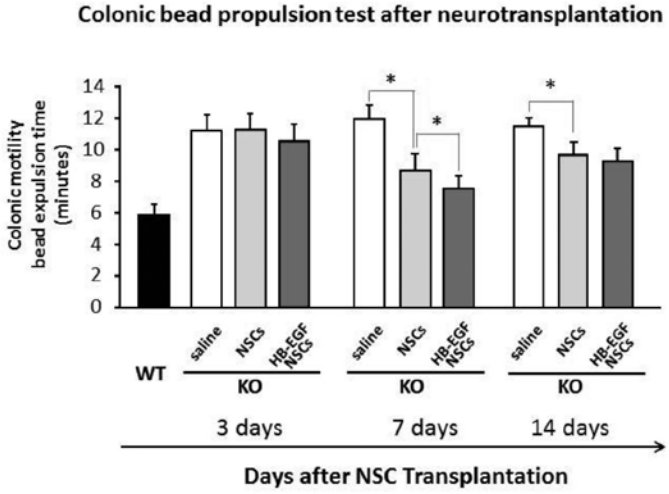
Methods:
GFP -labeled embryonic intestinal NSCs were isolated and transfected with a plasmid encoding the human HB -EGF gene or control vector. HB -EGF KO mice received an intestinal intramuscular injection of 20,000 HB -EGF-overexpressing NSCs in three sites of the proximal colon. After 1 and 2 weeks, grafted cells were visualized and characterized by whole mount immunohistochemistry for GFP, neuronal and glial cell markers. Colonic motility was assessed using the bead propulsion test and quantified by colonic bead expulsion time.

Results:
Transplanted HB -EGF-overexpressing NSCs had reduced apoptosis compared to transplanted control vector-NSCs 1 week post-transplantation. Overexpression of HB -EGF in transplanted NSCs enhanced their differentiation into PGP9.5-positive, GFAP -positive, and neuronal nitric oxide synthase-positive neurons. One week after transplantation, colonic motility was significantly improved in KO mice transplanted with HB -EGF-overexpressing NSCs, as demonstrated by significantly decreased colonic bead expulsion time (7.4 ± 1.2 minutes for HB -EGF-overexpressing NSCs; 8.7 ± 1.1 minutes for control vector-NSCs; 11.7 ± 0.9 minutes for normal saline injected group; $p<0.05$).

Conclusions:
These results demonstrate that transplantation of HB -EGF-overexpressing NSCs enhances the survival and neurogenesis of grafted cells in the defective ENS. Transplantation of NSCs genetically modified to overexpress HB

SCIENTIFIC SESSION I (CONT.)

-EGF may represent a potential novel future therapy for the treatment of Hirschsprung's disease.



NOTES:

SCIENTIFIC SESSION I (CONT.)

3

VCAM -1 EXPRESSION IN A MURINE OSTEOSARCOMA MODEL ENHANCES METASTASIS TO DRAINING LYMPH NODE AND LUNG

Iuliana D. Bobanga[1], Francesca Scrimieri, PhD[2], David J. Corn[3], Jaclyn A. Bjelac, MD[2], Saada Eid [2], Alex Y. Huang, MD, PhD[2].

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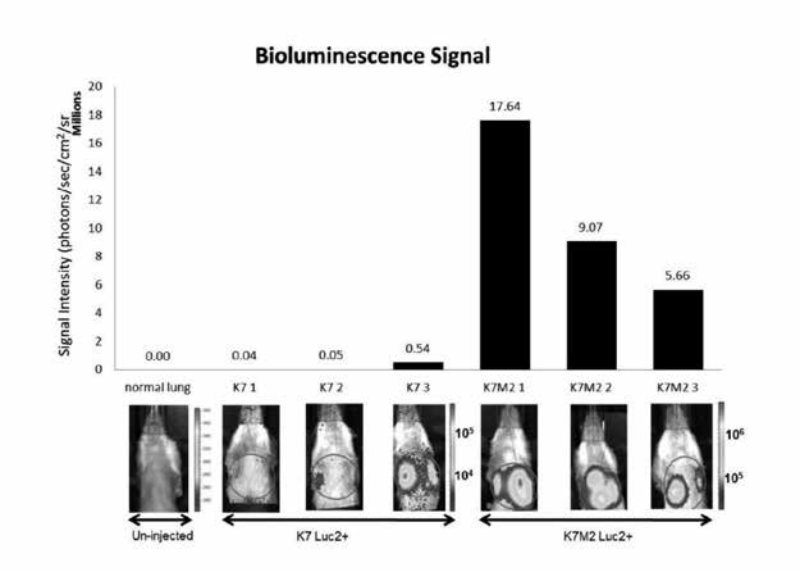
Purpose:
Vascular cell adhesion molecule -1 (VCAM-1) overexpression has recently been shown to provide survival advantages to metastatic cancer cells. K7M2 is an immune -resistant murine osteosarcoma cell line in which we observed a previously under -appreciated overexpression of VCAM -1 compared to the parental line K7. We hypothesize that VCAM -1 expression affects tumor -surrounding immune cells interactions, promoting immune tolerance and enhancing tumor metastasis.

Methods:
To evaluate *in vivo* how VCAM -1 affects tumor -surrounding immune cells interactions, we injected intratibially 106 firefly luciferase-expressing K7 or K7M2 cells in immunocompetent mice (3 mice per group). Bioluminescent (BLI) images were taken at several time points to follow tumor dissemination and growth. Inguinal and popliteal draining lymph nodes (DLNs) were collected and analyzed by flow cytometry for changes in immune cell infiltration and activation and by real-time quantitative PCR (qPCR) for the presence of MuLV gp70, a widely expressed murine tumor biomarker.

Results:
VCAM -1 overexpression increases tumor growth kinetics and metastatic potential in immune -competent mice as demonstrated by qPCR and bioluminescence. Molecular evidence of metastasis was found in DLN as early as day 4 post-injection and in lung by day 14 in the mice injected with VCAM -1 overexpressing line, whereas mice injected with primary line showed only a small tibial tumor. A larger tumor burden is seen by bioluminescence on day 28 in the lungs of mice injected with K7M2 cells when compared to the K7 group (p=0.02) (Figure 1). Moreover, flow cytometry of the DLNs on day 4 post-injection showed a trend towards increased CD4+CD44+ effector memory T cells in mice injected with K7M2 compared to K7 and to control non-injected mice.

SCIENTIFIC SESSION I (CONT.)

Conclusion:
K7M2 murine osteosarcoma cell line that overexpresses VCAM -1 bypasses the immune system and metastasizes sooner than the parental K7 line to the DLN and lungs. VCAM -1 inhibition is a potential therapeutic strategy in osteosarcomas with VCAM -1 overexpression.



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SCIENTIFIC SESSION I (CONT.)

4

HIRSCHSPRUNG-ASSOCIATED ENTEROCOLITIS CHANGES COMPOSITION OF INTESTINAL MICROBIOTA IN CHILDREN WITH HIRSCHSPRUNG DISEASE

Philip K. Frykman, M.D., Ph.D., M.B.A.[1], Tomas Wester, M.D., Ph.D. [2], Agneta Nordenskjold, M.D., Ph.D. [3], Akemi Kawaguchi, M.D. [4], Thomas T. Hui, M.D. [5], Anna L. Granstrom, M.D. [2], Zhi Cheng, M.D. [1], Vince Funari, Ph.D. [6], for the HAEC Collaborative Research Group [1].

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Hypothesis:
Children with Hirschsprung disease (HD) who develop Hirschsprung -associated enterocolitis (HAEC) have pathogenic gut microbiota compared with HD patients who have not developed HAEC.

Methods:
An IRB-approved international multicenter study enrolled n=18 consecutive HD patients ages 3 months to 7.6 years. Each subject's medical record was reviewed and one parent interviewed for detailed history of feeding, antibiotic and probiotic use, and enterocolitis symptoms. HAEC status was determined according to Pastor et al. and patients with active HAEC were excluded. Fresh feces was collected, DNA isolated and 16S libraries constructed and sequenced using semiconductor sequencing. Approximately 18,000 sequences were generated per patient, and Qiime pipeline was used to assess the diversity and prevalence of bacterial signatures.

Results:
Nine patients met criteria for having had at least one episode of HAEC. The HAEC and the HD groups were similar in age, length of aganglionosis, feeding type and probiotics received. Three HAEC subjects received antibiotics within 2 months of stool collection compared with one in the HD group (Table). Fecal microbiota composition of the HAEC group showed changes in diversity with increased Bacteriodetes and Proteobacteria, and a reduction in Firmicutes and Verrucomicrobia at the phyla-level compared with the HD group (Figure). When detailed compositional analysis was performed at the genus-level, we found a striking 54-fold reduction in Lactobacillus (a beneficial strain), a 22-fold increase in Clostridium and a remarkable 360-fold increase in Campylobacter (both pathogenic strains) in the HAEC group.

SCIENTIFIC SESSION I (CONT.)

Conclusion:
The HAEC group demonstrated reduced beneficial, and increased pathogenic bacterial strains. Changes in bacterial diversity of the HAEC group revealed increased Bacteriodetes and reduced Firmicutes support dysbiosis in children with HAEC.

Patient Characteristics		
	HD	HAEC
n	9	9
Median age (years)	2.3	3.5
Rectosigmoid transition zone (n)	8	8
Breast milk	5	5
Formula	7	7
Probiotics	4	3
Antibiotics (<2 months of stool collection)	1	3
Trisomy 21	1	2
Post op complications (<30 days)	0	3

NOTES:

SCIENTIFIC SESSION I (CONT.)

5

FECAL TRANSPLANT CAN RESCUE FROM CONFIRMED DISSEMINATED GUT- DERIVED SEPSIS DUE TO RESISTANT AND VIRULENT HUMAN PATHOGENS: POSSIBLE ROLE IN LATE ONSET NEONATAL SEPSIS

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Purpose:
Late-onset neonatal sepsis due to resistant, virulent gut pathogens is emerging as an important cause of mortality. New data suggests that restoration of normal gut flora can effectively treat sepsis. We tested the hypothesis that a model of lethal gut -derived sepsis using multi -drug resistant (MDR) human pathogens would recapitulate neonatal illness, and would allow us to evaluate the potential role for fecal transplant in its treatment.

Methods:
Mice underwent 30% hepatectomy to induce surgical stress and intestinal inoculation with an intact human pathogen community consisting of C. albicans, S. marcescens (MDR), E. faecalis, and K. oxytoca (MDR) isolated from a critically ill patient. Sepsis developed by 24h along with pathogen dissemination to lung, liver, spleen and blood. Septic mice were randomized to receive a fecal transplant using either homogenized (FT) or autoclaved (AC) feces from untreated healthy mice given as enemas on POD 1 and 2. To test the virulence potential of the cecal contents from the two groups, contents were lysed and inoculated onto cultured mouse bone marrow -derived dendritic cells (BMDCs).

Results:
FT treatment significantly reduced mortality in septic mice as compared to control AC mice (13% versus 80%, N=15/group, $p<0.001$). IL-6 and IL-10 release from BMDCs were significantly increased in FT mice compared to AC mice ($P<0.05$). Finally, BMDC assays performed on all healthy-appearing mice surviving to POD7 demonstrated that cecal contents from AC -treated mice remained proinflammatory while cecal contents from FT expressed low baseline levels of cytokines.

Conclusions:
Our model recapitulates gut -derived sepsis with pathogens that parallel those detected in critically ill neonates. Our data suggests that transplantation of normal mouse feces into the gut can rescue gut -derived sepsis and prevent mortality. This effect may be due, in part, to the re-establishment of the probiotic effect of normal gut flora on local and systemic immune function.

NOTES:

6

PROPRANOLOL AS A NOVEL THERAPY FOR LYMPHATIC MALFORMATIONS

Connie H. Keung, MD1, Julie Monteagudo, MD1, Peter Liou, MD1, Chris K. Kitajewski, BA 1, Maia Reiley, MS1, John Paul Andrews, BA 1, June K. Wu, MD1, Carrie J. Shawber*, PhD1, Jessica J. Kandel*, MD2.

1Columbia University Medical Center, New York, NY, USA, 2Comer Children's Hospital, the University of Chicago Medicine & Biological Sciences, Chicago, IL, USA.

Purpose:
Lymphatic malformations (LM) are associated with significant morbidities for which there are currently no consistently effective treatments. Development of novel therapies has been limited by lack of biologic understanding of LMs. We characterized a novel human LM progenitor cell (LMPC) population that recapitulates LMs in a mouse model. Propranolol has been proven to be an effective therapy for infantile hemangiomas, another vascular anomaly with a progenitor cell origin. We hypothesized that propranolol would alter development of experimental LMs.

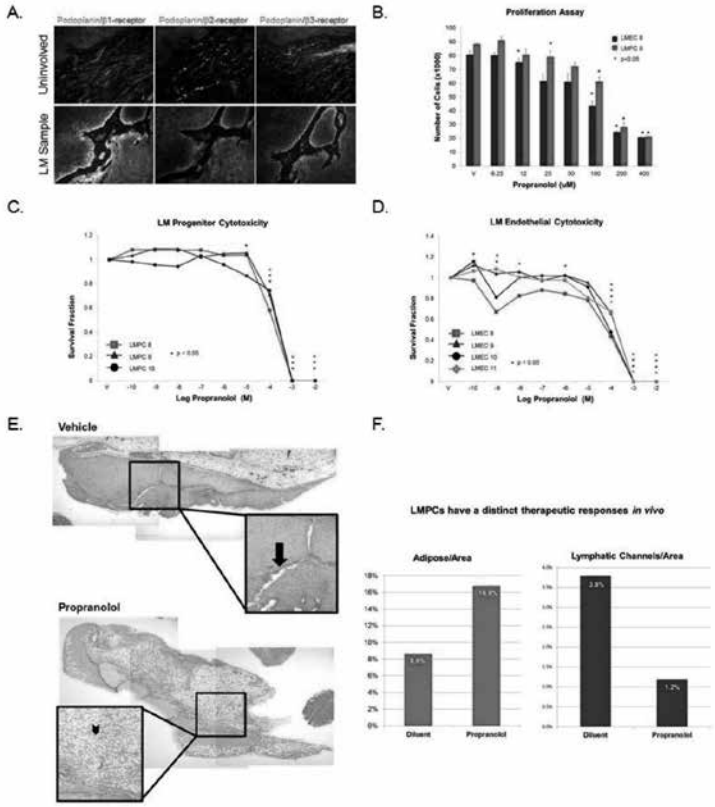
Methods:
De-identified patient samples (IRB-AAAA7338) of LMs and uninvolved tissues (N=8) were immunostained for beta1/2/3-adrenergic receptors and podoplanin, a lymphatic endothelial marker. Propranolol effects on LM-derived LMPCs and LM endothelial cells (LMECs) on *in vitro* proliferation were assessed (WST-8 cell-counting kit). Cytotoxicity was determined by fluorescence-based digital image microscopy. Next, NCR nude mice were randomized to treatment/control arms (N=6 each) and pretreated with propranolol (40mg/kg/day) or vehicle for 5 days prior to implantation of 1.8 x106 LMPCs in each cohort. Propranolol administration was continued throughout the experiment. Implants were removed at 5 weeks for analysis.

Results:
Immunohistochemistry demonstrated an increase in all three beta -adrenergic receptors in LM tissues. A significant decrease in LMEC proliferation was observed at 25uM propranolol, with LMPC proliferation significantly decreased at 50uM. Propranolol-induced cytotoxicity was found at 10-3M ($p < 0.05$) for both LMECs and LMPCs. *In vivo*, implants from propranolol -treated mice exhibited 3.2-fold decrease in lymphatic channel area and a 2-fold increase in adipose area as compared to controls.

Conclusion:
Human LMs contain a progenitor cells that can recapitulate LMs in an *in vivo* model. Propranolol dose -dependently represses proliferation and induces cytotoxicity in LMPCs *in vitro*, and decreases lymphatic channel area *in vivo*. Our data suggests that beta -adrenergic blockade may prove useful in therapy

SCIENTIFIC SESSION I (CONT.)

of human LMs.



Propranolol as a Novel Therapy for Lymphatic Malformations: **A.** LM and uninvolved tissues stained for beta-adrenergic receptors and podoplanin (D2-40), a lymphatic endothelial marker. All three are increased in LM tissues. **B.** Proliferation assay of LMECs and LMPCs treated with increasing dosages of propranolol. **C,D.** Cytotoxicity assay of of LMECs and LMPCs treated with increasing dosages of propranolol. **E.** H&E of 5 week LMPC Matrigel implants treated with vehicle (top) or propranolol (bottom). Arrow notes lymphatic channels and arrowheads note adipocytes. **F.** Quantitation of lymphatic channel and adipocyte density.

NOTES:

7

PARTIAL OR COMPLETE COVERAGE OF EXPERIMENTAL SPINA BIFIDA BY SIMPLE INTRA-AMNIOTIC INJECTION OF CONCENTRATED AMNIOTIC MESENCHYMAL STEM CELLS

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Purpose:
Surgical prenatal coverage of spina bifida is associated with significant complications, most notably preterm labor. Amniotic mesenchymal stem cells (aMSCs) can enhance fetal wound healing. We hypothesized that simple intra -amniotic delivery of large amounts of aMSCs may elicit some degree of repair of the spina bifida defect.

Methods:
Following IACUC approval, 24 time-dated pregnant Sprague -Dawley dams exposed to retinoic acid for the induction of fetal neural tube defects were divided in three groups. Group I had no further manipulations. Groups II and III received volume -matched intra -amniotic injections of either saline (group II) or a suspension of 2x106 cells/mL of aMSCs (group III) blindly in all fetuses (n=202) on gestational day 17 (term=21-22 days). Infused aMSCs consisted of syngeneic Lewis rat cells with identity confirmed by flow cytometry for CD29, CD44, CD45, CD73, and CD90 expressions, labeled with green fluorescent protein (GFP; 77-89% positivity by FACS analysis). Animals were killed before term. Statistical comparisons were by generalized estimating equations, ANOVA, the Wald test, and Bonferroni comparisons, as appropriate ($P<0.05$).

Results:
A total of 165 fetuses were viable at euthanasia. Among fetuses with spina bifida (96/165; 58%), there were no significant differences in the overall dimensions of the discernible defect across the groups ($P=0.19$). However, there was a statistically significant increase in the proportion of fetuses with variable degrees of coverage (some complete) of the defect by a thin, rudimentary skin, confirmed histologically, in group III ($P<0.001$), with no differences between groups I and II ($P=0.98$). Donor aMSCs were identified in 83% (33/40) of the fetuses in that group via immunohistochemistry for GFP.

Conclusions:
Amniotic mesenchymal stem cells can induce partial or complete coverage of experimental spina bifida after concentrated intra -amniotic injection. Intra-amniotic administration of amniotic mesenchymal stem cells may become a practical option in the prenatal management of spina bifida.

NOTES:

8

ARE ALL PULMONARY HYPOPLASIA THE SAME? A COMPARISON OF PULMONARY OUTCOMES IN NEONATES WITH OMPHALOCELE, CONGENITAL LUNG MALFORMATION AND CONGENITAL DIAPHRAGMATIC HERNIA

Adesola C. Akinkuotu, MD, Fariha Sheikh, MD, Iriving J. Zamora, MD, Darrell L. Cass, MD, Timothy C. Lee, MD, Christopher I. Cassady, MD, Amy R. Mehollin- Ray, MD, Jennifer L. Williams, MD, Rodrigo Ruano, MD PhD, Stephen E. Welty, MD, Oluyinka O. Olutoye, MD PhD.

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Omphaloceles (OM), congenital lung malformations (CLM) and congenital diaphragmatic hernias (CDH) may be associated with pulmonary hypoplasia and pulmonary morbidity. We hypothesize that given equivalent lung volumes, pulmonary morbidity will be comparable regardless of the etiology of the pulmonary hypoplasia.

Methods:
We reviewed all fetuses diagnosed with CDH, OM and CLM at a comprehensive fetal center between January 2000 and June 2013. Observed -to-expect total fetal lung volumes (O/E-TFLV) were calculated using fetal MRI measurements. For fetuses with CLM, O/E-TFLV was based on normal lung tissue. Patient characteristics and outcomes were compared between groups. A sub -analysis of patients with ratios between 40-60%, the most inclusive range for all anomalies, was performed.

Results:
Of the 306 patients, 179 had CDH, 25 had OM and 102 had CLM. Fetuses with CDH had the smallest mean O/E- TFLV (CDH: 34.2 ± 15.2% vs. OM: 56.3 ± 23.9% vs. CLM: 88.9 ± 31.1%; $p<0.001$). Fifty-six patients had O/E-TFLV between 40 and 60% (Table 1). The duration of intubation, need for ECMO and supplemental oxygen at 30 day of life and 6-month mortality were similar among groups. Significantly more patients with CDH had pulmonary hypertension than those with OM or CLM. The median length of stay was three times as long in CDH and OM compared to CLM which may reflect non-pulmonary co-morbidities.

Conclusions:
Fetuses with equivalent lung volumes (O/E-TFLV between 40 and 60%) had similar pulmonary outcomes regardless of diagnosis. There was a higher incidence of pulmonary hypertension in CDH patients. MRI-derived lung volumes may useful in predicting pulmonary outcomes in fetuses regardless of the etiology of the pulmonary hypoplasia.

SCIENTIFIC SESSION I (CONT.)

Table 1: Characteristics and outcomes of OM, CLM and CDH patients with O/E-TFLV between 40-60%

Variable	**OM n=13**	**CLM n=16**	**CDH n=27**	**p-value**
GA at Birth, wks mean ± SD	36.3 ± 4.5	36.3 ± 3.5	37.5 ± 2.1	0.388
O/E-TFLV,% mean ± SD	49.3 ± 5.9	50.3 ± 5.8	47.9 ± 5.0	0.384
Length of Intubation, days median (range)	6.5 (2-92)	7.5 (1-20)	9.0 (2-64)	0.327
Length of hospital stay, days median, (range)	30.5 (10-185)	8.0(1-61)	29.0 (4-189)	0.084
Pulmonary HTN, n (%)	0/12 (0%)*	0/16 (0%)Ŧ	11/27 (40.7%)	0.001
ECMO, n (%)	0/13 (0%)	0/16 (0%)	1/27 (3.7%)	0.579
Supplemental Oxygen at 30 DOL n (%)	2/12 (16.7%)	1/16 (6.3%)	7/27 (25.9%)	0.267
Mortality at 6 months n(%)	1/12 (2.2%)	0/14 (0%)	0/20 (0%)	0.235

OM= Omphalocele; CLM= Congenital lung malformation; CDH= Congenital Diaphragmatic Hernia; GA= Gestational Age; O/E TFLV= Ratio of Observed to Expected Total Fetal Lung Volume; HTN = hypertension; ECMO= Extra Corporeal Membrane Oxygenation; DOL = days of life
* Significant at the p< 0.05 lever for OM vs. CDH; Ŧ Significant at the p< 0.05 lever for CLM vs. CDH

NOTES:

SCIENTIFIC SESSION I (CONT.)

9

THE MANY FACES OF HYDROPS

S. Christopher Derderian, MD, Cerine Jeanty, MD, Shannon R Fleck BS, Lily S Cheng, MD, Shabnam Peyvandi, MD, Anita J Moon-Grady, MD, Jody Farrell, MSN, PNP, Shinjiro Hirose, MD, Juan Gonzalez, MD, Roberta L Keller, MD, and Tippi C MacKenzie, MD.
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Purpose:
Fetal hydrops develops from a myriad of disease processes and predicting survival is challenging. We reviewed our experience with hydropic fetuses to understand relevant anatomic and physiologic parameters in survival.

Methods:
We reviewed pre - and postnatal records of hydropic fetuses evaluated between 1996-2013 (Table). In twin-to-twin transfusion syndrome, the hydropic recipient was included.

Results:
Fetuses with sacrococcygeal teratomas or anemia had a higher cardiac output state compared to primary hydrothorax, congenital high airway obstructive syndrome, and congenital pulmonary airway malformation, indicated by a higher combined ventricular output index ($p=0.005$) and cardiothoracic ratio ($p<0.0001$). Despite differences in cardiac function, there were no differences in survival between fetuses with high cardiac output states and ones with low/normal cardiac output states (11/23 (48%) vs. 49/73 (67%), $p=0.26$). The physiologic distribution of fluid was variable and not significantly different between survivors and non-survivors. Interestingly, resolution of hydrops was not predictive of survival to birth (survival following resolution was 24/27 (89%) vs. 48/71 (68%) without resolution, $p=0.18$). The incidence of spontaneous preterm labor was 39/133 (29%) and of mirror syndrome was 15/133 (11%).

Conclusions:
Hydrops is the anatomic end-point of different physiologic processes and patient outcome is more dependent on the individual disease rather than the anatomic and physiologic manifestations of hydrops. The fact that survival is equal with and without resolution of hydrops suggests that resolution should not be the goal of fetal intervention. These patients remain at high risk of pregnancy complications including preterm labor and mirror syndrome. We propose that amniotic fluid or serum biomarkers in addition to detailed echocardiographic and sonographic evaluation will be a better predictor of survival.

SCIENTIFIC SESSION I (CONT.)

Table 1: Anatomic and physiologic characteristics and outcomes in hydropic patients.

sadfgsd	Ascite / Pleural Effusion / Skin Edema	Combined Ventricular Output Index	Cardiothoracic Ratio	Fetal Treatment	Hydrops Resolution	Survival to Birth
Sacrococcygeal Teratoma (12)	4 (33%) / 4 (33%) / 12 (100%)	540±145	0.47±0.04	4 (44%)	0 (0%)	2 (22%)
Anemia (15)	15 (100%) / 4 (27%) / 10 (67%)	526±73	0.47±0.04	10 (71%)	5 (36%)	9 (64%)
Primary Hydrothorax (24)	20 (83%) / 24 (100%) / 20 (83%)	358±265	0.22±0.01	19 (90%)	7 (33%)	15 (71%)
Congenital Pulmonary Airway Malformation (55)	53 (96%) / 30 (55%) / 43 (78%)	311±120	0.17±0.01	41 (85%)	12 (25%)	31 (65%)
Congenital High Airway Obstruction Syndrome (8)	8 (100%) / 1 (13%) / 8 (100%)	290±57	0.16±0.00	3 (75%)	1 (25%)	3 (75%)
Congenital Diaphragmatic Hernia (12)	9 (75%) / 11 (92%) / 8 (67%)	NA	NA	4 (40%)	1 (10%)	7 (70%)
Twin-to-Twin Transfusion Syndrome (38)	35 (92%) / 17 (47%) / 35 (92%)	NA	NA	18 (67%)	2 (7.4%)	12 (44%)

NOTES:

SCIENTIFIC SESSION I (CONT.)

10

MATERNAL PRE -ECLAMPSIA INCREASES RISK OF NEONATAL NECROTIZING ENTEROCOLITIS

Dhriti Mukhopadhyay, MD [1], Luka Komidar, PhD[2], Katie Wiggins -Dohlvik, MD[1], Madhava R. Beeram, MD[1], Lena Z. Perger, MD[3].

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Purpose:
Similar immunologic mechanisms underlie development of pre -eclampsia (PE) and necrotizing enterocolitis (NEC). Though PE is a known risk factor for prematurity and intrauterine growth restriction (IUGR), our hypothesis was that maternal PE independently increases NEC risk in newborns.

Methods:
Database of all births at our institution from 2008 to 2011 (n=9,993) was retrospectively reviewed after IRB approval. Multiple mother and baby variables including maternal age, race, parity, mode of delivery, gestational age (GA), birth weight, sex, and APGARs were included in analysis. Babies born to PE mothers (n=1368) were compared to the control group of non-pre -eclamptic mothers (n=8625). Babies with birth weights <10th percentile for GA were classified as small-for- gestational-age (SGA). Statistics were performed using Pearson's chi-squared test.

Results:
Incidence of NEC was 1.5% in the control group (n=126) and 4.6% in the PE group (n=63) (P<0.001). A higher percentage of PE babies were preterm < 37 weeks GA (14.5% in control vs. 41.4% in PE, p<0.001) and SGA (6.3% in control vs. 10.2% in PE, p<0.001). Within the preterm population, 9.0% of control babies and 10.8% of PE babies developed NEC (p=0.25). Effect of PE was dramatic in the SGA group, where 1.5% of controls developed NEC compared to 13.6% of PE babies (p<0.001).

Conclusion:
We conclude that pre -eclampsia is an independent risk factor for development of necrotizing enterocolitis in babies with intrauterine growth restriction given the observed tenfold odds increase. Abnormal placentation results in the pro-inflammatory condition that characterizes maternal pre -eclampsia and often leads to fetal hypoxia, which manifests as growth restriction. This combination of maternal systemic inflammatory response and fetal hypoxia can prime the fetal immune system in favor of pro-inflammatory phenotype and reduced immune regulation *in utero*. Affected newborns are thus predisposed to development of systemic inflammatory diseases such as NEC at birth.

NOTES:

SCIENTIFIC SESSION II

Scientific Session II
Oncology and General Surgery
Friday, May 30, 11:30 a.m. – 12:15 p.m.

11

PNEUMOTHORAX AS A COMPLICATION OF COMBINATION ANTI -ANGIOGENIC CHEMOTHERAPY IN CHILDREN AND YOUNG ADULTS WITH REFRACTORY SOLID TUMORS

Rodrigo B. Interiano, MD , Beth McCarville, MD, Jianrong Wu, PhD, Andrew M. Davidoff, MD, Fariba Navid, MD, John Sandoval, MD.
St. Jude Children's Research Hospital, Memphis, TN, USA.

Purpose:
Antiangiogenic agents show significant anti-tumor activity against various tumors. In a pediatric phase I study evaluating the combination of sorafenib, bevacizumab and low-dose cyclophosphamide in children with solid tumors, we noted pneumothorax as a complication. The purpose of this study was to identify patient characteristics and risk factors, and establish treatment recommendations for the development of pneumothorax in children receiving antiangiogenic therapy.

Methods:
We reviewed the demographics, clinical course, and radiographic data for patients (n=44) with solid tumors treated with sorafenib, bevacizumab and cyclophosphamide. We analyzed factors related to the development and management of pneumothorax.

Results:
Thirty three of 44 patients had pulmonary lesions. Eleven (33%) of these patients developed pneumothorax likely related to study therapy. Of these eleven patients, six were male, 8 were white and the median age was 14.7 years (range, 1.08 - 24 years). Histologies associated with pneumothorax included rhabdoid tumor, synovial sarcoma, osteosarcoma, Ewing sarcoma, Wilms tumor and renal cell carcinoma. Seven patients had prior chest surgery. All 11 patients had pulmonary lesions at the time of study entry. Nine of the 11 who developed pneumothoraces had cavitary lesions in response to study therapy ($p<0.001$). Median time to development of pneumothorax was 5.7 weeks (range, 2.4 - 31.6) from the start of therapy. Four (36%) patients were symptomatic and five (45%) required intervention. One patient died from complications related to pneumothorax.

Conclusions:
Pneumothorax is a potentially life-threatening complication of anti-angiogenic therapy in children with solid tumors. Development of cavitary pulmonary

SCIENTIFIC SESSION II (CONT.)

lesions in response to therapy represents a risk factor for pneumothorax. Antiangiogenic chemotherapy may cause central necrosis of lesions leading to pneumothorax.

Characteristics of patients with pulmonary lesions with or without pneumothorax				
	All Patients	Patients with Pneumothorax	Patients without Pneumothorax	P-value
No. of Patients	44	11	33	
Age (years)				
Median (range)	12.5 (1.08-24.5)	14.7 (1.08-24.5)	11.6 (1.19-22.4)	0.136
Pulmonary lesions at study entry				
Yes	33	11	22	0.041
No	11	0	11	0.041
Cavitary Pulmonary Lesion in Response to Therapy				
Yes	12	9	3	0.0002
No	21	2	19	0.0002

NOTES:

SCIENTIFIC SESSION II (CONT.)

12

UTILITY OF SENTINEL LYMPH NODE BIOPSY VERSUS PET CT IN DIAGNOSIS OF LYMPH NODE METASTASIS IN PEDIATRIC SOFT TISSUE SARCOMA — A PROSPECTIVE ANALYSIS

Nathalie L. Kremer, MD , Lars Wagner, MD, Michael Gelfand, MD, Greg M. Tiao, MD, Daniel von Allmen, MD, Brian Turpin, MD, Rajaram Nagarajan, MD, Hong Yin, MD, Roshni A. Dasgupta, MD MPH.

Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA.

Purpose:
Diagnosis of lymphatic spread is essential as it is the strongest predictor of overall failure in soft tissue sarcoma and occurs in 15-42% of patients. It is unclear whether positron emission tomography (PET)-CT scan or sentinel lymph node biopsy (SLN) is the best means of diagnosis of lymph node metastases. The purpose of the study was to prospectively compare the utility of SLN mapping with lymphoscintigraphy vs. PET-CT and cross-sectional imaging in the diagnosis of lymph node metastasis in pediatric soft tissue sarcoma patients.

Methods:
23 patients with soft tissue sarcoma were enrolled in a prospective IRB approved protocol from 2008 to 2013. All patients underwent PET-CT scans and CT -lymphoscintigraphy before SLN dissection

Results:
All patients underwent SLN biopsy with a median of 2 lymph nodes excised with a mean lymph node size of 1.7 ± 0.64cm. There were no postoperative complications. 5/ 23 (21.7%) of biopsies were positive for tumor and changed therapy in all patients including larger radiation fields and chemotherapy regimens. Size of lymph node was not predictive (P=0.1). 4/5 (80%) positive lymph node biopsies were not identified on MRI or PET-CT. 11/23 (48%) had FDG uptake in the regional lymph node basin on PET-CT, however only one (9%) had a pathologically proven nodal involvement, the SUV -intensity was not predictive.

Conclusion:
SLN biopsy identified positive nodal disease that was not diagnosed on cross-sectional imaging or PET-CT scan. SLN biopsy appears to have better efficacy than PET-CT in detecting lymph node metastases. SLN can be done safely with minimal post- operative complications and should be considered in staging of all patients with soft tissue sarcoma.

SCIENTIFIC SESSION II (CONT.)

Patient characteristics and histopathology

Total number of patients enrolled	23
Mean age (range)	14 years +/- 9.1 (14 months - 32 years)
Male : Female	1.3:1
Primary tumor	15 of extremities 6 of trunk 1 nasal cavity 1 mandible
Histopathology	5 Synovial Sarcoma 4 Rhabdomyosarcoma 1 Clear Cell Sarcoma 1 Spindle Cell Sarcoma 4 Other Sarcomas
Average survival up to current date (range)	24 months (2 months - 53 months)
Deaths	4

NOTES:

SCIENTIFIC SESSION II (CONT.)

13

COG RENAL TUMOR STUDY: SURGICAL PROTOCOL VIOLATIONS AS A SURROGATE MARKER FOR PEDIATRIC SURGERY CANCER QUALITY

Peter F. Ehrlich[1], Tom Hamilton[2], Ken Gow[3], Doug Barnhart[4], Roshni Das Gupta[5], Mike Chen [6], Jessica Kandel[7], **Richard Glick[8]**, Ferd Ferrer[9].

[1]University of Michigan, Ann Arbor, MI, USA, [2]Boston Childrens Hospital, Boston, MA, USA, [3]University of Washington, Seattle, WA, USA, [4]Primary Childrens Hospital, Salt Lake City, UT, USA, [5]Cincinnati, Cincinnati, OH, USA, [6]University of Alabama Birmingham, Birmingham, AL, USA, [7]University of Chicago, Chicago, IL, USA, [8]Cohen Childrens Hospital, Long Island, NY, USA, [9]Connecticut Childrens Hospital, Hartford, CT, USA.

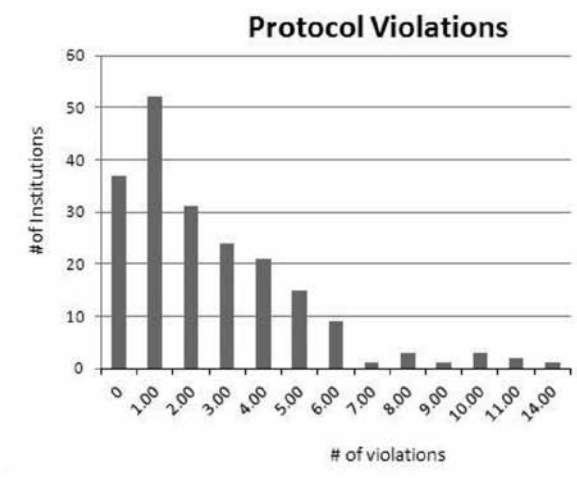
Purpose:
Optimization of care includes implementation of best practice guidelines that are designed to improve outcomes. However, there is a lack of benchmarks to assess Pediatricsurgical quality especially in cancer care. National guidelines exist for the surgical management of renal tumors in children. The purpose of this study was to evaluate the institutional rate of surgical protocol violations (SPV).

Methods:
Renal tumor study AREN03B2 open in 2006 and as of March 31, 2013, there were 3536 eligible patients. The surgical review forms for unilateral disease were reviewed for SPVs. The frequency, type, number of violations institutional prevalence, and quartiles are presented

Results:
Of the 3536 cases there were a total of 505 SPVs, for an overall incidence of 14.28%. The types of SPVs included a lack of lymph node sampling in 365 (73.0%)), avoidable spill in 61 (12.0%), biopsy immediately before nephrectomy in 89 (17.6%), an incorrect abdominal incision 32 (6.3%), and unnecessary resection of organs in 17 (3.3%). The SPVs occurred in 163/215 institutions (75.8%). For each center, the mean SPVs reported was 3.10 ± 2.38. The incidence of protocol violation per institution ranged from (0 to 67%). Centers with =1 case/year had 12.01± 2% incidence of SPV, those with 2 to 3 cases/year 17.1 ± 1.2% and those with =4 cases had 13.8 ± 1%.

Conclusions:
Despite several decades of education, a majority of institutions continue to have protocol violations in the surgical care of renal tumor patients. These violations potentially results in additional exposure to chemotherapy or radiation therapy.

SCIENTIFIC SESSION II (CONT.)



NOTES:

SCIENTIFIC SESSION II (CONT.)

14

PULMONARY RESECTION IN CHILDREN AND ADOLESCENTS WITH OSTEOSARCOMA — IS IT STILL HELPFUL WHEN METASTATIC DISEASE IS NOT LIMITED TO THE LUNGS

Austen Slade, BS[1], Carla L. Warneke, MS[2], Dennis P. Hughes, MD, PhD[2], Pamela A. Lally, MD[1], Kevin P. Lally, MD, MS[1], Andrea Hayes-Jordan, MD[2], Mary T. Austin, MD, MPH[2].

[1]The University of Texas Medical School at Houston, Houston, TX, USA, [2]The University of Texas MD Anderson Cancer Center, Houston, TX, USA.

Purpose:
To evaluate the impact of concurrent extra-pulmonary metastatic disease on overall (OS) and event-free survival (EFS) for pediatric osteosarcoma patients undergoing pulmonary metastatectomy.

Methods:
We retrospectively reviewed all patients < 21 years old who received pulmonary metastatectomy for osteosarcoma at our institution between January 1, 2001 and December 31, 2011 (n=76). We compared OS and EFS between patients with metastases limited to the lungs (Group A, n=58) to those with extra-pulmonary metastases (Group B, n=18) at the time of first pulmonary metastatectomy. Kaplan-Meier survival curves were compared using log -rank test. Cox proportional hazards regression analysis was used to determine independent predictors of survival. Statisticalsignificance is defined as $P<0.05$.

Results:
The median age at diagnosis was 14.4 years (range 4-20 years). The estimated median OS and EFS from first pulmonary metastatectomy were 2.0 years (95% CI 1.5, 2.8 years) and 5.5 months (95% CI 3.0, 8.1 months), respectively. Fifty-five patients (72%) died due to progression of metastatic disease. Median OS was significantly greater for Group A (2.6 years, 95% CI 1.9, 3.8) compared to Group B patients (0.9 years, 95% CI 0.6, 1.4) (log rank $p<0.0001$). Median EFS was significantly greater for Group A (7.9 months, 95% CI 5.0, 10.7) compared to Group B patients (1.6 months, 95% CI 0.8, 2.7) (log rank $p<0.0001$). There were no long-term survivors in Group B. Independent predictors of death included extra-pulmonary metastatic disease at the time of first thoracotomy (HR 3.1, 95%CI 1.7,5.7), bilateral pulmonary metastases (HR 3.0, 95% CI 1.7,5.3), and > 4 nodules resected at first thoracotomy (HR 2.8, 95% CI 1.7,4.9) (all $p<0.001$).

Conclusions:
Osteosarcoma patients with concurrent extra-pulmonary metastatic disease at the time of pulmonary metastatectomy have significantly worse survival compared to those with disease limited to the lungs. Pulmonary metastatectomy should only be considered in a select group of osteosarcoma patients.

NOTES:

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COMPLETE RESECTION OF HIGH-RISK NEUROBLASTOMA WITH METASTATIC DISEASE: A PROPENSITY ANALYSIS

Brian R. Englum , Paul J. Speicher, MD, Asvin M. Ganapathi, MD, Anthony W. Castleberry, MD, Timothy A. Driscoll, MD, Susan G. Kreissman, MD, Henry E. Rice, MD.
Duke University Medical Center, Durham, NC, USA.

Purpose:
With mortality near 50% and existing studies reporting conflicting results, surgical therapy for high-risk neuroblastoma (NB) remains an important and controversial subject. Using the National Cancer Data Base (NCDB), we evaluated the benefit of complete surgical resection for this disease.

Methods:
The NCDB collects data from more than 80% of cancers in the United States. Children with high-risk NB, defined as metastatic disease at the time of diagnosis, from 2004-2006 were analyzed. Patients were divided into two cohorts, complete primary tumor resection (CR) and less than CR (<CR). Log-Rank Test and Kaplan-Meier survival curves before and after propensity analysis with inverse probability weighting were used to assess overall survival (OS).

Results:
Of more than 6,000 patients with neuroblastoma in NCDB, 566 met inclusion criteria, with 135 (23.9%) undergoing CR. Children with CR were older (Age<1: 15.6% vs. 25.5%; p=0.025), more likely to have periadrenal tumors (97.0% vs. 79.6%; p<0.001), and showed a trend towards larger tumors (Table). 5-year mortality was 38.6% and 49.6% (p=0.055) for CR and <CR, respectively. CR patients trended toward improved OS (p=0.092), and after propensity analysis adjustment, the improvement in OS was significant (p=0.008; Figure).

Conclusions:
In the largest study of surgical treatment for high-risk NB to date, we demonstrate the value of CR for this disease and establish the importance of adjusted analysis in comparative effectiveness studies of NB. While these results strongly support continued use of aggressive surgical resection, further studies using large, NB - specific datasets are needed to guide surgical decisions.

SCIENTIFIC SESSION II (CONT.)

Table. Patient and tumor characteristics in neuroblastoma with metastatic disease by complete resect				
Variable	Overall	Less than CR	CR	P-value
N	566	431 (76.1%)	135 (23.9%)	
Age less than 1 yr 1 yr 2-5 yrs > 5 yrs	- 131 (23.1%) 90 (15.9%) 277 (48.9%) 68 (12%)	- 110 (25.5%) 63 (14.6%) 202 (46.9%) 56 (13%)	- 21 (15.6%) 27 (20%) 75 (55.6%) 12 (8.9%)	0.025
Tumor size < 3 cm 3-5.9 cm 6-9.9 cm ≥10 cm	- 31 (8.2%) 96 (25.4%) 136 (36%) 115 (30.4%)	- 25 (9.1%) 77 (28.1%) 90 (32.8%) 82 (29.9%)	- 6 (5.8%) 19 (18.3%) 46 (44.2%) 33 (31.7%)	0.082
Location of primary Periadrenal Other	- 474 (83.7%) 92 (16.3%)	- 343 (79.6%) 88 (20.4%)	- 131 (97%) 4 (3%)	<0.001
1-year mortality	77 (14.5%)	63 (15.7%)	14 (10.8%)	0.212
5-year mortality	213 (46.8%)	169 (49.6%)	44 (38.6%)	0.055

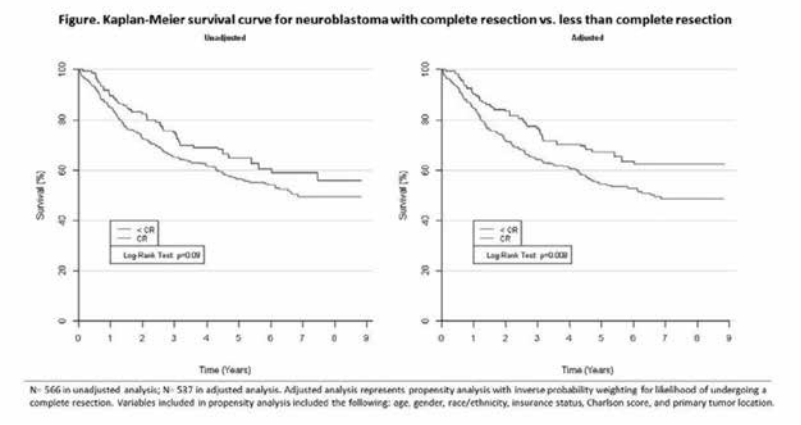

Figure. Kaplan-Meier survival curve for neuroblastoma with complete resection vs. less than complete resection

N= 566 in unadjusted analysis; N= 587 in adjusted analysis. Adjusted analysis represents propensity analysis with inverse probability weighting for likelihood of undergoing a complete resection. Variables included in propensity analysis included the following: age, gender, race/ethnicity, insurance status, Charlson score, and primary tumor location.

NOTES:

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MYCN DEREGULATION MODELS TUMOR INITIATION IN HUMAN NEURAL CREST STEM CELLS

Daniela Bashllari, BS, Fujia Lu, PhD, Elizabeth Lawlor, MD, PhD, Anthony Opipari, MD, PhD, Valerie Castle, MD, **Erika Newman, MD.**
The University of Michigan, Ann Arbor, MI, USA.

Introduction:
Neuroblastoma (NB) is an embryonic cancer of neural crest lineage. The transcription factor MYCN is an important regulator of progenitor cell proliferation and differentiation. Current understanding of MYCN tumorigenicity derives from studies in the transgenic mouse where MYCN overexpression in neuroectodermal cells leads to NB. To better understand how MYCN contributes to tumorigenesis, we hypothesized that MYCN deregulation during early human neural crest stem cell (NCSC) differentiation is a critical component of tumor initiation.

Methods:
Human embryonic stem cells (hESC) were grown in NCSC differentiation culture on a feeder layer of mouse embryonic fibroblasts. Using FACS and immunocytochemistry, we generated p75 and HNK1+ human neural crest neurospheres. Sorted cells were transduced with an inducible MYCN cDNA construct. We then tested the consequences of manipulating the expression MYCN on NCSC proliferation, migration, motility, and differentiation using multiple molecular assays. All experiments were repeated independently three times and results were analyzed with ANOVA.

Results:
NCSC-MYCN+ cells had growth factor independent proliferation that was twice that of NCSC as measured by trypan blue exclusion. NCSC-MYCN+ cells plated on a transwell membrane displayed significantly faster migration rates at 6, 12, and 24hrs. Cell motility as measured by a gap-closure assay showed that NCSC-MYCN+ cells moved more quickly to close the gap than did NCSC. Time -lapse analysis showed that NCSC-MYCN+ appeared to move in a cohesive sheet with complete gap closure by 8 hrs. NCSC-MYCN+ cells remained undifferentiated while control NCSC underwent spontaneous differentiation with cell elongation, neuronal projections and loss of p75 by day 14.

SCIENTIFIC SESSION II (CONT.)

Conclusion:
Our results demonstrate progress towards establishing the 1st human model of neuroblastoma development using hESC and further implicate MYCN in early NCSC tumor initiation. These data suggest that dysregulation of a single gene in normal NCSC is sufficient to cause phenotypic changes typical of neuroblastoma pathogenesis.

NOTES:

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LAPAROSCOPIC VERTICAL SLEEVE GASTRECTROMY SIGNIFICANTLY IMPROVES SHORT TERM WEIGHT LOSS AS COMPARED TO LAPAROSCOPIC GASTRIC BAND PLACEMENT IN MORBIDLY OBESE PEDIATRIC PATIENTS.

Felipe E. Pedroso, M.D., Jeffrey Gander, M.D., Pilyung Stephen Oh, M.D., Jeffrey L. Zitsman, M.D.

New York Presbyterian Hospital -Columbia University Medical Center, Dept of Surgery, Division of Pediatric Surgery, New York, NY, USA.

Purpose:
The incidence of morbidly obese adolescents has significantly increased, and bariatric surgery has shown to be an effective weight loss treatment in this population. We compared the degree of weight loss exhibited by laparoscopic gastric band (LAGB) placement to laparoscopic vertical sleeve gastrectomy (VSG).

Methods:
A single institution, retrospective evaluation of a prospectively collected database of LAGB and VSG procedures between the years 2006-2013 was performed.

Results:
A total of 152 morbidly obese patients underwent bariatric surgery at our institution between2006-2013. 128 patients underwent LAGB and 24 underwent VSG. There were no significant differences between VSG and LAGB groups on day of surgery for age (16.0 ± 1.2 vs. 16.9 ± 1.2, P=0.70), gender (P=0.99), preoperative weight (kg) (130.9 ± 18.9 vs. 135.6 ± 27.3, P>0.05), or BMI (47.5 ± 7.9 vs. 48.1 ± 8.2, P>0.05). Patients who underwent VSG vs. LAGB displayed significantly increased percent weight loss at 6 (21.0 ± 6.1 vs. 9.3 ± 6.0, P<0.0001), 12 (32.4 ± 8.9 vs. 12.1 ± 8.3, P<0.0001) and 18 (34.6 ± 9.8 vs. 14.5 ± 9.8, P<0.0001) months as well as significant percent BMI reduction at 6 (21.0 ± 7.5 vs. 9.3 ± 6.1, P<0.0001), 12 (34.1 ± 8.9 vs. 12.6 ± 8.9, P<0.0001), and 18 (35.4 ± 10.4 vs. 14.8 ± 9.8 P<0.001) months. At 12 months, no VSG patients had regained their preoperative weight, while 4.7% (6/128) of LAGB patients had an average 3.6% weight gain. LAGB patients also had an increased complication rate.

Conclusion:
We have shown, for the first time, an overall improvement in short term weight loss with VSG as compared to LAGB. However, given our short follow up and small cohort of VSG patients, further studies with longer follow up and greater patients will be required to confirm these findings.

SCIENTIFIC SESSION II (CONT.)

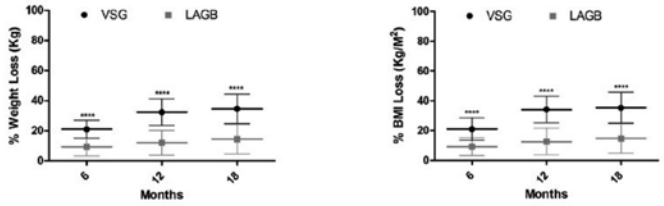

Figure 1: Laparoscopic vertical sleeve gastrectromy (VSG) significantly improves short term weight loss as compared to laparoscopic gastric band placement (LAGB).
****** = P < 0.0001**

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MINIMAL VS MAXIMAL ESOPHAGEAL DISSECTION AND MOBILIZATION DURING LAPAROSCOPIC FUNDOPLICATION: LONG-TERM FOLLOW-UP FROM A PROSPERCTIVE RANDOMIZED TRIAL

Amita A. Desai, MD , Hanna Alemayehu, MD, George W. Holcomb III, Shawn D. St. Peter, MD.

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

Purpose:
We have previously conducted a prospective randomized trial (PRT) from February 2006 to May 2008 comparing circumferential phrenoesophageal dissection and esophageal mobilization (MAX) to minimal dissection/ mobilization (MIN) which demonstrated that MIN dissection/mobilization decreased post-operative wrap herniation and the need for re-do operation. In this study, we provide long-term follow-up of the patients from our center who participated in the PRT.

Methods:
Parents of patients in the PRT were queried regarding symptoms, medication use, post-operative complications, and additional procedures. Medical records were reviewed. Student's t -test was used for continuous variables, and Fisher's exact was used for discrete variables using Chi-square with Yates correction where appropriate.

Results:
There were 58 MAX and 51 MIN patients from our center presumably alive, of which we were able to contact 39 MAX and 37 MIN patients at a mean follow-up of 6.6 years, and mean age of 8.3 yrs. Between early and late follow-up, a rise in the incidence of image proven herniation was noted in both groups (18% to 31% MAX vs 1.6% to 9.8% MIN). However, a 3 fold reduction in the MIN group remained (P=0.01). Re -operation rate at follow-up was 29% in MAX group compared to 6% in MIN group (P=0.01). Time to diagnosis of hernia was significantly longer in the MIN group (30±24 vs 15±10 months, P=0.04). There was a trend toward a longer time to reoperation in the MIN group (32±22 vs 15±11 months, P=0.06). Esophageal dilation was required in 50% of those who underwent re-do fundoplication compared to 2.1% that did not ($p<0.001$). Of the patients contacted, there was no significant difference between MIN and MAX group in reports of reflux symptoms or antacid use.

Conclusion:
Long -term follow-up continues to demonstrate a higher risk of wrap herniation with maximal esophageal dissection during laparoscopic fundoplication translates into more re-do operations.

NOTES:

SCIENTIFIC SESSION III

Scientific Session III
Surgical Quality: Are We Doing What We Think We Are?
Saturday, May 31, 9:00 a.m. – 10:30 a.m.

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SURGICAL WOUND MISCLASSIFICATION: A MULTICENTER EVALUATION

Shauna M. Levy, MD[1], Kevin P. Lally, MD, MS[1], Martin L. Blakely, MD, MS[2], Casey M. Calkins, MD[3], Sid Dassinger, MD[4], Eileen Duggan, MD[2], Eunice Y. Huang, MD, MS[5], Akemi L. Kawaguchi, MD[6], Monica E. Lopez, MD[7], Robert T. Russell, MD, MPH[8], Shawn D. St. Peter, MD[9], Christian J. Streck, MD[10], Adam M. Vogel, MD[11], KuoJen Tsao, MD[1], for the Pediatric Surgical Research Collaborative[1].

[1]Children's Memorial Hermann Hospital, University of Texas Health Science Center at Houston, Houston, TX, USA, [2]Vanderbilt Children's Hospital, Vanderbilt University Medical Center, Nashville, TN, USA, [3]Children's Hospital of Wisconsin, Medical College of Wisconsin, Milwaukee, WI, USA, [4]Arkansas Children's Hospital, University of Arkansas for Medical Sciences, Little Rock, AR, USA, [5]Le Bonheur Children's Hospital, The University of Tennessee Health Science Center, Memphis, TN, USA, [6]Children's Hospital Los Angeles, Keck Medical Center of USC, Los Angeles, CA, USA, [7]Texas Children's Hospital, Baylor College of Medicine, Houston, TX, USA, [8]Children's of Alabama, University of Alabama Birmingham School of Medicine, Birmingham, AL, USA, [9]Children's Mercy Hospital, University of Missouri - Kansas City School of Medicine, Kansas City, MO, USA, [10]MUSC Children's Hospital, Medical University of South Carolina, Charleston, SC, USA, [11]St. Louis Children's Hospital, Washington University School of Medicine, St. Louis, MO, USA.

Purpose:
Hospitals, quality collaborative and third party payers use surgical wound class (SWC) to stratify surgical site infection (SSI) risk. The validity of SWC is questionable and mainly evaluated in single institution studies. We hypothesized that the official SWC assignment in the electronic medical record (EMR) is often inaccurate and that the inter-hospital accuracy varies.

Methods:
The accuracy of SWC from the EMR was assessed for eight operations at 11 children's hospitals. After IRB approval, a maximum of 25 consecutive cases without concomitant procedures for each pre -selected operation during 2011 were selected for review. The NSQIP-SWC algorithm was used by surgeon reviewers to determine the SWC from the operative note for each case. Concordance between SWC from the EMR and surgeon reviewer was evaluated. Discordance was quantified by evaluating the number of classes between each SWC method. ?2 analysis was utilized.

Results:
2034 cases were included. Overall, SWC in the EMR was concordant with SWC determined by study surgeon in 1149 (56%) cases, with significant differences across institutions (median 58% concordance, range 47-66%;

SCIENTIFIC SESSION III (CONT.)

p<0.05). Inguinal hernia repair had the highest median concordance (92%); appendectomy the lowest (12%). EMR and reviewer SWC differed by up to three classes for appendectomy and incision and drainage procedures.

Conclusions:
SSI risk-stratification by SWC appears unreliable due to the inaccuracy of SWC and the wide variability of this measure. SWC should not be used for SSI risk stratification unless its accuracy and inter -institutional variability is improved. The scope/magnitude was determined by a surgical research collaborative addressing a clinical question by allowing increased sample size and study efficiency, resulting in generalizability

Operation	Median (Range) Institutional Concordance	Concordant Cases	1 Class Discordance	2 Class Discordance	3 Class Discordance
Appendectomy (N=275)	12% (0-28%)	31 (11%)	147 (53%)	79 (29%)	18 (7%)
Fundoplication (N=238)	46% (40-84%)	127 (53%)	110 (46%)	1 (0%)	0
Gastric Tube (N=275)	56% (32-100%)	176 (64%)	94 (34%)	5 (2%)	0
Incision and Drainage (N=217)	59% (12-100%)	114 (53%)	41 (19%)	44 (20%)	18 (8%)
Inguinal Hernia Repair (N=275)	92% (64-100%)	239 (87%)	26 (9%)	10 (4%)	0
Laparoscopic Cholecystectomy (N=275)	40% (8-68%)	101 (37%)	141 (51%)	33 (12%)	0
Pyloromyotomy (N=272)	83% (32-100%)	202 (74%)	69 (25%)	1 (0%)	0
Stoma Takedown (N=207)	83% (0-100%)	159 (77%)	46 (22%)	2 (1%)	0
Total (N=2034)	58% (47-66%)	1149 (56%)	46 (22%)	175 (9%)	36 (2%)

NOTES:

SCIENTIFIC SESSION III (CONT.)

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RECENT TRENDS IN THE OPERATIVE EXPERIENCE OF JUNIOR PEDIATRIC SURGEONS: A STUDY OF APSA APPLICANT CASE LOGS

Christopher A. Behr, M.D.[1], Anthony J. Hesketh, M.D., M.S.[1], Meredith Akerman, M.S.[1], Stephen E. Dolgin, M.D. [2], Robert A. Cowles, M.D. [3].

[1]The Feinstein Institute for Medical Research, Manhasset, NY, USA, [2]Steven and Alexandra Cohen Children's Medical Center, New Hyde Park, NY, USA, [3]Yale School of Medicine, New Haven, CT, USA.

Purpose:
Pediatric surgical education and workforce have changed significantly in the past decade. To document trends in the operative experiences of junior pediatric surgeons, we examined case logs submitted by applicants for membership to APSA.

Methods:
Case logs for 172 APSA membership applicants from 2006-2013 were reviewed. One hundred forty seven (85%) subjects were in practice < 5 years. Total case volume, case categories, and specific common and index operations were analyzed. Negative binomial regression was used to assess significant associations between the number of cases and the application year, presence of a pediatric surgery training program, region of the country, and years since completion of fellowship. Significance was considered at $p<0.05$.

Results:
Overall case numbers decreased since 2006/2007, and similar trends were seen in specific cases/categories (Table 1). The number of newborn cases did not change. Significant variations in operative experience were identified depending upon region, presence of pediatric surgery training program, and years since fellowship completion. Median reported value for several index cases was = 4 per year, including: gastroschisis/omphalocele (4.0/year), anorectal malformations (3.0/year), malrotation (3.0/year), orchidopexy (3.0/year), Hirschsprung's disease (2.0/year), CDH (2.0/year), intestinal atresia (2.0/year), esophageal atresia (1.1/year), and chest wall deformity (0.9/year). The median for the following cases was zero: choledochal cyst, portoenterostomy, neuroblastoma and sacrococcygeal teratoma.

Conclusions:
These data describing the experience of young pediatric surgeons supplement recent observations regarding pediatric surgery fellows and general surgery residents. The minimal exposure of young surgeons to particularly rare conditions appears to be one of a number of unresolved problems. This information will be useful in developing future workforce proposals.

SCIENTIFIC SESSION III (CONT.)

Table 1 - Select cases as reported by 2006-2013 APSA new member applicants (median cases/year)

	2006-2007 (n=12)	2008 (n=17)	2009 (n=29)	2010 (n=46)	2011 (n=34)	2012-2013 (n=34)
All cases (p<0.05)	584.1	397.3	416.5	404.4	372.0	398.7
All antireflux cases (p<0.01)	12.7	9.0	7.0	5.2	6.2	5.5
Antireflux operation, open (p<0.0001)	5.3	1.0	0.0	1.0	0.0	0.9
Pyloromyotomy (p<0.001)	21.1	11.0	6.7	8.9	8.6	7.2
Omphalocele / gastroschisis (p<0.01)	5.0	5.0	5.0	5.0	3.5	3.8
Inguinal herniorrhaphy/ hydrocelectomy (p<0.0001)	56.3	46.9	38.9	32.0	25.5	27.5
Orchidopexy (p<0.05)	7.0	2.0	4.0	3.0	2.4	2.1
Repair deformity of chest wall (p<0.01)	1.1	1.0	1.9	0.3	0.0	0.9
Other abdominal (p<0.01)	99.4	100.7	97.3	80.5	66.0	77.8

NOTES:

SCIENTIFIC SESSION III (CONT.)

21

EARLY VERSUS DELAYED REPAIR FOR NEONATAL INGUINAL HERNIA

Jason P. Sulkowski, MD [1], Jennifer N. Cooper, PhD[1], Eileen M. Duggan, MD[2], Ozlem Balci, MD[3], Seema Anandalwar[4], Martin L. Blakely, MD, MS[2], Kurt Heiss, MD[3], Shawn J. Rangel, MD, MSCE[4], Peter C. Minneci, MD, MHSc[1], Katherine J. Deans, MD, MHSc[1].

[1]Nationwide Children's Hospital, Columbus, OH, USA, [2]Monroe Carell Jr Children's Hospital, Nashville, TN, USA, [3]Children's Hospital of Atlanta, Atlanta, GA, USA, [4]Children's Hospital Boston, Boston, MA, USA.

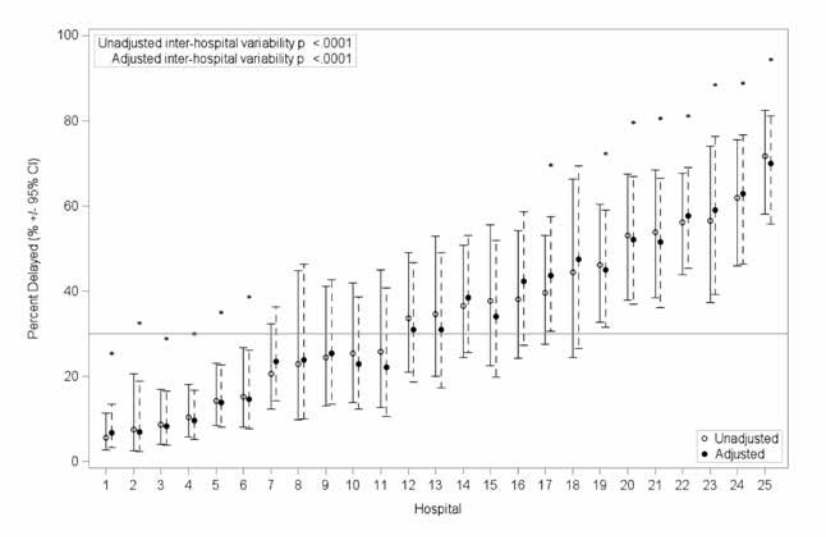
Purpose:
Management of inguinal hernias (IH) diagnosed in hospitalized neonates remains controversial with both early and delayed repair having unique risks and benefits. Our objective was to characterize practice variability and compare rates of serious adverse events (SAE), including recurrence and incarceration.

Methods:
Patients admitted to neonatal intensive care units with a diagnosis of IH at 25 children's hospitals participating in the Pediatric Health Information System from 1999-2011 were identified. Exclusion criteria included IH repair after 1 year of age or having another concurrent surgical procedure. Repair during initial hospitalization was considered "early" and at a subsequent encounter was considered "delayed". Inter-hospital variability in the proportion of delayed repairs was determined using an adjusted logistic mixed effects model. Differences in rates of SAEs, including IH-related emergency department visits; urgent/emergent repair; post-operative mechanical Ventilation; vasopressor support; need for reoperation; and in-hospital death were determined within 1 year of IH diagnosis.

Results:
Of the 2,030 patients identified, 32.9% underwent delayed IH repair. The proportion of patients with delayed repair varied widely across hospitals ($p<0.0001$, Figure). Compared to the early group, more patients in the delayed group were male, had a congenital anomaly, received mechanical ventilation, parenteral nutrition, and blood transfusions prior to IH repair (all $p<0.01$). The overall SAE rate was similar between groups (41% vs. 40%, $p=0.29$); however, more patients in the early group underwent reoperation for hernia within 1 year after initial repair (5.9% vs. 3.7%, $p=0.04$). In the delayed group, 8.2% had a diagnosis of incarceration at repair.

Conclusions:
Wide variability in the timing of neonatal hernia repair exists across hospitals. Early repair has an increased rate of reoperation, while delayed repair has a non-trivial rate of incarceration. Confirmatory chart validation and matched analyses are planned. A multi -institutional randomized trial may be necessary to determine optimal timing of repair.

SCIENTIFIC SESSION III (CONT.)



NOTES:

SCIENTIFIC SESSION III (CONT.)

22

TIMING OF LADD'S PROCEDURE IN PATIENTS WITH CRITICAL CONGENITAL HEART DISEASE

Jason P. Sulkowski, MD [1], Jennifer N. Cooper, PhD[1], Eileen M. Duggan, MD[2], Ozlem Balci, MD[3], Seema Anandalwar[4], Martin L. Blakely, MD, MS[2], Kurt Heiss, MD[3], Shawn J. Rangel, MD, MSCE[4], Katherine J. Deans, MD, MHSc[1], Peter C. Minneci, MD, MHSc[1].

[1]Nationwide Children's Hospital, Columbus, OH, USA, [2]Monroe Carell Jr Children's Hospital, Nashville, TN, USA, [3]Children's Hospital of Atlanta, Atlanta, GA, USA, [4]Children's Hospital Boston, Boston, MA, USA.

Purpose:
The optimal timing of Ladd's procedure for malrotation without volvulus in patients with critical congenital heart disease (CHD) is unknown. Our objective was to characterize practice variability and determine if timing of Ladd's procedure in this population affects rates of volvulus, intestinal loss, or death.

Methods:
Patients with critical CHD (cardiac surgical procedure by 1 year of age) and malrotation diagnosed during their initial admission at 34 of the hospitals contributing to the Pediatric Health Information System between 2004-2009 were included for analysis. Ladd's procedures performed during the first admission were classified as "early" and those performed at a subsequent admission were classified as "delayed". Inter-hospital variability in the timing of Ladd's procedure was determined using an adjusted logistic mixed effects model. Post-operative outcomes were compared between the two groups. Multi-institutional chart review validation was performed.

Results:
Of the 324 patients identified, 85.2% underwent an early Ladd's procedure. Chart validation confirmed 100% accuracy of diagnosis and treatment group assignment. There was significant variability in the proportion of delayed Ladd's procedures performed among hospitals ($p<0.0001$). Baseline characteristics including the severity of CHD and rates prematurity and non-cardiac anomalies were similar between the groups. Post-operative outcomes are shown in the table. In the delayed group, 13 patients underwent their Ladd's procedure during an urgent or emergent admission, but none had volvulus or underwent intestinal resection. Mortality and readmission rates were higher in the early group.

SCIENTIFIC SESSION III (CONT.)

Conclusions:

Outcomes Following Ladd's Procedure in Patients with Critical Congenital Heart Disease				
Variable	Total Cohort (N=324)	Early Ladd's (N=276)	Delayed Ladd's (N=48)	Early vs. Delayed p-value
Volvulus at subsequent admission within 1 year after malrotation diagnosis	4 (1.2)	4 (1.4)	0 (0)	1.0
Intestinal resection at subsequent admission after malrotation diagnosis to 1 year after Ladd's	15 (4.6)	15 (5.4)	0 (0)	0.14
Died at Ladd's admission	32 (9.9)	31 (11.2)	1 (2.1)	0.06
Died in-hospital within 1 year of malrotation diagnosis	43 (13.3)	41 (14.9)	2 (4.2)	0.04
Readmitted within 30 days	71 (21.9)	66 (23.9)	5 (10.4)	0.04
Readmitted within 1 year	228 (70.4)	201 (72.8)	27 (56.3)	0.02

NOTES:

SCIENTIFIC SESSION III (CONT.)

23

PRIORITIZING QUALITY IMPROVEMENT IN PEDIATRIC GENERAL SURGERY: INSIGHT FROM THE PEDIATRIC NATIONAL SURGICAL QUALITY IMPROVEMENT PROJECT

Anne M. Stey, MD, MSc[1], R. Lawrence Moss, M.D. [2], Bruce Lee Hall, MD PhD MBA [3], Charles Vinocur, MD[4], Kari Kraemer, PhD[3], Mark E. Cohen, PhD[3], Clifford Y. Ko, MD MS MSHS[3], Shawn J. Rangel, MD, MSCE[5].

[1]University of California Los Angeles, los angeles, CA, USA, [2]Nationwide Children's Hospital, Columbus, OH, USA, [3]American College of Surgeons National Surgery Quality Improvement Program, Chicago, IL, USA, [4]Nemours /Alfred I duPont Hospital for Children, Wilmigton, DE, USA, [5]Boston Children's Hospital, Boston, MA, USA.

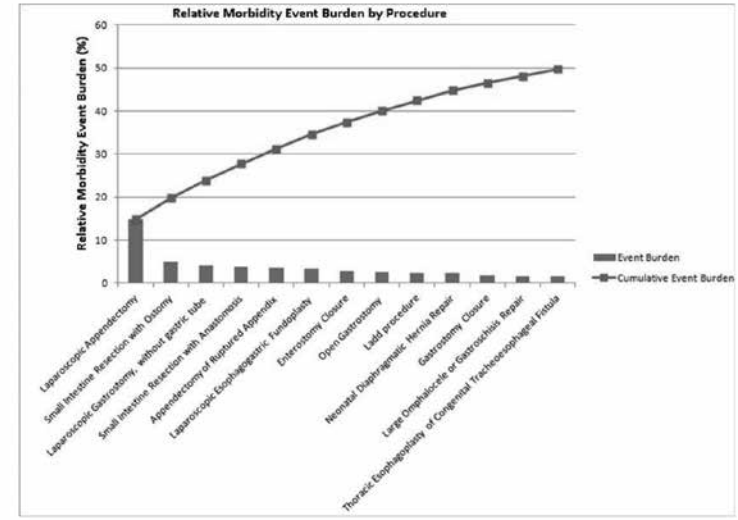
Introduction:
Pediatric surgical procedures which account for the greatest relative burden of morbidity and mortality have not been characterized and may provide high-priority targets for quality improvement efforts. The goal of this study was to identify these high-burden procedures using standardized, prospectively collected outcomes data from the National Surgical Quality Improvement Program-Pediatric (NSQIP-P).

Methods:
We analyzed 30-day morbidity and mortality for children undergoing general surgical procedures captured in 50 NSQIP-P hospitals during 2011-2012. A procedure's morbidity event burden was the number of morbidities detected within that procedure's volume divided by the total number of morbidities from all procedures. Mortality event burden was calculated for each procedure using the same approach.

Results:
During the two year period, 35,339 children undergoing 309 procedures were captured by NSQIP-P. The cumulative event burden was 2,760 morbidities and 153 mortalities. Thirteen procedures (4.2%) accounted for 51% of morbidity events, with the greatest relative burden attributable to laparoscopic appendectomy (14.9% of all morbidity events), small bowel resection with ostomy (4.9%), laparoscopic gastrostomy (4.1%), and small bowel resection with anastomosis (3.8%) (Figure). Six procedures (1.9%) accounted for 50% of all deaths, with the greatest burden attributable to small bowel resection with ostomy (13.7% of all deaths), small bowel resection with anastomosis (5.9%), and congenital diaphragmatic hernia repair (5.2%). By organ system, gastrointestinal procedures contributed the greatest relative burden of morbidity (77% of all morbidity events) and mortality (50% of all deaths).

SCIENTIFIC SESSION III (CONT.)

Conclusion:
A relatively small number of procedures account for the majority of morbidity and mortality in the NSQIP-P cohort. These findings provide a data -driven framework for the prioritization of quality improvement efforts around high-risk surgical procedures.



NOTES:

SCIENTIFIC SESSION III (CONT.)

24

CURRENT TRENDS IN THE SURGICAL TREATMENT OF PEDIATRIC OVARIAN TORSION: WE CAN DO BETTER

Danielle M. Austin [1], Owen Kahn[1], Melissa C. McCann[2], Trudy J. Lerer[2], Kyle Lee[2], Shefali Thaker [2], Katherine W. Herbst[2], Christine M. Rader [1], Brendan T. Campbell[1].

[1]Connecticut Children's Medical Center and University of Connecticut School of Medicine, Hartford, CT, USA, [2]Connecticut Children's Medical Center, Hartford, CT, USA.

Introduction:
Current literature strongly recommends ovarian preservation for pediatric patients with ovarian torsion. The purpose of this study was to evaluate national trends in the surgical management of pediatric ovarian torsion and to compare outcomes between pediatric surgeons (PED) and gynecologists (GYN).

Methods:
We queried Pediatric Health Information System (PHIS) data from 44 children's hospitals from January 2007 through December 2011. Patient inclusion criteria was age <18 years, female gender, diagnosis code for ovarian torsion, and procedure code for an ovarian surgical procedure. Patients with malignant disease were excluded. Outcomes were compared between pediatric general surgeons and gynecologists. All cases readmitted within one year of their procedure were reviewed. Data analysis was performed using Statistical Package for Social Scientists (SPSS).

Results:
One thousand one hundred and fifty-one patients that underwent surgical treatment for ovarian torsion and benign ovarian disease were identified. Mean age was 10.7 ± 4.1 years with a bimodal distribution peaking at 0 and 12 years. The majority of patients were treated using an open approach (n = 868, 75%). More than one- third (n = 398, 34.6%) of patients underwent oophorectomy. Concurrent oophoropexy (2.6%) and incidental appendectomy (0.2%) were infrequently performed. Pediatric surgeons performed the majority of procedures (81%) and were more apt to use a laparoscopic approach (PED 27% vs. GYN 17%, $p < .05$). Gynecologists were more likely to conserve ovarian tissue (PED 38% vs. GYN 27%, $p < .01$), and less likely to administer antibiotics for this clean procedure (PED 61% vs. GYN 29%, $p < .001$). The overall reoperation rate was 5.1% and did not differ significantly by subspecialty (PED 4.4% vs. GYN 7.8%).

Conclusions:
These data demonstrate that there is a significant opportunity for both pediatric surgeons and gynecologists to improve ovarian salvage rates and to reduce unnecessary antibiotic utilization for children with ovarian torsion.

NOTES:

SCIENTIFIC SESSION III (CONT.)

25

DECREASED MORTALITY FROM PARENTERAL NUTRITION-ASSOCIATED LIVER DISEASE IN PAIR -MATCHED INFANTS TREATED WITH PARENTERAL FISH OIL

Prathima Nandivada, MD, Kathleen M. Gura, PharmD, Mark Puder, MD, PhD.
Boston Children's Hospital, Boston, MA, USA.

Purpose:
Studies demonstrating the benefits of parenteral fish-oil (FO) therapy for the treatment of parenteral nutrition-associated liver disease (PNALD) have been criticized for the lack of well-matched controls. The purpose of this study is to determine if mortality is decreased in infants treated with parenteral FO compared to infants treated with parenteral soybean oil (SO), when matched for established risk factors in infants with intestinal failure and PNALD.

Methods:
178 patients treated with parenteral FO for PNALD from 2004 to 2012 at a tertiary-care center were identified. PNALD was defined by at least two consecutive direct bilirubin levels greater than 2mg/dL. Infants were matched for direct bilirubin level at initiation of FO, age at initiation of FO, and gestational age. Study endpoints included mortality from liver failure, resolution of cholestasis (defined as a direct bilirubin less than 2 mg/dL), and time to resolution of cholestasis. Statistical analysis was performed using McNemar's test and the student's t -test.

Results:
31 pairs of infants were successfully matched. No deaths occurred in the patients treated with parenteral FO, while 19.4% of infants treated with parenteral SO died ($p<0.001$). Resolution of cholestasis was achieved in 97% of infants treated with parenteral FO and 52% of infants treated with parenteral SO ($p=0.001$). Of the 15 pairs of infants that had resolution of cholestasis, cholestasis resolved more rapidly in the parenteral FO group than in the parenteral SO group (45.8 days versus 139.4 days, $p<0.001$).

Conclusions:
We conclude that parenteral FO therapy for infants with PNALD is associated with decreased mortality, increased rates of resolution of cholestasis, and a decreased time to resolution of cholestasis. These data suggest that the previously reported improvements in morbidity and mortality with FO therapy are likely due to the therapy itself and not a result of poorly matched controls.

NOTES:

SCIENTIFIC SESSION III (CONT.)

26

A DYNAMIC DISCHARGE PROTOCOL PROVIDES EFFICIENT CARE FOR UNCOMPLICATED APPENDICITIS

David E. Skarda, MD[1], **Kathy Schall, MD [1]**, Doug Barnhart, MD[1], Michael Rollins, MD[1], Rebecka Meyers, MD[1], Elizabeth Soukup, MD[1], Seth Andrews, MBA [2], Molly McFadden [3], Jared A. Olson, PharmD[2], Eric Scaife, MD[1].

[1]Division of Pediatric Surgery, Primary Children's Hospital, Salt Lake City, UT, USA, [2]Intermountain Healthcare, Primary Children's Hospital, Salt Lake City, UT, USA, [3]University of Utah School of Medicine, Division of Epidemiology, Salt Lake City, UT, USA

Purpose:
Postoperative management of uncomplicated appendicitis is highly variable and often includes an overnight stay in the hospital. We implemented a dynamic criteria -based discharge protocol designed to facilitate timely discharge for patients with uncomplicated appendicitis. We evaluated the effect of our protocol on length of stay (LOS), and total cost of care.

Methods:
After obtaining IRB approval, we implemented a dynamic criteria -based bedside nurse evaluation discharge protocol at our tertiary care children's hospital. Postoperatively, the bedside nurse evaluated patient's oral intake, pain control with oral medications and parent comfort with discharge. When all discharge criteria were met, the bedside nurse contacted the surgical team for discharge orders. We collected data on all patients with uncomplicated appendicitis at our institution following protocol implementation (May 1, 2012 to May 1, 2013) and compared them to a control group.

Results:
561 patients were treated for uncomplicated appendicitis (273 pre -, 288 post protocol). Following implementation of our protocol the percentage of patients with uncomplicated appendicitis discharged between the hours of 6:00 pm and 12:00 am increased from 11% to 27% ($p < 0.001$) and there was an overall reduction in LOS (including pre - and postoperative time) from 38 (95% CI 35-40) to 24 (95% CI 22-27) hours ($p < 0.001$). Total cost of care per patient also decreased from $5622 (95% CI $5416-$5836) pre -protocol to $4563 (95% CI $4399-$4732) following implementation ($p < 0.001$). There was no change in hospital readmission rate (3.1% pre -, 2.0% post protocol) or postoperative abscess rate (1.3% pre -, 0.9% post protocol).

Conclusion:
Criteria-based bedside nurse evaluation led to decreased LOS and total cost of care in patients with uncomplicated appendicitis. Reducing variability in postoperative care did not adversely affect clinical outcomes.

NOTES:

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HOME INTRAVENOUS VERSUS ORAL ANTIBIOTICS FOLLOWING APPENDECTOMY FOR PERFORATED APPENDICITIS, A RANDOMIZED CONTROLLED TRIAL

David A. Klima, **MD, Blair A. Wormer, MD**, Paul D. Colavita, MD, Chukwuma N. Eruchalu, Amanda L. Walters, MS, Graham H. Cosper, MD, B Todd Heniford, MD, Andrew M. Schulman, MD.

Carolinas Medical Center, Charlotte, NC, USA.

Purpose:
To compare the effect of home intravenous versus oral antibiotic therapy on complication rates and resource utilization following appendectomy for perforated appendicitis.

Methods:
IRB approved randomized controlled trial including patients aged 4-17 with surgically treated perforated appendicitis from 1/2011 - 9/2013. Perforation was defined as a hole in the appendix or intra -abdominal fecalith at time of operation, and further divided into three grades: I-contained perforation, II-localized contamination to right gutter/pelvis, III-diffuse contamination extending to left gutter/upper quadrants. One hundred thirty-seven consecutive patients underwent appendectomy for perforated appendicitis. All received IV ertapenem while inpatients. Postoperatively, 80(58%) were consented and randomized by perforation grade to complete a 10 day course of antibiotic therapy at home with either IV ertapenem via PICC line, or oral amoxicillin/clavulanate. Criteria for discharge included >24hrs without fever (>101.5º), tolerating diet, and pain control with oral medications. Thirty day postoperative complication rates including abscess, readmission, and wound infection, as well as hospital charges, were compared.

Results:
Forty -three (54%) patients were randomized to the IV group and 37(46%) to the oral group. IV patients were slightly older (12.4±3.5yrs v. 10.2±3.6yrs;$p<0.01$) with higher BMI(21±6 v. 18±4;$p<0.05$) than oral patients; however there were no differences in gender, race, comorbidities, temperature at admission(101.5º±1.6º v. 101.5º±1.5º;$p>0.05$), WBC count at admission(17.9±6.6 v. 16.8±4.8;$p>0.05$), or perforation grade (I-20.9% v. 24.3%, II-32.6% v. 35.1%, III-46.5% v. 40.5%;all $p>0.05$). When comparing IV to oral, there was no difference in operative approach(Laparoscopic-95.4% v. 91.7%, Open-2.3% v. 8.3%, Converted-2.3% v. 0;all $p>0.05$), length of stay(4.3±1.5days v. 4.2±1.9days;$p>0.05$), postoperative abscess rate(11.9% v. 8.3%;$p>0.05$), wound infection(0 v. 5.6%;$p>0.05$), or readmission rate(14.3% v. 16.7%;$p>0.05$). Total hospitalization charges were significantly higher for IV versus oral therapy ($42,049±$8,404 v. $34,029±$8,064; $p<0.0001$).

SCIENTIFIC SESSION III (CONT.)

Conclusions:
Oral antibiotics were as effective at preventing post-operative abscess and readmission, and incurred fewer hospital charges than intravenous antibiotics for completion of therapy following appendectomy for perforated appendicitis.

NOTES:

28

REDUCINGCT SCANS FOR APPENDICITIS BY INCREASING THE DIAGNOSTIC ACCURACY OF ULTRASONOGRAPHY

Jason W. Nielsen, MD[1], Laura Boomer, MD [1], Kelli Kurtovic, BS[1], Ryan Mallory, BA [2], Eric Lee, MD[1], Brent Adler, MD[1], Greg Bates, MD[1], Jennifer Cooper, PhD[1], Brian Kenney, MD[1].

[1]Nationwide Children's Hospital, Columbus, OH, USA, [2]Ohio State University College of Medicine, Columbus, OH, USA.

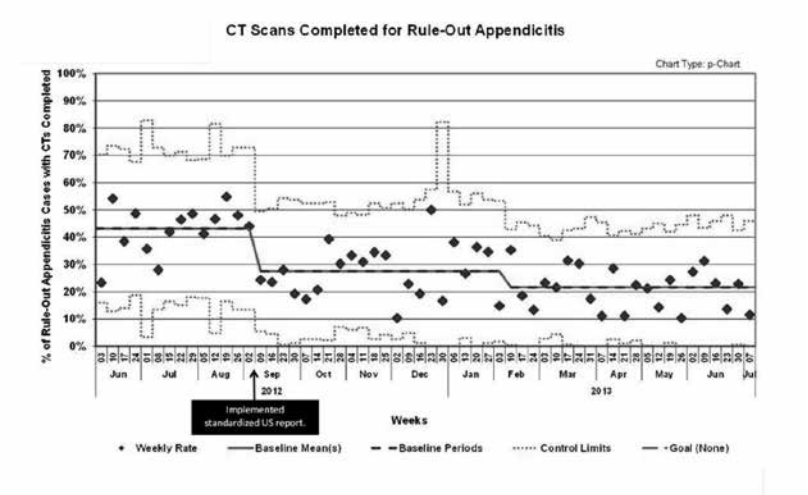
Purpose:
CT scans for appendicitis lead to increased cost and radiation exposure, whereas ultrasounds are often inconclusive and fail to visualize the appendix. In order to reduce the use of CT scans, we implemented a standardized ultrasound report based on validated signs of appendicitis to improve its diagnostic utility.

Methods:
As part of a quality improvement effort, we introduced a standardized ultrasound report in September 2012. Patients were definitively classified into four categories: 1. Normal appendix; 2. Appendix not fully visualized without secondary signs; 3. Appendix not fully visualized with secondary signs; 4. Appendicitis. Category 1 and 2 reports were considered negative for appendicitis; Category 3 and 4 reports were considered positive. Outcomes for patients undergoing ultrasound or CT scan for appendicitis between 9/1/2012 -7/7/2013 (Period B, n=1307) were compared to the 3 months prior to the standardized report (Period A, n=278). Data were analyzed using chi-square or Fisher's exact tests with a significance level of $p<0.05$.

Results:
In Period A, 76 of 278 (27.3%) patients had appendicitis versus 264 of 1307 (20.2%) in Period B. Patients per category in Period B were: Category 1 n=494, Category 2 n=550, Category 3 n=46, Category 4 n=214, and inconclusive n=3. Inconclusive exams decreased from 47.8% to 0.23% ($p<0.001$). Ultrasound sensitivity improved from 68.4% to 92.4% ($p<0.001$); specificity did not significantly change (97.0% to 98.3%, $p=0.26$). Negative predictive values of Category 1 and 2 reports were 96.7% and 99.6%. CT utilization for appendicitis decreased from 43% in Period A to 21.7% in the second half of Period B ($p<0.001$).

Conclusions:
Implementation of a standardized ultrasound report with definitive category selection based on validated secondary signs of appendicitis nearly eliminated inconclusive exams, improved diagnostic accuracy even when the appendix was not fully visualized, and resulted in decreased use of CT scans.

SCIENTIFIC SESSION III (CONT.)



NOTES:

29

A RISK -STRATIFIED COMPARISON OF FASCIAL VERSUS FLAP CLOSURE TECHNIQUES ON EARLY OUTCOMES OF INFANTS WITH GASTROSCHISIS

Claudia N. Emami, MD MPH, Fouad Youssef, MD, Robert J. Baird, MD CM MSc, Pramod Puligandla, MD MSc.

Montreal Children's Hospital, Montreal, QC, Canada.

Background:
While fascial closure is the traditional surgical management of gastroschisis (GS), flap closure (skin or umbilical cord) has gained popularity. We evaluated the early outcomes and complications of the fascial and flap techniques after stratifying patients by disease severity.

Methods:
A national, population -based gastroschisis data registry was analyzed from 2005-2011. We compared fascial to flap closures and stratified patients into low or high-risk groups using the validated Gastroschisis Prognostic Score (GPS), which evaluates bowel injury based on the severity/presence of bowel matting, atresia, necrosis and perforation at birth. Demographic and outcome data, including length of stay (LOS), complications and markers of resource utilization, were analyzed using Fisher's exact and Student's t -tests for categorical and continuous variables, respectively ($p<0.05$ significant).

Results:
Of 701 eligible GS cases, 76 were excluded due to missing closure method data. There were 435 fascial closures (343[78.8%] low-risk, 92 high-risk) and 128 flap closures (111[86.7%] low-risk, 17 high-risk; $p=0.06$). Demographics and birthweight did not differ between groups. In patients with low GPS scores (Table 1), flap closure demonstrated significant differences in resource utilization and failure of closure, with no differences in overall complication rates or wound infections. Analysis of high- risk patients revealed no statistically significant differences in outcomes, although a clinically important reduction in LOS was observed with flap closure (73.6 vs. 95.6 days; $p=0.44$).

Conclusion:
Flap closure was not associated with an increase in patient morbidity and seemed suitable as a definitive closure method for GS patients irrespective of disease severity. Furthermore, flap closure reduced several markers of resource utilization in patients with low-risk disease.

SCIENTIFIC SESSION III (CONT.)

	Fascial Closure (n=342)	Flap Closure (n=111)	
Use of GA	232 (67.6%)	31 (27.9%)	P<0.0001
Location of Closure (OR v NICU)	310:32	34:72	P<0.0001
Closure success	302 (87.8%)	107 (96.4%)	P<0.01
Length of stay	42.69	41.95	P=0.879
Complication rate (overall)	148 (43.1%)	43 (38.7%)	P=0.50
Wound Infection	38 (11.1%)	6 (5.4%)	P=0.096
Compartment syndrome	10 (2.9%)	1 (0.9%)	P=0.307
Days NPO	14.4	14.2	P=0.879
Days TPN	33.3	34.4	P=0.213

NOTES:

SCIENTIFIC SESSION IV

Scientific Session IV
Trauma and Critical Care
Saturday, May 31, 11:00 a.m. – Noon

30

SAFETY AND EFFICACY OF PERFLUBRON-INDUCED LUNG GROWTH IN NEONATES WITH CONGENITAL DIAPHRAGMATIC HERNIA: RESULTS OF A PROSPECTIVE, RANDOMIZED TRIAL

George B. Mychaliska, MD, **Benjamin S. Bryner, MD**, Ronald Dechert, DrPH, MSc, RRT, Jeannie Kreutzman, RN, MSN, CPNP, Michael Becker, RRT, Ronald B. Hirschl, MD.
University of Michigan, Ann Arbor, MI, USA.

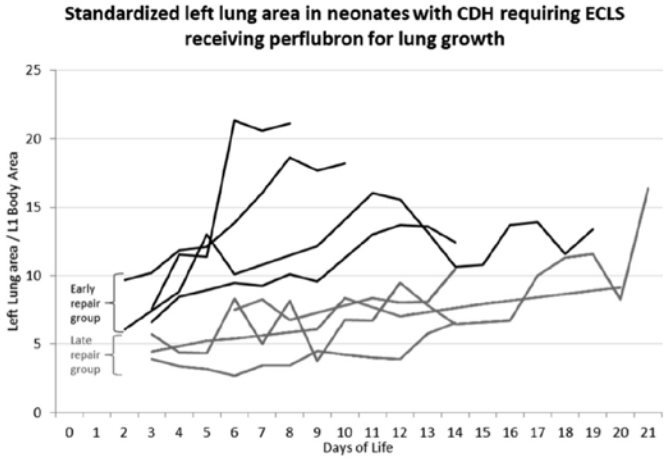
Purpose:
In perflubron-induced lung growth (PILG) therapy, mechanical transduction is used to stimulate lung growth. This study examined the safety and efficacy of PILG in neonates with congenital diaphragmatic hernia (CDH) requiring extracorporeal life support (ECLS).

Methods:
Infants with left-sided CDH requiring ECLS were eligible. Exclusion criteria included active air-leak, intracranial hemorrhage and major congenital anomalies. In the experimental arm, perflubron was instilled endotracheally and continuous positive airway pressure of 8mmHg was applied without ventilation. Chest x-rays were used to quantify lung size (standardized against L1 vertebral body area). Midway through the study period our group's practice shifted toward "early repair" (CDH repair during the first 1-2 days of ECLS).

Results:
Sixteen infants were enrolled with eight randomized to each arm. In the conventional-ventilation arm, ECLS run was 11.1 ± 3.7 days and six survived to discharge (75%). In the perflubron arm, ECLS run length was 17.8 ± 3.1 days, and four survived (50%). No adverse events related to perflubron occurred. Within the experimental group, four patients had "late repair" (15-19 days of life [DOL]) and four had early repair (2 -3 DOL) (figure). When compared to the "late repair" group, the "early repair" patients had similar total lung growth, but accelerated growth and shorter ECLS runs (table). Despite a more than doubling of left-sided lung area (126±33% increase), all four nonsurvivors succumbed with suprasystemic pulmonary hypertension.

Conclusions:
PILG is safe in neonates with CDH requiring ECLS. A doubling of lung size was seen on average, which was accelerated with early CDH repair. Interestingly, despite amelioration of pulmonary hypoplasia, pulmonary hypertension persisted and was a major contributor to mortality.

SCIENTIFIC SESSION IV (CONT.)



Outcomes and lung growth parameters for eight infants receiving perflubron in a trial of PILG.		
	"Late repair" group	"Early repair" group
Years of Birth	2006-2008	2009-2010
Days of Life at CDH Repair (range)	15-19	2-3
ECLS Run Length (days)	21.5 ± 4.8	14.0 ± 5.3
Duration of Perflubron Instillation (days)	13.8 ± 5.1	10.3 ± 5.1
Survival	2/4 (50%)	2/4 (50%)
Left Lung Growth (% increase)	128 ± 65%	136 ± 43%
Right Lung Growth (% increase)	66 ± 63%	66 ± 23%
Mean % Left Lung Growth Per Day of Perflubron Instillation	6.0 ± 1.0%	16.2 ± 16.0%
Mean % Right Lung Growth Per Day of Perflubron Instillation	1.1 ± 1.6%	3.7 ± 3.9%

NOTES:

SCIENTIFIC SESSION IV (CONT.)

31

CAROTID REPAIR POST-ECMO: PATENCY RATES AND DEVELOPMENTAL OUTCOMES

Eileen M. Duggan, MD , Amy Zhai, MD, Harish Krishnamoorthi, Melissa E. Danko, MD, Jamie Tice, BSN, Igor V. Voskresensky, MD, Daphne Hardison, BSN, John B. Pietsch, MD, Harold N. Lovvorn III, MD.

Vanderbilt University Medical Center, Nashville, TN, USA.

Purpose:

Infants who are placed on peripheral jugular/carotid veno-arterial extracorporeal membrane oxygenation (VA-ECMO) undergo either carotid repair or ligation at time of decannulation. Study aim: to evaluate patency rates after carotid repair and compare developmental outcomes between the repaired and the ligated groups.

Methods:

After IRB approval, a retrospective cohort study of our institutional ECMO Registry was completed. The cohort was comprised of all neonates without congenital heart disease (CHD) who had VA-ECMO between 1989 and 2012. Carotid patency was determined by review of imaging reports. Post-ECMO developmental testing was completed using the Developmental Assessment of Young Children (DAYC) test. Continuous variables were compared using the student's t -test or Wilcoxon rank-sum test. Categorical variables were compared using the chi-square test.

Results:

Of 818 total children registered in our ECMO database, 124 neonates without CHD were placed on VA-ECMO via the common carotid. Of the 100 patients decannulated, 53 had repair, and 47 had ligation. The table shows comparisons between these two groups. Patients who had ligation had longer cannulation times and hospitalizations. 83% of carotids repaired and imaged (n=36) remained patent at last study (mean - 542 days). Twenty-three patients had DAYC testing documented (see table) - these patients had similar baseline and hospitalization characteristics. DAYC scores did not differ between repaired and ligated patients in any category.

Conclusions:

At this single institution, long-term patency is excellent after carotid artery repair post-ECMO with no increase in stroke rate. It should be considered for all children if vessel condition permits. Developmental outcomes appear similar for patients having either carotid repair or ligation, although the numbers and follow-up time are limited.

SCIENTIFIC SESSION IV (CONT.)

Comparisons between neonates receiving carotid repair and ligation post-ECMO			
Variable	Repaired (n=53)	Ligated (n=47)	P-value
EGA (wks)	38.5	37.6	0.06
Cannulation time (days)	5.2	8.1	<0.0001
Length of hospitalization (days)	37	50	0.04
IVH	26%	34%	0.39
Stroke	4.7%	2.3%	0.54
DAYC scores	Repaired (n=8)	Ligated (n=15)	P-value
cognitive	100	103	0.63
physical development	86	87	0.88
communication	97	102	0.39

NOTES:

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NUTRITIONAL STATE OF SURVIVORS OF CONGENITAL DIAPHRAGMATIC HERNIA - PREDICTORS OF GROWTH IN THE FIRST 12 MONTHS

Sigrid Bairdain, MD, MPH, Jeremy Fisher, MD, Faraz A. Khan, MD, Ryan P. Cauley, MD, MPH, Katelyn Ariagno, RD, David Zurakowski, PhD, Jill Zalieckas, MD, MPH, Tom Jaksic, MD, PhD, Jay M. Wilson, MD, Nilesh Mehta, MD.

Boston Children's Hospital, Boston, MA, USA.

Purpose:
Protein energy malnutrition is prevalent among survivors of congenital diaphragmatic hernia (CDH) and may be associated with delayed growth and development. We aimed to examine factors that impact growth over the 12-months following intensive care unit (ICU) discharge.

Methods:
Following IRB approval, patients with CDH treated in the ICU from 2000-2010 with follow-up of at least 12 months in a multidisciplinary program were reviewed. Nutritional intake, anthropometry, and clinical ICU variables were recorded. Multivariate regression determined variables that predicted a significant increase in Weight for Age Z-score [(WAZ) = 1] over 12 months. Optimal provision of specific nutritional variables was determined via a receiver operating characteristic (ROC) curve.

Results:
110 infants with CDH (88% left-sided) were analyzed. 51% required patch repair, while 24% required ECMO. Mean (SD) birth weight (BW) was 3.1kg (0.6). WAZ at ICU discharge was -1.4(1.6), but improved to -0.5(1.2) at 12-months [mean (SD) change in WAZ was 1.0(1.5)]. BW<3kg (OR=3.9, 95% CI 1.5-9.8, p=0.003), protein intake = 2.3 g/kg/day (OR=4.1, 95% CI 1.7-10.3, p=0.002), and inhaled nitric oxide (iNO) (OR=2.7, 95% CI 1.1-7.2, p=0.050) were independent predictors of increase in WAZ = 1 over 12 months. A minimum daily protein intake of 2.3g/kg/day was associated with improved nutritional status (area under ROC curve 0.692; 95% CI 0.586-0.800, p<0.001).

Conclusions:
The nutritional status of CDH survivors followed in a multidisciplinary clinic improved significantly between discharge and 12-month follow up. Higher BW was a significant predictor of larger WAZ at 12 months, but infants with BW <3kg demonstrated a faster rate of growth over this period. Aggressive treatment of pulmonary hypertension with iNO appears to have a positive impact on nutritional status. Protein provision should exceed =2.3g/kg/day to ensure optimal growth in this cohort.

NOTES:

SCIENTIFIC SESSION IV (CONT.)

33

MANAGING MODERATELY INJURED PEDIATRIC PATIENTS WITHOUT IMMEDIATE SURGEON PRESENCE: 10 YEARS LATER

Laura A. Boomer, MD , Jason Nielsen, MD, Wendi Lowell, Kathy Haley, Carla Coffey, Kathy Nuss, MD, Benedict C. Nwomeh, MD, MPH, Jonathan I. Groner, MD.
Nationwide Children's Hospital and the Ohio State University College of Medicine, Columbus, OH, USA.

Purpose:
Beginning in 2003, the pediatric emergency medicine (PEM) physician replaced the surgeon as the team leader for all second tier or "level II" trauma resuscitations at a busy pediatric trauma center. The initial experience with this paradigm change was reported in 2006 and 2007. The purpose of this study was to review our experience and outcomes 10 years after implementing this practice change.

Methods:
Trauma registry data for all level II activations were extracted for the three years (2000-2003) prior to policy change (period 1, n=1011) and compared to the 10 years afterward (2003-2013; period 2, n=4736). Data included demographics, length of stay (LOS), and injury severity score (ISS), and the following outcomes: readmissions, complications, delays in diagnosis and mortality. Differences between the cohorts were analyzed using? 2 or Fischer's Exact Test where appropriate, with significance at $p<.05$.

Results:
Mean ISS scores for admitted patients during period 1 (8.2) and period 2 (7.7) were similar. During period 1, 918 of 1011 (91%) patients were admitted compared to 2674 of 4726 (56.6%, $p<.001$) in period 2. During the final 18 months of period 1, 336 of 627 (53.6%) patients underwent abdominal CT versus 1892 of 4736 (39.9%, $p<.001$) in period 2. Additionally during this 18 month period, the median ED LOS was 135 minutes versus 177 minutes in period 2. There were no missed abdominal injuries identified in either cohort. Four patients died during period 1 compared to 2 during period 2 ($p=0.011$). The readmission rate during period 2 was low at 0.7%.

Conclusions:
We conclude that level II trauma resuscitations can be safely coordinated without immediate surgeon presence. In addition, although ED LOS increased when PEM physicians replaced surgeons, admission, CT scan, and mortality rates decreased significantly without an increase in missed injuries.

NOTES:

SCIENTIFIC SESSION IV (CONT.)

34

THE EFFECT OF BALANCED BLOOD COMPONENT RESUSCITATION AND CRYSTALLOID ADMINISTRATION IN PEDIATRIC TRAUMA PATIENTS REQUIRING TRANSFUSION IN IRAQ AND AFGHANISTAN

Mary J. Edwards, M.D.[1], Michael B. Lustik, M.S.[2], Margaret Clark, M.D.[1], Kevin M. Creamer, MD[3], David W. Tuggle, MD[4].

[1]Department of Surgery, Tripler Army Medical Center, Honolulu HI, [2]Department of Clinical Investigation, Tripler Army Medical Center, Honolulu HI, USA, [3]Hospitalist Division, Children's National Medical Center, Washington, DC, USA, [4]Department of Trauma, UT Southwestern, Dell Children's Medical Center, Austin, TX, USA.

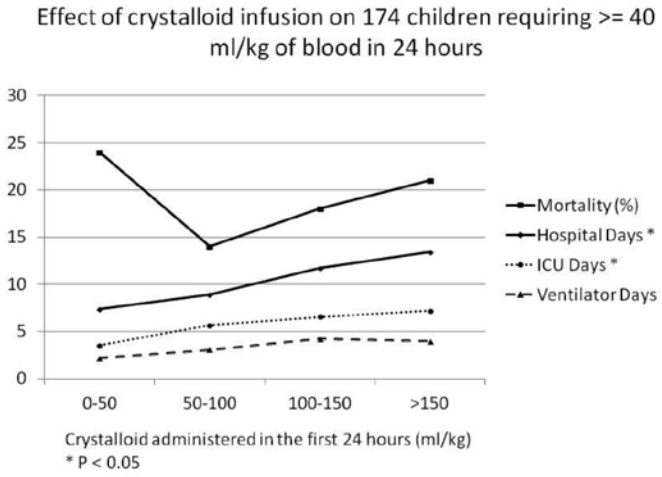
Purpose:
Evidence suggests that component balanced (1:1 PRBC:FFP or whole blood) resuscitation, and avoidance of crystalloids in traumatically injured adults requiring massive transfusion results in improved clinical outcomes. Such evidence for pediatric patients is lacking.

Methods:
The Joint Trauma System Registry provides data for the 1311 injured children aged 14 years or younger admitted to U.S. military hospitals and requiring transfusion in Iraq and Afghanistan from 2002-2012. Logistic regression was used to determine risk factors for high volume (>= 40 ml/kg) or massive (>= 70 ml/kg) transfusions. The effect of crystalloid volume and balanced component resuscitation in the first 24 hours was assessed.

Results:
907 patients met criteria for analysis. 174 children received high volume transfusions of either whole blood or packed red blood cells in the first 24 hours of admission. 52 received massive transfusions. Mortality was higher (29%) in patients receiving massive transfusions and high volume transfusions (19%) as opposed to others (10%). Younger age, penetrating injury, severe abdominal and extremity injury and increased ISS were associated with the need for a large volume transfusion. Increased ISS was associated with the need for a massive transfusion. Increased crystalloid administration was an independently associated with increased ICU and hospital stay in children requiring large volume and massive transfusions. Increased crystalloid use was associated with higher mortality among all patients requiring a transfusion. Balanced component resuscitation did not improve mortality, hospital stay, and ventilator or ICU days.

Conclusions:
This retrospective review suggests that for injured children requiring large volume or massive transfusions, heavy reliance on crystalloid for resuscitation has an adverse effect on outcomes. There was no evidence of improved outcome with balanced component resuscitation in this cohort.

SCIENTIFIC SESSION IV (CONT.)



NOTES:

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PEDIATRIC EMERGENCY DEPARTMENT THORACOTOMY: A LARGE CASE SERIES REVIEW FROM A LEVEL 1 TRAUMA CENTER

Casey J. Allen, MD , Evan J. Valle, MD, Chad Thorson, MD, MSPH, Anthony R. Hogan, MD, Eduardo A. Perez, MD, Holly Neville, MD, Tanya Zakrison, MD, MPH, Juan E. Sola, MD.
University of Miami Miller School of Medicine, Miami, FL, USA.

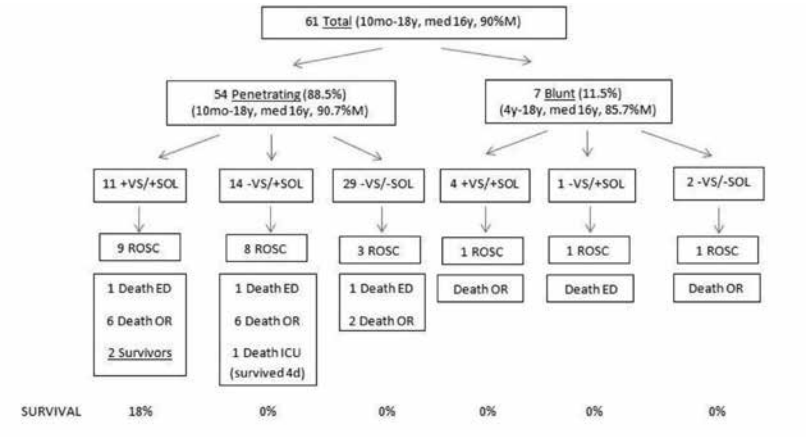
Purpose:
There are established guidelines for performing an emergency department thoracotomy (EDT) in the adult trauma patient. However, since it is rarely utilized in the pediatric patient, it is difficult to identify trends and factors associated with survival. We reviewed our pediatric experience at a level 1 trauma center and report the largest analysis over the past 25 years.

Methods:
All pediatric patients (age = 18) who received an EDT from 1991-2012 were reviewed. Demographics analyzed included age, sex, mechanism of injury, and ISS. We reviewed patient records for the presence of vital signs (VS) or signs of life (SOL) in the field, time without VS in the field, presence of VS or SOL upon arrival, location of injuries, return of spontaneous circulation (ROSC), and factors associated with survival.

Results:
A total of 61 patients were identified with a median age of 16 years and an average ISS of 46. Most patients were male (90%) and sustained a penetrating injury (88%).The most common injuries were gunshot wound to the chest (79%) and abdomen (38%). In the field, 46% had initial VS and 67% had SOL. Upon arrival, 29% had VS and 56% had SOL. After EDT, 23 patients (38%) had return of spontaneous circulation (ROSC). Of these, 21 expired (OR 16, ED 4, ICU 1). Both survivors (15y, 16y) sustained penetrating injury and had VS upon arrival.

Conclusion:
EDT survivors sustained penetrating injuries and had VS upon arrival. There were no survivors in blunt trauma patients regardless of the presence of VS and SOL on arrival. Pediatric trauma patients who arrive without VS and SOL do not warrant EDT. The over-performance of EDT is likely due to the lack of known survival factors and perhaps an overly aggressive approach when faced with a potential pediatric mortality.

SCIENTIFIC SESSION IV (CONT.)



NOTES:

INNOVATION SESSION

Innovation Session
Saturday, May 31, 1:30 p.m. – 2:30 p.m.

i1

AN EXTRACORPOREAL ARTIFICIAL PLACENTA SUPPORTS EXTREMELY PREMATURE LAMBS FOR ONE WEEK

Benjamin S. Bryner, MD, Brian W. Gray, MD, Elena Perkins, Hayley Hoffman, BS, Gabe Owens, MD, PhD, John Barks, MD, Alvaro Rojas -Pena, MD, Robert H. Bartlett, MD, George B. Mychaliska, MD.

University of Michigan, Ann Arbor, MI, USA.

Purpose:
The treatment of prematurity remains an unsolved problem. We developed an extracorporeal artificial placenta (AP) that simulates the intrauterine environment, provides gas exchange and maintains fetal circulation while avoiding mechanical ventilation (MV). We compared the AP with MV in an extremely premature lamb model.

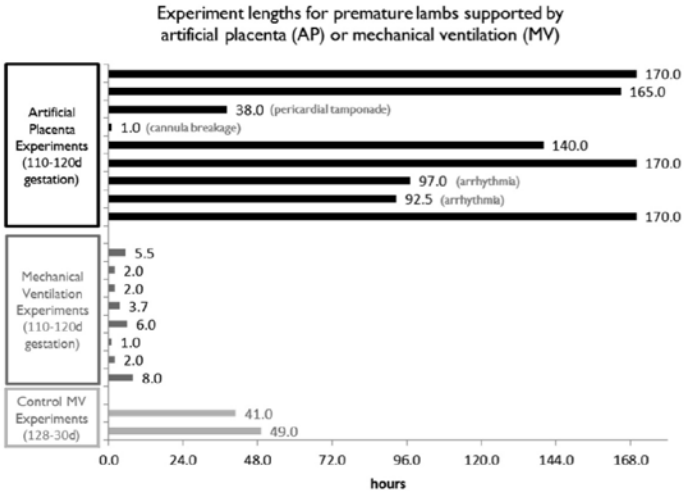
Methods:
Extremely premature lambs (110 -120 days; term=145 days) were used. AP lambs (n=9) were cannulated for VV-ECLS (jugular drainage, reinfusion via umbilical vein) on native placental support. An endotracheal tube was placed and filled with amniotic fluid. The cord was divided and VV-ECLS was initiated. MV lambs (n=8) were intubated, ventilated, given exogenous surfactant, and transitioned to high-frequency oscillatory ventilation (HFOV). Two near-term lambs (128 -130 days) were used to validate our MV protocol. All lambs received fluids, parenteral nutrition, prophylactic antibiotics, and methylprednisolone. Hemodynamics, blood gases, hemoglobin, electrolytes, ventilator parameters, and circuit flows were measured. Echocardiography was used to assess patency of the ductus arteriosus.

Results:
Four premature lambs survived for one week on the AP (see figure); another lamb survived 6 days. The mean pO2 was 38.4±10.8 mmHg; mean pCO2 was 42.3±10.7 mmHg; mean arterial pressure had a mean of 47.9±9.8 mmHg, and circuit flow averaged 87.4±17.9 cc/min/kg body weight. The ductus arteriosus remained patent in three of these lambs. Four AP lambs died earlier from various complications. The MV lambs survived 2-8 hours. Each of these lambs experienced a transient improvement with surfactant, but developed progressive hypercarbia and hypoxia despite high airway pressures and HFOV. Two near-term lambs were ventilated for 41-49 hours.

Conclusions:
Extremely premature lambs can be supported for one week with the artificial placenta, but not with mechanical ventilation. The AP provided long-term

INNOVATION SESSION (CONT.)

hemodynamic stability and good gas exchange. Further studies will assess prolonged control of fetal circulation and organ maturation during application of the AP.



NOTES

INNOVATION SESSION (CONT.)

i2

MYPECTUS: A NOVEL MOBILE HEALTH SYSTEM FOR REMOTE ASSESSMENT OF TREATMENT

Brittany Harrison, BA [1], Lily Stern, BS[1], Philip Chung, MS[1], Mozziyar Etemadi, MS, PhD[1], Dillon Kwiat, BS[1], Michael R. Harrison, MD[1], Marcelo Martinez Ferro, MD[2].
[1]University of California, San Francisco, SAN FRANCISCO, CA, USA, [2]Hospital Privado de Niños, Fundación Hospitalaria, Buenos Aires, Argentina.

Purpose:
Mobile technology provides the opportunity to verify and incentivize patient compliance. We developed a novel assessment system that senses temperature and pressure, transmits this data to clinicians, and engages patients. The purpose of this pilot study was to test our MyPectus system in patients with Pectus Carinatum (PC) undergoing non-invasive dynamic compression, for which the outcome depends on patient compliance.

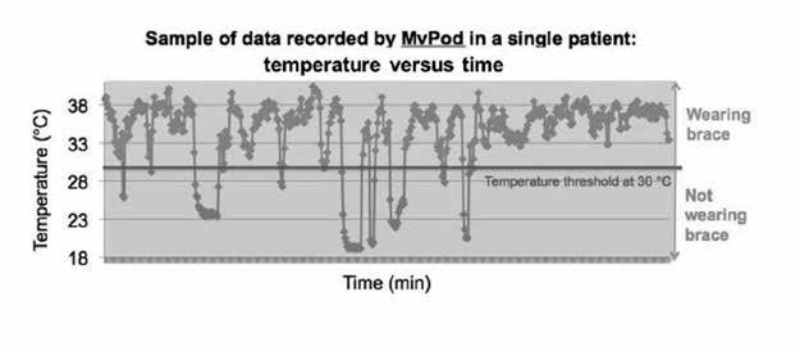
Methods:
We developed a system which includes (1) MyPod (My Pectus Onboard Device) inserted in the brace, (2) smartphone application for patients, and (3) web -based dashboard for clinicians. MyPod (which is the size of a smartphone) contains temperature and pressure sensors, and an onboard data -logger. Every 20 minutes, data wirelessly downloads via Bluetooth 4.0 from MyPod to patients' smartphones and is stored in the cloud server for clinical analysis. With IRB approval and informed consent, we studied eight patients ages 10 - 16 with moderately severe PC deformities who underwent bracing with FMF DynamicCompression System® at Fundación Hospitalaria Children´s Hospital in Buenos Aires, Argentina. We measured patients' baseline pressure. Over four weeks, patients wirelessly synced MyPod data with a MyPectus iOS application. They received points for increased brace compliance. Clinicians accessed data from the cloud in real-time. Efficacy was determined after one month by comparing objective online data and patient-reported online surveys.

Results:
In all eight patients, MyPod recorded temperature and pressure data, wirelessly sent it to smartphone applications, and saved it in the cloud. The data correlated with patient-reported usage. All patients had positive feedback about receiving points for compliance.

Conclusion:
This first-in-human study demonstrates that the MyPectus System continuously updates relevant clinical data, transmits it to clinicians, and engages patients. We are developing a modular, integrated, mobile patient-monitoring system to incentivize patients and allow for remote management in

INNOVATION SESSION (CONT.)

various clinical scenarios.



NOTES:

INNOVATION SESSION (CONT.)

i3

A NOVEL ENDOLUMINAL CATHETER TOOL SHOWS POTENTIAL FOR NON-INVASIVE TREATMENT OF INFANTILE HYPERTROPHIC PYLORIC STENOSIS (IHPS)

Carolyn Cochenour, BSc, Tim Kane, MD, Peter C. Kim, MD PhD, Axel Krieger.
Children's National Health System, Washington, DC, USA.

Background:
Laparoscopic and open pyloromyotomy offer definitive treatment for pyloric stenosis but are associated with complications including perforation, incomplete myotomy, and infection. Effective pyloromyotomy enlarges the pyloric channel at most 30% circumferentially. We hypothesized that a similar outcome can be accomplished effectively with an endoluminal balloon tool.

Methods:
A new endopyloric catheter-based balloon dilation tool was designed and evaluated for proof-of -concept in cadaveric models. Efficacy of dilatation following 3 cycles of inflation and limits of pyloric over-insufflation for safety were measured in rabbit cadaveric pyloric and cervix tissues. Insertion force was measured using test models and compared to catheter deflection force in preparation for planned testing in preclinical models, using nonparametric analysis ($p<0.01$).

Results:
Effective dilatation was achieved (increase in normalized circumference (C), 2pR) of 63% in the rabbit pylorus (n=4, ?C=7.97±2.71mm) and 112% in the rabbit cervices (n=4, ?C=6.64 ± 0.42mm) resulting in a proportional increase in flow based on a normalized cross sectional lumen area (A) of 181% in rabbit pylorus (? A=17.68±7.61mm 2) and 354% in rabbit cervices (?A=10.02 ± 1.98mm2) ($p=0.001$). Histological examination demonstrated intact mucosa in all specimens ($p<0.01$). Balloon inflation up to three times the diameter of the pre -dilated pyloric lumen was determined to be safe with no tearing of the samples. Using a simulated anatomical environment, we determined the insertion force through the hypertrophic pylorus lumen is less than 100g. The prototype catheters (n=5) kinked at 364.4±35.1g, indicating adequate safety margin.

Conclusion:
Our novel balloon device for endoluminal dilatation can achieve an effective and safe increase of the pyloric channel lumen in a cadaver model. Our data indicate that non-invasive endoluminal dilation can significantly increase the flow by 2-3 folds. This novel endopyloric tool has potential for less invasive surgical treatment of IHPS. Preclinical in-vivo testing of this non-invasive endoscopic approach and technique will be conducted.

NOTES:

INNOVATION SESSION (CONT.)

i4

GENERATION OF AN ARTIFICIAL INTESTINE AND VALIDATION IN DOGS: A PROOF-OF -CONCEPT STUDY

Shahab Shaffiey, MD [1], Hongpeng Jia, MD[1], Tim Keane, BS[2], Misty Good, MD[1], Chhinder Sodhi, PhD[1], Tom Prindle, BS[1], Cait Costello, PhD[3], John March, PhD[3], Deborah Nagle, MD[4], Stephen Badylak, DVM., PhD, MD[2], David J. Hackam, MD, PhD[1].

[1]Children's Hospital of Pittsburgh, Pittsburgh, PA, USA, [2]University of Pittsburgh, Pittsburgh, PA, USA, [3]Cornell University, Ithaca, NY, USA, [4]Beth Israel Deaconess Medical Center, Boston, MA, USA.

Purpose:
Short bowel syndrome remains a major pediatric problem for which intestinal transplantation represents definitive care but is fraught with complications. Investigators have turned to the development of tissue -engineered approaches to enhance absorptive capacity. We now sought to define the ability of intestinal stem cell precursors to form intact intestinal units on a novel scaffold, and then developed a large animal model to evaluate its regenerative properties *in vivo*.

Methods:
Intestinal stem cells were isolated from intestine resected from human neonates with NEC (n=5), and mice (6 weeks, n=10) expressing the stem cell reporter gene Lgr5, and were cultured in a collagen -coated scaffold derived from acellular porcine intestinal submucosa. To mimic the natural environment of the intestine, murine intestinal myofibroblasts and microbiome components were added. Whole mount confocal microscopy and mRNA expression were used to evaluate epithelial differentiation (MUC2, lys, e-cadherin, chromagranin), and recapitulation of a native intestinal architecture. We developed a canine model in which we performed rectal mucosectomy then implanted the novel scaffold into the mucosal defect (n=4), then evaluated the scaffold biweekly via colonoscopy and biopsy to determine neo-mucosal growth.

Results:
Isolated intestinal stem cells from both mice and humans formed donor-derived structures resembling villi and crypts within the collagen lined scaffold, and to differentiate into goblet, enteroendocrine, paneth and enterocytes based on immunofluorescence and RT -PCR. The addition of the microbiome and intestinal myofibroblasts induced increased differentiation into goblet and paneth cells (p=0.03). Strikingly, histologic analysis of implanted scaffold into dogs revealed a newly formed mucosal layer by six weeks with intact large intestinal crypt and villi structures on the scaffold.

INNOVATION SESSION (CONT.)

Conclusions:
We now demonstrate the feasibility of developing an artificial intestine from the intestinal stem cells of mice and humans, providing proof-of -concept validation for our scaffold using a large animal model in dogs.

NOTES:

INNOVATION SESSION (CONT.)

i5

ENDOBRONCHIAL OCCLUSION WITH ONE-WAY ENDOBRONCHIAL VALVES: A NOVEL TECHNIQUE FOR PERSISTENT AIR LEAKS IN CHILDREN

Michael F. Reed, MD, **Abigail B. Podany, MD**, Dorothy V. Rocourt, MD, Christopher R. Gilbert, DO, Mary C. Santos, MD, Robert E. Cilley, MD, Peter W. Dillon, MD, Jennifer W. Toth, MD.

Pennsylvania State Hershey Medical Center, Hershey, PA, USA.

Purpose:
In the pediatric population, persistent air leaks can result from pulmonary infection or barotrauma. Management strategies include surgical intervention, prolonged pleural drainage, ventilator manipulation, and even ECMO. We hypothesized that endobronchial valve placement would be an effective minimally invasive intervention for prolonged air leaks in children.

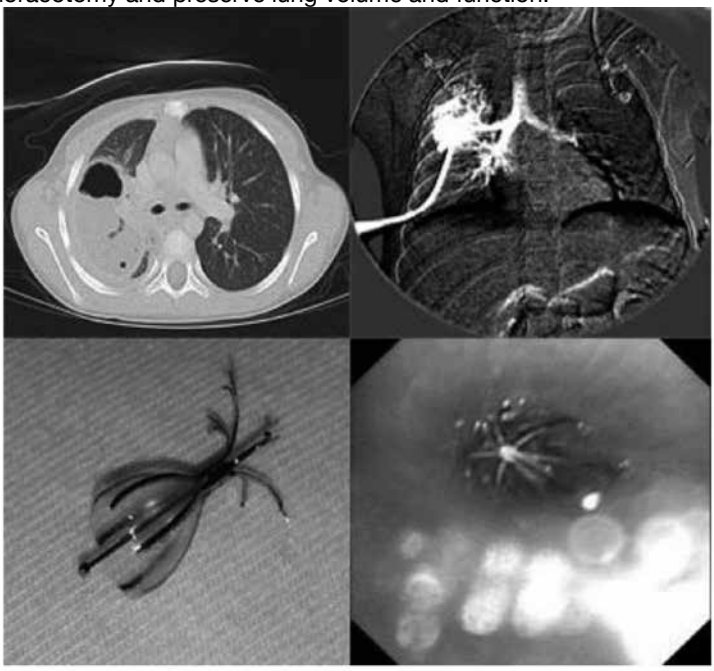
Methods:
Endobronchial valve placement was approved by the Institutional Review Board (IRB) under a Humanitarian Device Exemption, and review of children undergoing the procedure was also approved by the IRB. Children with prolonged air leaks refractory to conventional management strategies were evaluated by a multidisciplinary team (pediatric surgery, interventional pulmonology, and thoracic surgery) for endobronchial valve placement. Airway management and bronchoscopic techniques were adapted to accommodate the pediatric population. Flexible bronchoscopy was performed under general anesthesia. Airways leading to the air leaks were isolated with balloon occlusion. Retrievable one-way endobronchial valves were deployed via catheter (figure).

Results:
Four children (16 months to 16 years) had prolonged air leaks following necrotizing pneumonia (2), lobectomy (1), and pneumatocele (1). All had pleural drains. The number of valves placed per patient ranged from 1-4. Average time to air leak resolution was 12 days (range 0-39). Average duration to chest tube removal was 25 days (range 7-39). All four children had complete resolution of their air leaks. All were discharged from the hospital. Three of four have had uneventful valve removal. None required additional surgical interventions.

Conclusion:
Endobronchial valve placement for prolonged air leaks due to a variety of etiologies is safe and effective in children for resolving fistulae, achieving early pleural drain removal and shortening length of stay. This novel technique has particular utility in the pediatric population to avoid the morbidity of

INNOVATION SESSION (CONT.)

thoracotomy and preserve lung volume and function.



NOTES:

INNOVATION SESSION (CONT.)

i6

SACRAL NERVE STIMULATOR FOR DYSFUNCTIONAL ELIMINATION SYNDROME IN CHILDREN

Jason P. Sulkowski, MD, Kristine M. Nacion, MPH, Peter C. Minneci, MD, MHSc, Hayat M. Mousa, MD, Seth A. Alpert, MD, **Steven Teich, MD**.
Nationwide Children's Hospital, Columbus, OH, USA.

Purpose:
Neuromodulation with a percutaneously implanted sacral nerve stimulator (SNS) has been used to treat adult patients with dysfunctional elimination syndrome (DES), a constellation of symptoms associated with both gastrointestinal (GI) and genitourinary dysfunction. This series of patients represents our early experience with this new technique in pediatric patients.

Methods:
Between May 2012 and September 2013, 17 patients had a SNS placed. A temporary SNS was placed initially to determine clinical efficacy, followed by permanent SNS placement 2-3 weeks later. Retrospective chart review was performed to collect baseline clinical characteristics. Patients completed the Fecal Incontinence Qualify of Life Scale, the Fecal Incontinence Severity Scale, the PedsQL Gastrointestinal Symptom Scale (PedsQL), and a validated voiding survey to obtain a pre -operative baseline and after surgery to determine post-operative outcomes.

Results:
Within our population, the average age was 11.5 ± 3.6 years, eight patients were female, and seven had primarily GI symptoms while nine had both fecal and urinary dysfunction. Since SNS placement, five patients had decreased doses of/or ceased using laxatives, cecostomy flushes, or both. Three patients were weaned off anticholinergics for urinary dysfunction. In the ten patients with complete pre - and post-operative data, all three GI measures improved with significant improvement in the overall score on the Fecal Incontinence Severity Scale ($p=0.02$); and abdominal discomfort reported on the PedsQL ($p=0.02$). Of the five patients reporting urinary symptoms, three demonstrated marked improvement, two of whom had complete resolution. After implantation, stimulators were repositioned in two patients for reported discomfort, and a UTI was reported in another patient. Average follow-up has been 8.4 ± 6 months.

Conclusions:
This series demonstrates improvements in both fecal and urinary function after sacral nerve stimulator placement in pediatric patients with dysfunctional elimination syndrome. Sacral nerve stimulation represents a promising therapy for this challenging clinical condition.

NOTES:

VIDEO SESSION

Video Session
Saturday, May 31, 2:30 p.m. – 3:30 p.m.

V1

THORACOSCOPIC REPAIR OF ESOPHAGEAL ATRESIA WITH DISTAL TRACHEOESOPHAGEAL FISTULA AND A PROXIMAL TYPE-H TRACHEOESOPHAGEAL FISTULA

Zachary J. Kastenberg, MD, James K. Wall, MD, **Matias Bruzoni**.
Stanford University, Palo Alto, CA, USA.

Purpose:
To report a combined approach using thoracoscopy and flexible bronchoscopy to identify and repair a rare tracheoesophageal fistula (TEF) anatomic variant. This variant had both a distal tracheoesophageal fistula and a proximal tracheoesophageal fistula in an H-type configuration located high in the thoracic inlet.

Methods:
A 2,045-gram, ex-35 week female with a history of CHARGE syndrome in mild respiratory distress underwent thoracoscopy for what was preoperatively believed to be a Gross type C tracheoesophageal fistula. After ligation of the distal fistula, ventilation remained challenging and intraoperative flexible bronchoscopy through the endotracheal tube revealed a proximal fistula. The proximal fistula was in an H-type configuration high in the thoracic inlet. The video describes the surgical technique used to repair both fistulae and the esophageal atresia thoracoscopically.

Results:
The operative time was 125 minutes and there were no intraoperative complications. A postoperative contrast study at 10 days and 3 months revealed an intact esophageal repair without a leak or stricture. A postoperative rigid bronchoscopy at 10 days showed no airway abnormalities.

Conclusions:
The thoracoscopic repair of this rare tracheoesophageal fistulae variant with H-type anatomy between the proximal pouch and trachea located high in the thoracic inlet is feasible in low birth weight infants. Intraoperative flexible bronchoscopy is a valuable tool in determining a second fistula and assisting with the repair.

NOTES:

VIDEO SESSION (CONT.)

V2

HYDROCOLPOS DRAINAGE IN CLOACA

Andrea Bischoff, M.D., Belinda Dickie, M.D., Jason Frischer, M.D, Marc A. Levitt, M.D., Alberto Peña, MD.

Cincinnati Children's Hospital, Cincinnati, OH, USA.

Purpose:
30% of the patients with cloaca have a hydrocolpos that may compress the trigone, producing uretero -vesico obstruction, megaureters, and hydronephrosis. In addition, the hydrocolpos may become infected and can perforate, with serious consequences for the patient. Ideally, the hydrocolpos must be drained at the time of colostomy opening.

Methods:
A video was recorded highlighting the important technical details of hydrocolpos drainage in two cloaca patients that had previously underwent a colostomy opening and were left with an undrained hydrocolpos. In one patient, a vesicostomy was also previously performed in an attempt to drain the hydrocolpos, which in retrospect was unnecessary.

Results:
With an infra-umbilical midline laparotomy or with a left lower quadrant oblique incision used for the colostomy opening, the hydrocolpos can be found behind the bladder. When opening the posterior vaginal wall at the dome, special emphasis should be placed on identification and protection of the uterus. When two hemivaginas are present a window can be created within the vaginal septum to allow for a single tube to drain both hemivaginas. The draining tube should remain in place until the time of the definitive cloacal reconstruction.

Conclusion:
Perineal intermittent catheterization of the common channel, single percutaneous aspiration of the hydrocolpos content, and vesicostomies are inadequate and contra-indicated methods of hydrocolpos drainage. During colostomy opening the hydrocolpos should be properly drained with a transabdominal indwelling tube that should remain in place until the time of the cloacal repair.

NOTES:

VIDEO SESSION (CONT.)

V3

CONGENITAL STERNAL CLEFT REPAIR

Cathy A. Burnweit, MD[1], Jun Tashiro, MD MPH[2].

[1]Miami Children's Hospital, Miami, FL, USA, [2]University of Miami Miller School of Medicine, Miami, FL, USA.

Abstract:

Congenital sternal cleft is a rare congenital chest wall deformity. Three types exist: complete, inferior, and superior. The complete and inferior variants are often associated with intra -cardiac or intra -abdominal anomalies. The superior type is usually found in isolation. Regardless of the type, the defect leaves the heart and great vessels unprotected and can lead to loss of thoracic domain from organ herniation if left untreated. Repair in the neonatal period is recommended, as the sternum is unossified and the chest compliant, allowing for easier manipulation and approximation. This presentation depicts the primary closure of a superior cleft in a two-month old child. The key steps of the operation include excision of the abnormal overlying skin, dissection of the sternal bars, tapering of the lower cartilage, and approximation of the sternal bars. Ensuring hemodynamic stability and avoiding compression of the thoracic structures are critical for this procedure. The postoperative course was uneventful, and the child recovered well. She developed normally over two years of follow-up.

NOTES:

VIDEO SESSION (CONT.)

V4

RESECTION OF DUODENAL WEB USING HYBRID NATURAL ORIFICE TRANSLUMINAL ENDOSCOPIC SURGERY (NOTES)

Maria Carmen Mora, MD [1], Kevin P. Moriarty, MD[2], Michael V. Tirabassi, MD[2], Gregory T. Banever, MD[2].

[1]Baystate Medical Center, Springfield, MA, USA, [2]Baystate Children's Hospital, Springfield, MA, USA.

Purpose:
We present a case of a hybrid NOTES (natural orifice transluminal endoscopic surgery) for resection of a duodenal web. The operation performed was a transgastric duodenal web resection through an existing gastrostomy site.

Methods:
The patient is a 2-year-old -male with Down syndrome and congenital heart disease. From birth the patient had persistent emesis and failure to thrive for which he underwent a laparoscopic gastrostomy tube placement at 3-weeks of age. At 29-months of age with continued failure to thrive he underwent further work-up including a repeat upper GI. This was suspicious for a duodenal web near the ampulla, later confirmed on EGD. We therefore performed an incisionless resection of the duodenal web via the existing gastrostomy site. Initially the plan was to use the endoscope for visualization and the gastrostomy site for instrumentation; however, the endoscope visualization was inadequate. The gastrostomy site was dilated and an extra small wound protector was placed with a sterile glove over it allowing insufflation and access via the fingers for the laparoscope and 3mm instruments. A 70-degree laparoscope was used for visualization. The opening of the web was cannulated using a Fogarthy catheter prolapsing the web towards the stomach. A 3mm hook cautery and then the LigaSure were used to incise and excise the anteriolateral aspect of the duodenal web. Intraoperative CXR ruled out free air. A 1cm 14-French Mickey button was placed at the completion of the procedure. The length of the operation was 100 minutes.

Results:
The patient did well postoperatively and was discharged home on POD 4. At his four -month postoperative visit he was at the 7th percentile on the growth curve compared to 4th percentile preoperatively.

Conclusions:
Hybrid NOTES for resection of duodenal web via an existing gastrostomy site provides a new minimally invasive approach for treatment of this anomaly.

NOTES:

VIDEO SESSION (CONT.)

V5

ENDOSONOGRAPHY IN PERIRECTAL PROCEDURES

Arun Thenappan, Daniel Teitelbaum, Marcus Jarboe.
University of Michigan C.S. Mott Children's Hospital, Ann Arbor, MI, USA.

Purpose:
Perirectal procedures in the pediatric population are often difficult to perform and prone to complications secondary to the underdeveloped tissues of children and the difficulty clearly identifying the anatomy purely by visualization or palpation. Endosonography may be an extremely beneficial adjunct in the efficient and effective performance of several of these procedures.

Methods:
We demonstrate operative footage and ultrasound images utilized in the care of patients treated at the University of Michigan.

Results:
Here we demonstrate the use of ultrasound in three common perirectal procedures: injection of Clostridium botulinum toxin or BoTox for internal sphincter achalasia or in Hirschsprung's disease who are suffering from recurrent enterocolitis, sclerotherapy for rectal prolapse, and seton placement in complicated Crohn's perirectal fistulas.

Conclusions:
We demonstrate that ultrasound is a simple and useful adjunct in the performance of such perirectal procedures.

NOTES:

VIDEO SESSION (CONT.)

V6

ULTRASOUND-GUIDED LATERAL APPROACH TO INTERNAL JUGULAR CATHTER PLACEMENT

Marcus Jarboe, MD, K Elizabeth Speck, MD.
University of Michigan, Ann Arbor, MI, USA.

Purpose:
The purpose of this video is to demonstrate the ultrasound-guided lateral approach to placing a central venous catheter and show its advantages related to the standard ultrasound-guided approach.

Methods:
The approach to the internal jugular vein is started adjacent to the clavicle, just lateral to the sternocleidomastoid muscle on the the right side. The ultrasound probe is placed in a transverse fashion cephalad and adjacent to the clavicle. The needle trajectory is in-line with the probe.

Results:
The lateral approach enables clear and simultaneous visualization of the entire needle and key anatomic structures such as the edge of the lung, the internal jugular vein, and the carotid artery. Second, the approach allows a gentle curve on the catheter when tunneling, avoiding kinks and avoiding tendency of catheter movement in the tunnel pocket when the neck moves. Third, in cases of internal jugular occlusion, the lateral approach makes it possible to access the brachiocephalic vein.

Conclusions:
The ultrasound-guided lateral approach to central venous catheter placement shows all important structures simultaneously, provides better tunneling and has more options as far as access to more central vessels.

NOTES:

SCIENTIFIC SESSION V

Scientific Session V
Miscellaneous Surgery
Sunday, June 1, 8:00 a.m. – 9:15 am

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MYPOD: AN EMR-BASED TOOL THAT FACILITATES QUALITY IMPROVEMENT AND MAINTENANCE OF CERTIFICATION

Loren Berman, MD, Brian J. Duffy, MD, Charles D. Vinocur, MD.
A.I. duPont Hospital for Children, Wilmington, IL, USA.

Background:
Maintenance of Certification was designed to regularly assess physician competencies including operative case volume and outcomes. Current national programs do not adequately track clinical performance, including surgical occurrences. This information, if collected consistently and systematically, can be used to facilitate quality improvement efforts.

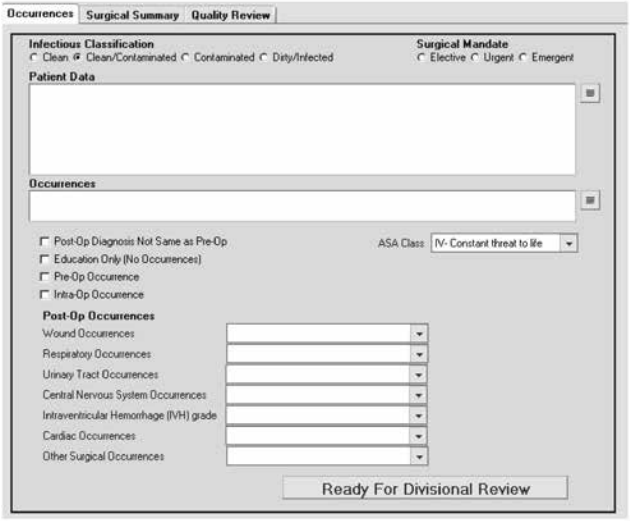
Methods:
We developed an EMR-based program called MyPOD (My Personal Outcome Data) to track surgical outcomes at our institution. Cases are automatically downloaded to a surgeon's peer-protected site from EPIC Op-Time, an operating room management system, two weeks after the procedure. Downloaded information includes demographic data, procedure(s), ASA, and wound class. The surgeon records a case summary including any occurrences, deaths, or systems issues as defined by the NSQIP-Pediatric program (FORM 1A). Data can be directly uploaded to the ACS case log system for maintenance of certification purposes. All occurrences are reviewed at the divisional M&M and scored on FORM 1B. After divisional review, the cases are forwarded to the director of surgical outcomes and quality for a final review. This enables trending of systems issues and clinical problems within and across divisions and facilitates the process of gathering further information or follow-up about a case.

Results:
Over the first 18 months, 4736 cases were performed by 18 surgeons. There were 101 occurrences, and multiple systems issues were identified and acted upon in order to prevent future similar occurrences. We plan to roll out MyPOD to all divisions and develop the ability to automatically refer a case to another division(s) where issues were identified in order to achieve loop closure.

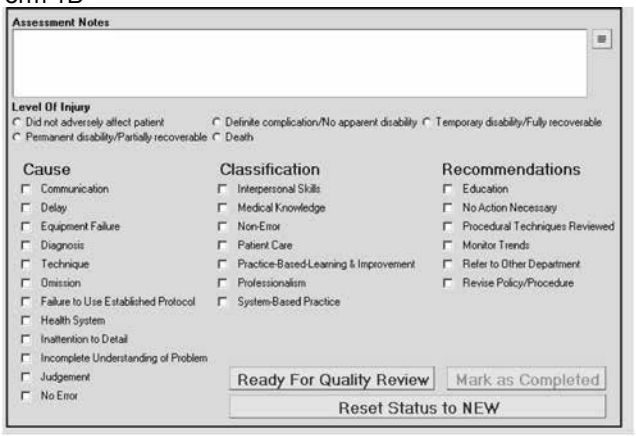
Conclusion:
The MyPOD program provides the basis for comparative data that is essential in evaluation of performance and facilitates quality improvement in surgery. This and similar EMR-driven tools are becoming essential components of the MOC process.

SCIENTIFIC SESSION V (CONT.)

Form 1A



Form 1B



NOTES:

SCIENTIFIC SESSION V (CONT.)

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THORACOSCOPIC PLACEMENT OF PHRENIC NERVE PACERS FOR ONDINE'S CURSE

Kristina J. Nicholson, BS[1], Lauren B. Nosanov, BA [1], Kanika A. Bowen, MD[2], Iris A. Perez, MD[2], Thomas G. Keens, MD[2], Cathy E. Shin, MD[2].

[1]University of Southern California Keck School of Medicine, Los Angeles, CA, USA, [2]Children's Hospital Los Angeles, Los Angeles, CA, USA.

Purpose:
Congenital central hypoventilation syndrome, or Ondine's curse, is a rare disorder affecting central respiratory drive. Patients with this disorder fail to ventilate adequately, particularly while sleeping, and require lifelong ventilatory support. Thoracoscopic placement of diaphragmatic pacers can reduce or eliminate mechanical ventilation requirements. As this operation is performed at only a few centers, little is known about complications and long-term outcomes.

Methods:
Following IRB approval (CCI-13-000-50), a single -center retrospective review was performed for patients undergoing operative management of congenital central hypoventilation syndrome between 2000-2012. Data abstracted from the medical record included operation duration, ventilation method, number of trochars required, post-operative and pacing outcomes.

Results:
Eighteen patients undergoing thoracoscopic placement of diaphragmatic pacers for congenital central hypoventilation syndrome were identified during the study period. One patient underwent both a primary operation and a replacement during this period, and one patient only received a replacement. Mean surgical time was 3.2 +/ - 0.8 hours. In all cases except one, three trochars were utilized for each hemithorax, and no cases were converted to open procedures. All patients had bilateral chest tubes placed post-operatively except one who had only unilateral chest tube placement. Five patients (27.8%) experienced post-operative complications, including atelectasis and pneumothorax. The mean ICU stay was 4.3 +/ - 2.0 days, and the mean hospital stay 5.7 + -/1.5 days. Twelve patients (66.7%) achieved their daily goal pacing times within the follow-up period.

Conclusions:
Thoracoscopic placement of diaphragmatic pacers is a safe and effective treatment modality for congenital central hypoventilation syndrome. Observed complications were temporary, and the majority of patients were able to achieve pacing goals and reduce or eliminate mechanical ventilation requirements. Few require re- operation. This case series represents significant single -center experience with an uncommonly performed procedure.

NOTES:

SCIENTIFIC SESSION V (CONT.)

38

MANAGEMENT OF RECURRENT INTUSSUSCEPTION IN THE AIR CONTRAST ENEMA ERA: A REVIEW OF 716 PATIENTS

Jeremy G. Fisher, MD, Eric A. Sparks, MD, Christopher GB Turner, MD, Justin D. Klein, MD, Elliot Pennington, MD, Faraz Khan, MD, David Zurakowski, PhD, Dario O. Fauza, MD, PhD, Biren P. Modi, MD.

Department of Surgery, Boston Children's Hospital, Boston, MA, USA.

Purpose:
Air contrast enema (ACE) is standard treatment for primary ileocolic intussusception. Management of recurrences is less clear. This study describes patterns of management for recurrent intussusception and aims to delineate its appropriate therapy by quantifying the relationship between recurrence and need for bowel resection, pathologic lead points (PLPs), and complication rates.

Methods:
Following IRB approval, patients with intussusception at one institution from 1997 to 2013 were reviewed. Management of ultrasound-proven recurrences, ACE outcomes, operations, resections, and PLPs were noted. Student's t -test and Fisher's exact test were used for univariate analysis and risk factors for resection and PLP were evaluated by multivariate logistic regression ($P<0.05$).

Results:
Of 716 cases of intussusception, 666 were ileocecal, with 29 PLPs: 18 Meckel's diverticuli, 5 polyps, 4 lymphomas, 2 duplication cysts. Initial episodes underwent ACE (636; 95.5%), operation (22; 3.3%), or resolved spontaneously (8; 1.2%). Among those undergoing ACE initially, >1 recurrence was seen in 95 (15%). Successful initial ACE had a negative predictive value of 96% for resection and 99% for PLP (i.e. after successful ACE, 4% had resections, 1% PLP). Conversely, after failed initial ACE, 40% of patients required resection and 23% had PLPs ($P<0.0002$ for both). Number of recurrences was not predictive of PLP ($P=0.25$) or resection ($P=0.20$). Four ACE- related complications occurred (0.5%), three at 1st ACE and one at 3rd ACE.

Conclusions:
This large cohort of patients with intussusception treated with ACE demonstrates that unsuccessful ACE in children with ileocolic intussusception is associated with increased risk for requiring bowel resection and for harboring pathologic lead points. Number of recurrences is not related to presence of a lead point, bowel resection rate, or ACE-related complications. These data suggest that ACE should be the treatment of choice in recurrent intussusception and no set number of recurrences should trigger automatic operative intervention.

NOTES:

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COMBINED LAPAROSCOPIC/FLUOROSCOPIC PRIMARY GASTROJEJUNOSTOMY BUTTON TUBE PLACEMENT: DESCRIPTION OF TECHNIQUE AND REVIEW OF INITIAL CLINICAL EXPERIENCE

Mariya Skube, MD , Elizabeth Berdan, MD, Robert D. Acton, MD, Daniel A. Saltzman, MD,PhD, Bradley J. Segura, MD, Donavon J. Hess, MD,PhD.

University of Minnesota, Minneapolis, MN, USA.

Purpose:
We present a technique for primary laparoscopic/fluoroscopic gastrojejunostomy (GJ) button tube placement. This technique was developed to avoid the difficulties of a combined laparoscopic/endoscopic approach and to mitigate difficulties associated with directing the catheter through the pylorus, preventing the catheter from coiling in the stomach, and advancing the catheter into the jejunum. We describe the conduct of the operation and evaluate the initial experience.

Methods:
27 patients with 27 procedures performed from 2011 to 2013 at a tertiary care children's hospital were retrospectively reviewed. All attempted operations were included in the analysis. The stomach was retained to the abdominal wall with through -and-through sutures. A gastrotomy was dilated and the pylorus transited with a 20 French introducer. Under fluoroscopy, a wire was passed through the introducer, and advanced into the jejunum through a catheter. A 20 Fr. Peel-away introducer was placed over the wire and through the pylorus. The GJ button was advanced over the wire and through the peel -away introducer. The retaining sutures were tunneled subcutaneously.

Results:
Patients averaged 34 months of age (range 1 mo. – 17 yr.), had a mean weight of 12.2 kg (range 3.8 - 46.7 kg), and a mean ASA score of 2.8 (range 2 – 3). Indications for all operations were GERD with failure to thrive, or GERD with aspiration. All operations initiated for laparoscopic/fluoroscopic GJ tube placement were successful. Operative time averaged 40 minutes (range 16 – 71 min). Estimated blood loss averaged 2 mL (range 1 – 25 mL). There were no operative complications. In a mean follow-up period of 16 months (range 4 – 29 mo.), no complications were noted.

Conclusions:
This technique mitigates many of the difficulties of primary GJ button placement, and can be performed with a high level of success and reasonable operative times with minimal morbidity.

NOTES:

SCIENTIFIC SESSION V (CONT.)

40

H-TYPE TRACHEOESOPHAGEAL FISTULAS: A MULTICENTER REVIEW OF OUTCOMES IN A RARE DISEASE

Sara C. Fallon, MD[1], Shawn D. St. Peter, MD[2], Jacob C. Langer, MD[3], Kuojen Tsao, MD[4], Caroline Kellagher, BA [4], Dave R. Lal, MD[5], Jill S. Whitehouse, MD[5], Diana L. Diesen, MD[6], Michael D. Rollins, MD[7], Elizabeth M. Pontarelli, MD[8], Jeffrey S. Upperman, MD[8], Charles M. Leys, MD[9], Mark L. Wulcan, MD[10], Sarah J. Hill, MD[10], Martin L. Blakely, MD[11], Corey W. Iqbal, MD[12], Timothy D. Kane, MD[13], David E. Wesson, MD[1].

[1]Division of Pediatric Surgery, Michael E. DeBakey Department of Surgery, Baylor College of Medicine, Houston, TX, USA, [2]Department of Surgery, Children's Mercy Hospital and Clinics, Kansas City, MO, USA, [3]Division of Pediatric Surgery, The Hospital for Sick Children, Toronto, ON, Canada, [4]Departments of Pediatric Surgery and Surgery and the Center for Surgical Trials and Evidence-based Practice at the University of Texas Medical School at Houston, Houston, TX, USA, [5]Department of Surgery, Division of Pediatric Surgery, Medical College of Wisconsin and Children's Hospital of Wisconsin, Milwaukee, WI, USA, [6]Children's Medical Center Dallas, UT Southwestern Medical Center,, Dallas, TX, USA, [7]Division of Pediatric Surgery, Primary Children's Medical Center, University of Utah, Salt Lake City, UT, USA, [8]Department of Pediatric Surgery, Children's Hospital Los Angeles, Los Angeles, CA, USA, [9]Department of Surgery, Indiana University Medical Center, Indianapolis, IN, USA, [10]Emory University School of Medicine, Atlanta, GA, USA, [11]Department of Surgery, Vanderbilt University Medical Center, Nashville, TN, USA, [12]Division of Pediatric Surgery, University of California at San Francisco, San Francisco, CA, USA, [13]Department of Surgery, The George Washington University School of Medicine & Health Sciences, Washington, DC, USA.

Purpose:
The H-type tracheoesophageal fistula (TEF), without esophageal atresia (EA), is a rare anomaly with its own unique management issues. Outcomes after surgical treatment are largely unknown due to small compilations of patients. We conducted a large, multicenter review to characterize this population and assess the operative outcomes.

Methods:
A multicenter retrospective review of all H-type TEF patients treated from 2002-2012 was performed after IRB approval at each institution. Variables collected were patient demographics, operative technique, hospital course, and long -term outcomes. Descriptive analyses were performed.

Results:
Twelve centers identified 81 patients with H-type TEF. The overall survival was 95% (Table). Most patients were repaired via the cervical approach (95%). Esophageal leak occurred in 5 of 62 who had a contrast study. Two (2%) developed a recurrent TEF. A total of 23% (19/81) failed extubation after repair, 19% had vocal cord abnormalities on laryngoscopy, and 7% required a tracheostomy (2 patients with tracheomalacia, 1 patient with

SCIENTIFIC SESSION V (CONT.)

bilateral cord paresis +tracheomalacia, 1 patient with unilateral vocal cord paralysis+tracheomalacia, and 1 patient with an aberrant compressive right mainstem bronchus). One patient with choanal atresia/CHARGE had a tracheostomy pre -operatively.

Conclusions:

Patient Demographics and Operative Outcomes					
Patient Demographics	n=81	Operation/ Hospital Course	n=81	Long-term Outcomes	n=81
Gender (M/F)	63%/37%	Cervical/ Thoracotomy/ Thoracoscopy	77 (95%) 3 (4%) 1 (1%)	Laryngoscopy performed	25 (31%)
EGA	37.2(+2.8)	Age at surgery (median, days)	16 (2-1427)	If performed, evidence of vocal cord dysfunction	15 (19%)
Birth weight (mean, g)	2585 (+711)	Drain placed	20 (25%)	Delayed stenosis	4 (5%)
		Median POD swallow study	7 (2-34)	GERD	28 (35%)
		Leak on swallow study	5/62 (8%)	Recurrence	2 (2%)
		Time to start feeds (median, days)	4 (0-15)	Tracheostomy	6 (7%)
		Time to full feeds (median, days)	9 (1-57)	Survival	77 (95%)
		In-hospital complications	Wound infxn (2), sepsis/line infection (2), aspiration pna (1), medical nec (2), GI bleed/ carotid injury (1)	Length of follow up (median)	803 (7 days-5412 days)

This study suggests repair of H-type TEF is associated with a substantial risk of breathing difficulties and vocal cord dysfunction. These data argue for review of surgical technique and routine laryngoscopy to evaluate vocal cord function in patients who demonstrate breathing difficulties after repair.

NOTES:

SCIENTIFIC SESSION V (CONT.)

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PATIENTS' SELF-REPORTED OUTCOME AFTER UNDERGOING ELECTIVE LAPAROSCOPIC APPENDECTOMY FOR THE TREATMENT OF CHRONIC RIGHT LOWER QUADRANT PAIN

Jose S. Lozada, MD[1], A. Daniel Guerron, MD[1], Oliver Soldes, MD[2], Lori Mahajan, MD[1], Federico G. Seifarth, MD[1].

[1]Cleveland Clinic, Cleveland, OH, USA, [2]Akron Children's Hospital, Cleveland, OH, USA.

Purpose:
To describe the patients' self-reported outcome of elective laparoscopic appendectomy as a treatment for chronic right lower quadrant abdominal pain.

Methods:
We conducted a retrospective analysis at our institution of patients who underwent elective appendectomies for chronic right lower quadrant abdominal pain in the last 40 months. Patients who suffered from unclear RLQ abdominal pain >12 months were included. All subjects underwent extensive gastroenterological workup with negative results; including negative CT scans, upper and lower endoscopies, ultrasounds, laboratory work and HIDA scans. Once patients were identified, we then contacted the families, who were asked to rate, on a 5 point likert scale the change in post-operative pain where 1 was much worse, 2 was somewhat worse, 3 was no change, 4 was somewhat resolved, and 5 was completely resolved.

Results:
We identified 28 patients: 10 males, 18 females, ages 4-17y (mean 13.4y). All 28 patients reported resolution of pain during their visit 4 weeks after surgery. Sixteen of the 28 surgical specimens revealed inflammatory changes. We were able to follow-up with 22 of the 28 patients by telephone. Post-operative phone follow-up time ranged from 9-30 months. On the 5-point scale, of the patients whom we were able to contact, 19/22 reported complete resolution of pain, 2/22 reported somewhat improved pain, and 1/22 reported no change. No patients reported a negative effect after the surgery.

Conclusions:
Elective laparoscopic appendectomy is a valuable diagnostic and therapeutic tool. The procedure is associated with low morbidity and a short post-operative hospitalization. Given the potentially invasive, expensive and long diagnostic trail experienced by patients with unclear abdominal pain, we recommend early consideration of laparoscopic appendectomy in the care of patients with unclear chronic right lower abdominal pain.

NOTES:

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INFANT GASTROSTOMY TUBE OUTCOMES BASED ON TUBE CHARACTERISTICS

Naomi -Liza Denning, Danielle N. Leranth, PA -C, John C. Densmore, MD.
Medical College of Wisconsin, Wauwatosa, WI, USA.

Purpose:

Although gastrostomy complication rates have been studied, a paucity of reports correlate tube characteristics and method of placement to patient outcome. This retrospective review analyzes these effects in infants receiving gastrostomy tubes.

Methods:

Charts of 314 infant gastrostomies from 2004-2010 were reviewed. Tube characteristics were long vs. button, silicon vs. latex, and balloon vs. mushroom. Method of placement was categorized as PEG, laparoscopic Georgeson (LG), laparoscopic pexy (LP), and Stamm gastrostomy (SG). Two -year outcomes were tracked (leakage, granulation, prolapse, cellulitis, wound infection, hernia, dehiscence, small bowel obstruction, peritonitis, dislodgement < and > 6 weeks, migration, misplacement, persistent fistula, reoperation). Mantel -Haenszel chi-square (trend) test and Poisson regression with scale deviance were used for analysis.

Results:

314 patients experienced 481 complications. Individual complications were not correlated with tube characteristics. Analyzing total complication rates revealed that balloon tubes had a higher mean complication rate (1.75 vs. 1.36, $p = 0.04$). Buttons trended a higher rate of overall complication (1.82 vs. 1.43, $p = 0.06$). Individual complications occurring > 20 times were analyzed by tube characteristics and surgical technique. Balloon tipped tubes had a higher rate of fistula requiring closure (23% vs. 13%, $p = 0.025$). Long tubes and latex tubes had a higher rate of cellulitis (13% vs. 5.9%, $p = 0.029$ and 18.2% vs. 9.3%, $p = 0.011$). Surgical technique was correlated with likelihood of tract leakage (LP 29.3%, SG 22.1%, PEG 13.4%, LG 9.5%, $p = .047$). Long tubes, mushroom tubes, and PEG tubes had lowest incidence of tube dislodgement < 6 weeks (all $p < 0.01$).

Conclusion:

Gastrostomy tubes incur significant morbidity. Tube characteristics did not correlate with individual complication rates. However, among tubes with complications, differences in tube characteristics and method of placement were noted. Increasing the observations in this study will likely illuminate differences in outcome.

NOTES:

EXHIBITS & SUPPORT

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Fort Lauderdale, FL

APSA 47th Annual Meeting and Joint Meeting with IPSO
May 14–18, 2016
Manchester Grand Hyatt San Diego
San Diego, CA

APSA 48th Annual Meeting
May 4–7, 2017
The Westin Diplomat Resort & Spa
Hollywood, FL

APSA 49th Annual Meeting
May 3–6, 2018
JW Marriott Desert Springs Resort & Spa
Palm Desert, CA

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