WPTC
San Diego

Hotel del Coronado

Coronado, California | July 9-11, 2014

CONFERENCE SYLLABUS

Presented by

Phoenix Children’s Hospital

Children’s Hospital Colorado

Intermountain Primary Children’s Hospital
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Greetings from the Planning Committee

Dear Conference Attendee,

The Western Pediatric Trauma Conference welcomes you to the historic Hotel Del Coronado, where the picturesque views promise to enrich your learning experience.

We would like to thank:

• The faculty who have generously taken time from their busy schedule to share their expertise
• The moderators, planning committee, and many others who have joined our team to prepare for this conference
• The exhibitors who support this conference and bring cutting-edge products and services to enhance pediatric trauma services
• Our attendees! Without you, this conference would not be possible

Enclosed you will find a layout of the conference facilities, course schedule, abstracts, and information on obtaining your continuing education credit.

It is our hope that as you take in the cool ocean breeze, you will also take with you ideas to improve pediatric trauma care and outcomes. Thank you for attending the Western Pediatric Trauma Conference in San Diego, CA. We hope to see you again next year in Park City, Utah.

Sincerely,

Western Pediatric Trauma Conference Planning Committee
Planning Committee

President and Chair

David Notrica, MD FACS FAAP
Associate Professor of Surgery
University of Arizona
Assistant Professor of Surgery
Mayo Clinic
Medical Director, Trauma Services
Phoenix Children’s Hospital
Phoenix, Arizona

Chairs

Robert Bolte, MD
Professor of Pediatrics
Division of Pediatric Emergency Medicine
University of Utah
Salt Lake City, Utah

Steven Moulton, MD FACS
Professor of Surgery
University of Colorado
Medical Director, Trauma Services
Medical Director, Burn Services
Children’s Hospital Colorado
Aurora, Colorado

Eric R. Scaife, MD FACS
Associate Professor of Surgery
University of Utah Health Care
Chief, Division of Pediatric Surgery
Medical Director, Trauma Services
Primary Children’s Hospital
Salt Lake City, Utah

David W. Tellez, MD FAAP FCCM
Associate Professor of Clinical Medicine,
Department of Child Health
University of Arizona
Pediatric Intensivist, Phoenix Children’s Hospital
Medical Director, Pediatric Services
Air Evac

Planning Committee Members

Sharon Chow, MN RN
Trauma Program Manager
St. Luke’s Children’s Hospital
Boise, Idaho

Ray Cuellar, BSBA
Trauma/Burn Outreach Coordinator
Children’s Hospital Colorado
Aurora, Colorado

Kristine Hansen, BSN RN
Trauma Program Manager
Primary Children’s Hospital
Salt Lake City, Utah

Stephanie Harrison, RN MBA BSN CPEN CEN
Trauma/Burn Program Manager
Children’s Hospital Colorado
Aurora, Colorado

Summer Magoteaux, BSN RN
Trauma Program Manager
Phenix Children’s Hospital

Tatum Senter
Event Coordinator, Trauma Services
Phoenix Children’s Hospital
Facility Layout

- Grande Hall
- Exhibit Hall
- Poster Session
- & Break Room
- Viceroy
- General Sessions
- Regent & Empress
- Early Registration
- Coronet Room
- Welcome Reception
- Vista Walk
- Lunch
- Windsor Lawn
- Beach
- Hotel del Coronado
- Facility Layout
- Grande Hall
- Exhibit Hall
- Poster Session
- & Break Room
- Viceroy
- General Sessions
- Regent & Empress
- Early Registration
- Coronet Room
- Welcome Reception
- Vista Walk
- Lunch
- Windsor Lawn
- Beach
- Hotel del Coronado
## Course Schedule

### TUESDAY, JULY 8, 2014

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>4:00 pm</td>
<td>Pre-registration</td>
</tr>
<tr>
<td>4:30-6:30</td>
<td>Welcome Reception</td>
</tr>
</tbody>
</table>

### WEDNESDAY, JULY 9, 2013

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>7:00 am</td>
<td>Sign-In and Breakfast (provided; with exhibitors)</td>
</tr>
<tr>
<td>7:30</td>
<td>Welcome and Opening Remarks</td>
</tr>
<tr>
<td></td>
<td>David Notrica, MD FACS FAAP and Robert Meyer, CEO, Phoenix Children's Hospital</td>
</tr>
<tr>
<td>7:45</td>
<td><strong>Children in Mass Casualty Events</strong></td>
</tr>
<tr>
<td></td>
<td>David Tuggle, MD FACS FAAP FCCM</td>
</tr>
<tr>
<td>8:45</td>
<td><strong>Damage Control in Pediatric Abdominal Trauma</strong></td>
</tr>
<tr>
<td></td>
<td>Steven Stylianos, MD FACS</td>
</tr>
<tr>
<td>9:15</td>
<td><strong>Is the Head Bone Connected to the Spine Bone?</strong></td>
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<td>A Critical Analysis of Atlantooccipital Dislocation in the Pediatric Population</td>
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<td></td>
<td>Douglas Brockmeyer, MD FAAP</td>
</tr>
<tr>
<td>9:45</td>
<td><strong>The Role of the Trauma Nurse Practitioner</strong></td>
</tr>
<tr>
<td></td>
<td>Lisa Runyon, CPNP</td>
</tr>
<tr>
<td>10:15</td>
<td>Break (visit exhibits)</td>
</tr>
<tr>
<td>10:30</td>
<td><strong>Successful Injury Prevention: Lessons from Patient Safety</strong></td>
</tr>
<tr>
<td></td>
<td>J. Michael Dean, MD MBA</td>
</tr>
<tr>
<td>11:00</td>
<td><strong>Children: The Overlooked Casualty of the War in Afghanistan</strong></td>
</tr>
<tr>
<td></td>
<td>Stephen J. Fenton, MD FACS</td>
</tr>
<tr>
<td>11:30</td>
<td><strong>Concussion or Mild Traumatic Brain Injury?</strong></td>
</tr>
<tr>
<td></td>
<td>A Pediatric Trauma Surgeon's Perspective</td>
</tr>
<tr>
<td></td>
<td>Barbara Gaines, MD</td>
</tr>
<tr>
<td>12:00 pm</td>
<td>Lunch (provided; visit exhibits)</td>
</tr>
</tbody>
</table>

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*Note: Locations are indicated by place names.*
Family Presence in the Trauma Bay

Wednesday, July 9, 2014
1:00 PM

Starring:
R. Todd Maxson, MD
and Steven Stylianos, MD

Officiant:
David Notrica, M.D.
CONTINUED, WEDNESDAY, JULY 9, 2014

1:00  “Beast of the Beach” Point-Counterpoint
      Family Presence in the Trauma Bay
      R. Todd Maxson, MD vs. Steven Stylianos, MD
      Moderator: David Notrica, MD FACS FAAP

1:30  End Points of Resuscitation
      James Davis, MD

2:00  A Heart-Warming Approach to Pediatric
      Hypothermia in the Emergency Department
      Robert Bolte, MD

2:30  The Excitement of Performance Improvement
      and the Mystique of the Medical Audit Committee
      Mary Hilfiker, MD PhD MMM

3:00  Challenging Cases
      Eric Scaife, MD FACS

3:30  Break (visit exhibits)

3:45-4:45  Poster Presentations
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Speaker(s)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00</td>
<td>Sign-In and Breakfast</td>
<td></td>
<td>Viceroy</td>
</tr>
<tr>
<td>7:30</td>
<td>Evidence-based ED Evaluation of Pediatric Head Trauma</td>
<td>Nathan Kuppermann, MD MPH</td>
<td>Regent &amp; Empress</td>
</tr>
<tr>
<td>8:00</td>
<td>To Image or Not to Image? That is the Question</td>
<td>Barbara Gaines, MD</td>
<td>Regent &amp; Empress</td>
</tr>
<tr>
<td>8:30</td>
<td>Balanced Resuscitations in Children</td>
<td>R. Todd Maxson, MD</td>
<td>Viceroy</td>
</tr>
<tr>
<td>9:00</td>
<td>Complex GU Trauma</td>
<td>Kathleen Graziano, MD</td>
<td>Regent &amp; Empress</td>
</tr>
<tr>
<td>10:00</td>
<td>Break (visit exhibitors)</td>
<td></td>
<td>Viceroy</td>
</tr>
<tr>
<td>10:15</td>
<td>Pediatric Emergency Department Registries: What Does the Future Hold for Pediatric Research?</td>
<td>Lalit Bajaj, MD MPH</td>
<td>Regent &amp; Empress</td>
</tr>
<tr>
<td>10:45</td>
<td>Top Ten Hits from the Pediatric Trauma Literature</td>
<td>Dennis Lund, MD</td>
<td>Regent &amp; Empress</td>
</tr>
<tr>
<td>11:15</td>
<td>Podium Presentations</td>
<td></td>
<td>Viceroy</td>
</tr>
<tr>
<td>11:45</td>
<td>Lunch (provided; visit exhibits)</td>
<td></td>
<td>Regent &amp; Empress</td>
</tr>
<tr>
<td>12:45</td>
<td>“Conquer Coronado” Point-Counterpoint Can FAST be Trusted?</td>
<td>Eric Scaife, MD FACS vs. Ramin Jamshidi, MD</td>
<td>Regent &amp; Empress</td>
</tr>
<tr>
<td></td>
<td><strong>Child Maltreatment Segment</strong></td>
<td><strong>Moderator:</strong> David Notrica, MD FACS FAAP</td>
<td></td>
</tr>
<tr>
<td>1:15</td>
<td>Rule of Thumb</td>
<td>James Davis, MD</td>
<td>Regent &amp; Empress</td>
</tr>
<tr>
<td>2:15</td>
<td>Post Mortem Imaging</td>
<td>Ramin Jamshidi, MD</td>
<td>Regent &amp; Empress</td>
</tr>
<tr>
<td>2:45</td>
<td>Pediatric Burns: Abusive, Neglectful, or Simply Accidental?</td>
<td>Steven Moulton, MD FACS</td>
<td>Regent &amp; Empress</td>
</tr>
<tr>
<td>3:15</td>
<td>Child Maltreatment Panel Q&amp;A</td>
<td>James Davis, MD, Steven Moulton, MD, and Ramin Jamshidi, MD</td>
<td>Regent &amp; Empress</td>
</tr>
</tbody>
</table>
Can FAST be Trusted?

Thursday, July 10, 2014
12:45 PM

Starring:
Eric Scaife, M.D.
and Ramin Jamshidi, M.D.

Officiant:
David Notrica, M.D.
### Course Schedule:

**CONTINUED, THURSDAY, JULY 10, 2014**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>3:30</td>
<td>Break (visit exhibits)</td>
</tr>
<tr>
<td>3:45-4:45</td>
<td>Podium Presentations</td>
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</tbody>
</table>

**Friday, July 11 , 2014**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 am</td>
<td>Sign-In and Breakfast</td>
</tr>
<tr>
<td>7:30</td>
<td>Not Just Little Adults: Unique Considerations in the Difficult Pediatric Airway&lt;br&gt;Sarena Teng, MD</td>
</tr>
<tr>
<td>8:00</td>
<td>Is It Still “Cool” to use Hypothermia Following Pediatric TBI? &lt;br&gt;David Adelson, MD FACS FAAP</td>
</tr>
<tr>
<td>8:30</td>
<td>ARDS: The Trauma Never Ends&lt;br&gt;David Tellez, MD FAAP FCCM</td>
</tr>
<tr>
<td>9:00</td>
<td>Abstract Award Presentations</td>
</tr>
<tr>
<td>9:15</td>
<td>Break (visit exhibits)</td>
</tr>
<tr>
<td>9:30</td>
<td>Evidence-based ED Evaluation of Pediatric Abdominal Trauma&lt;br&gt;Nathan Kuppermann, MD MPH</td>
</tr>
<tr>
<td>10:00</td>
<td>Na is Nice but Wet is Worrisome&lt;br&gt;David Tuggle, MD FACS FAAP FCCM</td>
</tr>
<tr>
<td>10:30</td>
<td>Secrets to a Successful ACS-COT Verification Site Visit&lt;br&gt;Steven Stylianos, MD</td>
</tr>
<tr>
<td>11:00</td>
<td>Green to Orange: Changes in ACS Verification&lt;br&gt;R. Todd Maxson, MD</td>
</tr>
<tr>
<td>11:30</td>
<td>Adjourn</td>
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</tbody>
</table>
Faculty

KEYNOTE

David W. Tuggle, MD FACS FAAP
FCCM
Clinical Professor of Surgery,
University of Texas-Southwestern
Associate Trauma Medical Director,
Dell Children's Medical Center

James W. Davis, MD
Clinical Professor of Surgery,
University of California, San Francisco
Chief of Trauma,
Community Regional Medical Center

P. David Adelson, MD FACS FAAP
Director, Barrow Neurological Institute
Chief, Pediatric Neurosurgery
Children's Neurosciences
Phoenix Children's Hospital

J. Michael Dean, MD MBA
Chief, Division of Pediatric Critical Care
Vice-Chairman, Pediatrics,
Primary Children's Hospital

Lalit Bajaj, MD MPH
Associate Professor of Pediatrics,
University of Colorado
Research Director,
Section of Emergency Medicine
Associate Director,
Clinical Trials Organization
Director, Evidence-Based Practice
Children’s Hospital Colorado

Stephen J. Fenton, MD FACS
Assistant Professor of Pediatric Surgery,
University of Utah
Attending Physician, Pediatric Surgery
Primary Children's Hospital

Robert Bolte, MD
Professor of Pediatrics,
Division of Pediatric Emergency Medicine
University of Utah

Barbara A. Gaines, MD
Associate Professor,
University of Pittsburgh
Clinical Director, Pediatric General and Thoracic Surgery
Director, Trauma and Injury Prevention Program
Director, Pediatric Surgery Training Program

Douglas Brockmeyer, MD
Chief, Division of Pediatric Neurosurgery
Academic Coordinator,
Pediatric Neurosurgery Fellowship Program
University of Utah

Kathleen Graziano, MD
Clinical Assistant Professor of Surgery,
University of Arizona
Attending Pediatric Surgeon,
Pediatric Surgeons of Phoenix
Director, Reproductive Anomalies Clinic
Phoenix Children's Hospital
Mary Hilfiker, MD PhD MMM
Clinical Professor of Surgery,
University of California, San Diego
Medical Director, Trauma Services
Rady Children’s Specialists of San Diego,
A Medical Foundation

Ramin Jamshidi, MD
Attending Pediatric Surgeon,
Pediatric Surgeons of Phoenix

Nathan Kuppermann, MD MPH
Professor, Emergency
Medicine and Pediatrics
Bo Tomas Brofeldt Endowed Chair,
Department of Emergency Medicine
University of California, Davis

Dennis P. Lund, MD
Professor of Child Health and Surgery,
University of Arizona
Executive Vice President,
Phoenix Children’s Medical Group
Surgeon-in-Chief,
Phoenix Children’s Hospital

R. Todd Maxson, MD
Associate Professor of Surgery,
University of Arkansas
Medical Director, Trauma and Burn
Services Arkansas Children’s Hospital

Steven Moulton, MD FACS
Professor of Surgery,
University of Colorado
Medical Director, Trauma and Burn
Services Children’s Hospital Colorado

David Notrica, MD FACS FAAP
Associate Professor of Surgery,
University of Arizona
Assistant Professor of Surgery,
Mayo Clinic Arizona
Medical Director, Trauma Services
Phoenix Children’s Hospital

Lisa Runyon, MS CPNP
Trauma Nurse Practitioner,
Primary Children’s Hospital

Eric R. Scaife, MD FACS
Associate Professor of Surgery,
University of Utah Health Care
Chief, Division of Pediatric Surgery
Medical Director, Trauma Services
Primary Children’s Hospital

Steven Stylianos, MD
Professor of Surgery and Pediatrics,
Columbia University College of
Physicians and Surgeons
Surgeon-in-Chief,
Chief, Division of Pediatric Surgery
Morgan Stanley Children’s Hospital of
NY Presbyterian

David W. Tellez, MD FAAP FCCM
Associate Professor of Clinical Medicine,
Department of Child Health
University of Arizona
Pediatric Intensivist, Phoenix Children’s Hospital
Medical Director, Pediatric Services
Air Evac

Sarena Teng, MD
Pediatric Anesthesiologist/Intensivist
Ochsner Medical Center
Faculty Disclosure of Financial and Commercial Relationships

WESTERN PEDIATRIC TRAUMA CONFERENCE
Sponsored by Phoenix Children’s Hospital
July 9-11, 2014

Disclosure of Relevant Financial Relationships
The following speakers have no relevant financial relationships with commercial interests to disclose:

Lalit Bajaj, MD
Robert Bolte, MD
Douglas Brockmeyer, MD
James Davis, MD
J. Michael Dean, MD
Stephen Fenton, MD
Kathleen Graziano, MD
Mary Hilfiker, MD
Ramin Jamshidi, MD
Nathan Kuppermann, MD
Dennis Lund, MD
David Notrica, MD
Lisa Runyon, NP
Eric Scaife, MD
Steven Stylianos, MD
David Tellez, MD
Sarena Teng, MD
David Tuggle, MD
Barbara Gaines, MD

The following speakers have relevant financial relationships with commercial interests to disclose:

David P. Adelson, MD
Companies
Integra, Codman, Baxter
Received
Grant/Research Support
Role
Investigator

R. Todd Maxson, MD
Companies
American College of Surgeons
Received
Consultant Fee
Role
Consultant
Arkansas Dept. of Health
Consultant Fee
Consultant

Steven Moulton, MD
Company
Flashback Technologies Inc.
Received
Consultant Fee
Role
Consultant
Equity, IP Rights
Ownership, Inventor

Drs. Adelson, Maxson, and Moulton, submitted their presentation material for review in advance of this program. On the basis of the information provided, we have determined that no conflict of interest exists with respect to their role in this continuing medical education activity.

This statement verifies that all activity planning member disclosure of relevant financial relationships has been reviewed. On the basis of the information provided, it has been determined that no conflict of interest exists with respect to their role in this continuing medical education activity.

If there appears to be a conflict of interest, the planning member is no longer involved in planning over CME content relevant to the commercial interest.
Wednesday, July 9, 2014

**7:00 - 7:30 AM**
Sign In and Breakfast

**7:30 - 7:45**
Welcome and Opening Remarks
David Notrica, MD FACS FAAP &
Robert Meyer, CEO at Phoenix Children’s Hospital

**7:45 - 8:45**
**KEYNOTE: Children in Mass Casualty Events**
David Tuggle, MD FACS FAAP FCCM

Objectives:
1. Observations of event management will be discussed
2. The random factors that occur will be reviewed
3. Recommendations for modifying disaster drills will be discussed

**8:45 - 9:15**
**Damage Control in Pediatric Abdominal Trauma**
Steven Stylianos, MD

Objectives:
1. Recognize the lethal triad of hypothermia, acidosis and coagulopathy associated with major hemorrhage
2. Define concepts and techniques of damage-control operative procedures
3. Define the role of endoscopists and interventional radiologists in the multi-disciplinary care of the pediatric abdominal trauma patient
Wednesday, Continued

9:15 - 9:45  
Is the Head Bone Connected to the Spine Bone? A Critical Analysis of Atlantooccipital Dislocation in the Pediatric Population  
Douglas Brockmeyer, MD FAAP

Objectives:  
1. Become familiar with the anatomy and pathophysiology relevant to atlantooccipital dislocation  
2. Become familiar with controversies surrounding the accurate diagnosis of AOD in the pediatric population  
3. Be able to discuss various ways to treat AOD in the pediatric population

9:45 - 10:15  
The Role of the Trauma Nurse Practitioner  
Lisa Runyon, CPNP

Objectives:  
1. Identify the role and scope of practice for Nurse Practitioners in a Level 1 pediatric trauma center  
2. Review the impact that the Trauma Nurse Practitioner has on length of stay and patient/staff satisfaction  
3. Discuss the future directions for role expansion

10:15 - 10:30  
Break (visit exhibits)
**Wednesday, Continued**

**10:30 - 11:00**

**Successful Injury Prevention: Lessons from Patient Safety**
J. Michael Dean, MD MBA

**Objectives:**
1. Understand basic approaches to patient safety
2. Correlate lessons learned from patient safety and from injury prevention strategies
3. Be able to conceptualize new injury prevention strategies based on principles used for improving patient safety

**11:00 - 11:30**

**Children: the Overlooked Casualties of the War in Afghanistan**
Stephen J. Fenton, MD FACS

**Objectives:**
1. Recognize the perils faced by Afghan children during the war in Afghanistan
2. Identify injuries that can be sustained by children in combat zone
3. Understand life saving measures that can be implemented to minimize mortality of these injuries

**11:30 - 12:00**

**Concussion or Mild Traumatic Brain Injury? A Pediatric Trauma Surgeon’s Perspective**
Barbara Gaines, MD

**Objectives:**
1. Identify current strategies in the management of concussion
2. Understand the evaluation priorities for multi-system head injured patients
3. Understand components of current concussion legislation

**12:00 - 1:00 PM**

Lunch (provided; visit exhibits)
Wednesday, Continued

1:00 - 1:30
“Beast of the Beach” Point-Counterpoint
Family Presence in the Trauma Bay
R. Todd Maxson, MD vs. Steven Stylianos, MD
Moderator: David Notrica, MD FACS FAAP

1:30 - 2:00
End Points of Resuscitation
James Davis, MD

Objectives:
1. Identify the physiology of biochemical markers of shock resuscitation
2. Understand the use and limitations of biochemical endpoints of resuscitation

2:00 - 2:30
A Heart-Warming Approach to Pediatric Hypothermia
in the Emergency Department
Robert Bolte, MD

Objectives:
1. Recognize indications for ECMO rewarming of the hypothermic child
2. Understand the utility of a formal activation protocol for pediatric rewarming
Wednesday, Continued

2:30 - 3:00
The Excitement of Performance Improvement and the Mystique of the Medical Audit Committee
Mary Hilfiker, MD PhD MMM

Objectives:
1. Review the importance of PI and discuss ways to engage the trauma surgeons and others in the process
2. Discuss the role of the medical audit committee and the function of MAC in the trauma system

3:00 - 3:30
Challenging Case
Eric Scaife, MD FACS

3:30 - 3:45
Break (visit exhibits)

3:45 - 4:45
Poster Presentations
Thursday, July 10, 2014

7:00 - 7:30 AM
Sign In and Breakfast

7:30 - 8:00
Evidence-based ED Evaluation of Pediatric Head Trauma
Nathan Kuppermann, MD MPH

Objectives:
1. Describe the epidemiology of pediatric head trauma
2. Discuss the evidence around appropriate CT use
3. Introduce the topic of knowledge translation to promote the use of evidence in the ED

8:00 - 8:30
To Image or Not to Image? That is the Question
Barbara Gaines, MD

Objectives:
1. Demonstrate an understanding of current issues regarding radiation exposure in pediatric trauma imaging
2. Identify situations in which alternative imaging strategies may be utilized in diagnosing pediatric traumatic injuries
3. Recognize the value of the development of evidence based practice guidelines to avoid unnecessary exposure to radiation through imaging
Thursday, Continued

8:30 - 9:00
Balanced Resuscitations in Children
R. Todd Maxson, MD FACS

Objectives:
1. Review the concepts of both damage control and balanced fluid resuscitation
2. Examine with the learner if areas exist where the recommendations for adults should differ for children
3. Discuss any specific literature that supports varying from the adult recommendations

9:00 - 9:30
Complex GU Trauma
Kathleen Graziano, MD

Objectives:
1. Describe specific genitourinary injuries commonly found with certain mechanisms of injury
2. Manage life-threatening and non-acute genitourinary injuries
3. Understand the role of consultants in the management of pelvic trauma

9:30 - 10:00
The Five W’s of Non-operative Management Failure: Who, What, When, Where, and Why?
David Notrica, MD FACS FAAP

Objectives:
1. Understand non operative management of pediatric solid organ injury
2. Understand which patients fail nonoperative management
3. Understand the timing of nonoperative management failure
Thursday, Continued

10:00 - 10:15
Break (visit exhibits)

10:15 - 10:45
Pediatric Emergency Department Registries: What Does the Future Hold for Pediatric Research?
Lalit Bajaj, MD MPH

Objectives:
1. Describe the evolution of PECARN ED patient registries
2. Understand the complexity of multi-center data aggregation
3. Contemplate how the data in these registries can be used for research and improvements in pediatric trauma care

10:45 - 11:15
Top Ten Hits from the Pediatric Trauma Literature
Dennis Lund, MD

Objectives:
1. Gain an understanding of the potential issues of radiation exposure in traumatized children
2. Understand the predictive value of the initial Glasgow Coma Scale Score in pediatric trauma patients
3. Understand the potential role of real time thromboelastography (rTEG) in the management of pediatric trauma victims
Thursday, Continued

11:15 - 11:45
Podium Presentations

Presentation Order:
1. SHOULD NON-ACCIDENTAL TRAUMA PATIENTS BE ADMITTED TO THE TRAUMA SERVICE - Megan Gilbert
2. CHAIR LIFT RELATED SKI AND SNOWBOARDING INJURIES IN CHILDREN - Eric Glissmeyer
3. THROMBOELASTROGRAM IS AN IMPORTANT CLINICAL TOOL TO DIRECT TRANSFUSION IN PEDIATRIC TRAUMA PATIENTS - Satbir (Rosie) Dhillon
4. PEDIATRIC SPECIFIC SHOCK INDEX ACCURATELY IDENTIFIES SEVERELY INJURED CHILDREN - Shannon Acker

11:45 AM - 12:45 PM
Lunch (provided; visit exhibitors)

12:45 - 1:15
“Conquer Coronado” Point-Counterpoint
Can FAST be Trusted?
Eric Scaife, MD FACS vs Ramin Jamshidi, MD
Moderator: David Notrica, MD FACS FAAP
Thursday, Continued

Child Maltreatment Segment

1:15 - 2:15
Rule of Thumb
James Davis, MD

Objectives:
1. Identify the frequency and severity of domestic violence
2. Recognize the signs and symptoms of domestic violence
3. State the importance and significance of screening and utilize a screening tool to identify the victims of domestic violence

2:15 - 2:45
Post Mortem Imaging
Ramin Jamshidi, MD

Objectives:
1. Understand the role of post-mortem imaging in non-accidental trauma
2. Understand the expected difference in post-mortem CT
3. Understand the medico-legal implications of post-mortem CT

2:45 - 3:15
Pediatric Burns: Abusive, Neglectful, or Simply Accidental?
Steven Moulton, MD FACS

Objectives:
1. Describe the management of small to moderate size pediatric burn injuries
2. Differentiate accidental from non-accidental burn injuries
Thursday, Continued

3:15 - 3:30
Child Maltreatment Panel Questions & Answers
James Davis, MD, Steven Moulton, MD FACS, and Ramin Jamshidi, MD
Moderator: Eric Scaife, MD

3:30 - 3:45
Break (visit exhibitors)

3:45 - 4:45
Podium Presentations

Presentation Order:
1. HELICOPTER VERSUS GROUND EMERGENCY MEDICAL SERVICES FOR TRANSPORTATION OF TRAUMATICALLY INJURED CHILDREN - Camille Stewart
2. SCREENING LABS FOR PEDIATRIC BLUNT ABDOMINAL TRAUMA: A QUANTITATIVE ANALYSIS - Crystal Silva
3. RISK FACTORS FOR CEREBROVASCULAR INJURY DIAGNOSED BY CT ANGIOGRAPHY IN THE PEDIATRIC POPULATION: IMPLEMENTATION OF A PREDICTION SCORE - Vijay Ravindra
4. CAR SEAT EDUCATION FOR PARENTS: DVD-BASED SOCIAL LEARNING VS LIVE EDUCATION - Rebecca Ragar
5. ROLE OF ERCP IN PEDIATRIC BLUNT ABDOMINAL TRAUMA: A CASE SERIES AT A LEVEL ONE PEDIATRIC TRAUMA CENTER - Erin Garvey
6. PREVENTABLE TRANSFERS IN PEDIATRIC TRAUMA: A 10-YEAR EXPERIENCE AT A LEVEL I PEDIATRIC TRAUMA CENTER - Justin Lee
7. PEDIATRIC FACIAL FRACTURES: DEMOGRAPHIC DETERMINANTS INFLUENCING CLINICAL OUTCOMES - Kenny Chan
8. BENCHMARKS FOR SPLENECTOMY IN PEDIATRIC TRAUMA: HOW ARE WE DOING? - Stephanie Polites
Friday, July 11, 2014

7:00 - 7:30 AM
Sign In and Breakfast

7:30 - 8:00
Not Just Little Adults: Unique Considerations in the Difficult Pediatric Airway
Sarena Teng, MD

Objectives:
1. Recognize the unique considerations in pediatric anatomy and physiology as they relate to airway management
2. Identify certain pediatric congenital syndromes or diseases which can have subtle or not-so-subtle implications for a difficult pediatric airway
3. Understand the current practice guidelines and literature which can aid in manipulation of pediatric difficult airways

8:00 - 8:30
Is it Still “Cool” to Use Hypothermia Following Pediatric TBI?
David Adelson, MD FACS FAAP

Objectives:
1. Provide an overview of the complex issues of the management of traumatic brain injury and in particular, pediatric TBI
2. Understand the complex issues surrounding and performing clinical trials in pediatric TBI
3. Provide the current understanding of the utilization of temperature regulation and therapeutic hypothermia in Pediatric TBI
Friday, Continued

8:30 - 9:00
ARDS: The Trauma Never End
David Tellez, MD FAAP FCCM

Objectives:
1. Review the current understanding of the initial lung injury
2. Better understand the mechanisms of ongoing lung injury from barotrauma to biotrauma
3. Update the audience on the current literature on what therapies may be beneficial and what aren’t

9:00 - 9:15
Abstract Award Presentations

9:15 - 9:30 AM
Break (visit exhibits)

9:30 - 10:00
Evidence-based ED Evaluation of Pediatric Abdominal Trauma
Nathan Kuppermann, MD MPH

Objectives:
1. Describe the epidemiology of pediatric abdominal trauma
2. Describe clinical prediction rules for appropriate CT use
3. Describe the potential benefits of the FAST examination
Friday, Continued

10:00 - 10:30
Na is Nice but Wet is Worrisome
David Tuggle, MD FACS FAAP FCCM

Objectives:
1. The participant will learn of the historical basis for crystalloid resuscitation
2. Recent data will be presented as a counterpoint to traditional fluid resuscitation schemes
3. The importance of sodium levels will be reviewed

10:30 - 11:00
Secrets to a Successful ACS-COT Verification Site Visit
Steven Stylianos, MD

Objectives:
1. Recognize key areas in preparing for an ACS-COT Verification Site Visit
2. Define strategies to prevent Type 1 and Type 2 deficiencies during an ACS-COT verification site visit

11:00 - 11:30
Green to Orange: Changes in ACS Verification
R. Todd Maxson, MD

Objectives:
1. Review for the learner the need to update the standards for trauma center performance
2. Highlight the major changes that affect a pediatric trauma center
3. Discuss the timeline of implementation of the new criteria

11:30 AM
Adjourn
Exhibits

Exhibit Hall Hours

**Tuesday, July 8, 2014**
Setup 3:00 - 5:00 PM

**Wednesday, July 9, 2014**
7:00 AM - 4:45 PM
Setup 6:30 - 7:00 AM
Breakfast 7:00 - 7:30
Break 10:15 - 10:30
Lunch 12:00 - 1:00 PM
Break 3:30 - 3:45
Poster Session 3:45 - 4:45

**Thursday, July 10, 2014**
7:00 AM - 4:30 PM
Breakfast 7:00 - 7:30 AM
Break 10:00 - 10:15
Lunch 11:45 AM - 12:45 PM
Break 3:15 - 3:30

**Friday, July 11, 2014**
7:00 AM - 9:30 AM
Breakfast 7:00 - 7:30 AM
Break 9:15 - 9:30
Take Down 9:30

Exhibitors by table:

1. PMT
2. Covidien
3. Air Evac Services
4. Ethicon
5. Haemonetics
6. Scrubs and Beyond
7. Ossur America
8. Z-Medica
9. Microsurgery Instruments
10. Mayo Clinic Pediatric Trauma Center
11. Belmont Instrument Corporation
12. B-Line Medical
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Abstract Title:
SHOULD NON-ACCIDENTAL TRAUMA PATIENTS BE ADMITTED TO THE TRAUMA SERVICE

Author(s):
Gilbert M, Magoteaux S, Notrica DM

Background:
The American College of Surgeons (ACS) requires a quality review of all cases admitted to a non-surgical service if those admissions exceed 10% of the total trauma patient population annually. Prior to 2011, all non-accidental trauma (NAT) patients were admitted to the trauma service (TS). The trauma surgeons questioned their contribution to the care of these patients, so hospital policy was changed to allow NAT admission to non-surgical services (NSS) such as the general pediatrics service. As part of the quality review process, all cases were evaluated for performance improvement indicators.

Methods:
Trauma performance improvement (PI) data was examined to determine the rates of missed diagnosis, lack of consult, readmission, lack of follow up, and all other PI indicators during the 3-year period of NAT admission to TS (January 2008 to December 2010), and then compared to admissions to NSS in the 3-year later period (January 2011 to December 2013). Additionally, the quality data was analyzed to compare the TS performance to all other services.

Results:
In the initial 3-year period, 47% of cases were admitted to the TS, 29% admitted to NSS, and 24% admitted to other surgical services (OSS). The overall frequency of NAT cases triggering quality indicators was 19% in the early period. In the later period, 27% of cases were admitted to the TS, 56% to NSS, and 17% admitted to OSS. In this period, 25% experienced care-related indicators. When comparing TS to NSS (from 2011 to present), care-related indicators were present in 15.7% of patients admitted to TS, and 32% for NSS and 16% in OSS.

Conclusion:
Admission of NAT to a SS decreases the frequency of common errors such as missed diagnosis, lack of appropriate consultation, readmission, and lack of follow up. The ACS guidelines should require NAT to be admitted to a SS.
Abstract Title:
CHAIR LIFT RELATED SKI AND SNOWBOARDING INJURIES IN CHILDREN

Author(s):
Eric Glissmeyer

Background:
Ski and snowboarding injuries (SSI) are common and a perennial source of morbidity. Chair lift related SSIs occur at regulated facilities and may be preventable. Chair lift related injuries have been previously reported to represent 13% of all pediatric SSIs that were hospitalized but have not been further described. It is not known how chair lift related injuries compare to non-chair lift related SSIs in children.

Methods:
Data were obtained from the trauma registry of Utah’s only pediatric trauma center. We queried for SSIs in children, requiring hospitalization from November 2004-Feb 2014.

Results:
443 cases of SSIs occurred during the study period. 34 cases (8%) were related to chair lifts. Children suffering lift related SSIs were more likely to be younger (7.3 years vs 12.1, p<.0001), female (44% vs 19%, p=.0017), processed as a trauma activation (62% vs 34%, p=.0024). There was no difference between lift related SSIs and non-lift related SSIs with respect to mortality, Injury Severity Score, length of hospital stay, intensive care length of stay, airway intubation, or need for management of injuries in the operating room. Of the 34 cases of lift related SSIs, 29 (85%) occurred falling from a chair lift, 3 (9%) falling when exiting the lift and 2 (6%) crashing into a part of the chair lift. None died. When stated (in 11/29), mean estimated height of fall from lift was 26 feet. The body region with most injuries with abbreviated injury score ≥3 was lower extremity (9/34, all femur fractures).

Conclusion:
Falls from chair lifts occur more commonly in younger, female children and more often result in hospital trauma activation when compared with other SSIs. Though less frequent than previously reported, falls from chair lifts remain a source of morbidity in SSIs.
Abstract Title:
THROMBOELASTROGRAM IS AN IMPORTANT CLINICAL TOOL TO DIRECT TRANSFUSION IN PEDIATRIC TRAUMA PATIENTS

Author(s):
Satbir (Rosie) Dhillon

Background:
We hypothesized that coagulopathy assessed by thromboelastography (TEG) can direct the need for transfusion in pediatric trauma patients < 15 years of age, when the “BIG” score calculated as (base deficit + [2.5 x INR] + [15-GCS]) cannot.

Methods:
A retrospective review was performed of severely injured trauma patients ≤ 18 years of age evaluated in our ED from January 2008 through March 2013. Thromboelastrogram was performed on 72 patients. Demographic data included ISS, age, sex, mortality, and units of blood products transfused. A p-value of < 0.05 was considered statistically significant.

Results:
Analysis yielded eleven patients under 15 years of age and 6 (55%) required transfusions. Median ISS was 25 (9, 33), median age (years) was 11 (range 7, 13), 54% were males with an overall hospital mortality of 18%. When comparing BIG score versus TEG parameters as predictors of transfusion within first 48 hours after injury, reaction (R) time and β-angle were associated with any red cell transfusion (OR 12.15, 95% CI 1.63-90.34; p = .015 and OR 0.65, 95% CI 0.47-0.89: p=0.007, respectively). The maximal amplitude (MA) and percent lysis at 30 minutes (Lys-30) were associated with a need for any FFP (OR 0.90, 95% CI 0.82-0.98: p = 0.02, OR 1.25 and 95% CI 1.03-1.53: p= 0.03, respectively). R time, β-angle, MA and Lys-30 were all significantly associated with the need for any platelet transfusion (P < 0.05). BIG score was not associated with a need for any red cell or FFP transfusion however there was an association with the need for platelet transfusion (OR 1.51, 95% CI 1.07-2.14; p = 0.02).

Conclusion:
During the early assessment of an injured child, TEG appears to be helpful in directing the need for blood transfusion. We recommend TEG as a routine lab panel in the early assessment of significantly injured children.
Abstract Title:
PEDIATRIC SPECIFIC SHOCK INDEX ACCURATELY IDENTIFIES SEVERELY INJURED CHILDREN

Author(s):
Shannon Acker

Background:
Shock index (SI) (heart rate/systolic blood pressure) >0.9 predicts mortality in adult trauma patients. We hypothesized that age adjusted SI could predict outcomes in children.

Methods:
Retrospective review of children age 4-16 years admitted to two trauma centers between 1/07-6/13 following blunt trauma with an injury severity score (ISS) >15 was performed. We evaluated the ability of SI >0.9 at emergency department presentation and elevated shock index, pediatric age adjusted (SIPA) to predict outcomes. SIPA was defined by maximum normal HR and minimum normal SBP by age. Cutoffs included SI >1.22 (age 4-6), >1.0 (7-12), and >0.9 (13-16).

Results:
Among 543 children, SI >0.9 identified severely injured children (ISS >30) (13.7% SI<0.9 vs 25.6% SI>0.9; p<0.001), blood transfusion in the first 24 hours (7.9% vs 19.9%; p<0.0001), and grade 3 or higher liver or spleen laceration requiring blood transfusion (7.7% vs 26.1%; p=0.04), but was not associated with mortality (1.4% vs 7.5%; p=0.19) (Table 1). Elevated SIPA was associated with severe injury (ISS>30) (12.7% normal SIPA vs 36.7% elevated SIPA; p<0.0001), higher risk of blood transfusion in the first 24 hours (8.7% vs 27.3%; p<0.0001), grade 3 or higher liver or spleen laceration who required blood transfusion (6.9% vs 40.7%; p<0.001), and higher in hospital mortality (1.8% vs 11.3%; p<0.0001).

Conclusion:
Elevated SIPA is able to accurately identify children who are most severely injured, have intraabdominal injury requiring transfusion, and are at highest risk of death better than adult specific cutoffs and can be used to triage children to higher levels of care.
Abstract Title:
HELCOPER VERSUS GROUND EMERGENCY MEDICAL SERVICES FOR TRANSPORTATION OF TRAUMATICALLY INJURED CHILDREN

Author(s):
Camille Stewart

Background:
Helicopter emergency medical services (HEMS) are a common mode of transportation for trauma patients. While HEMS are faster than ground emergency medical services (GEMS), the expense is significantly greater. Studies comparing mode of transportation are conflicting, and few studies include transportation time or distance because these data are frequently missing. Currently, no published studies examine this question in pediatric trauma patients.

Methods:
We queried trauma registries at two level 1 pediatric trauma centers for children 0-17 years old treated from 2003 - 2013, who were transportation by HEMS or GEMS, with known transport starting location and outcome. A geocoding service was used to estimate travel distance and time to definitive treating hospital via HEMS and GEMS. Three multiple regression analyses were performed: drive time/distance, travel time/distance, and excluding time/distance.

Results:
We identified 14,405 traumatically injured children; 3,870 (26.9%) transported by HEMS and 10,535 (73.1%) transported by GEMS. In all three models, transport type did not significantly effect survival, discharge disposition, or ICU length of stay (LOS). Transport by GEMS was associated with a shorter hospital LOS (53.1% - 68.6% decrease, p<0.001), with greatest benefit seen in children without TBI (additional 64.5 - 51.7% decrease, p=0.03). Increasing distance was associated with longer ICU and hospital LOS (p<0.05), however, the effect of HEMS versus GEMS was similar for all driving distances. Of note, 862/3,850 (22.3%) of children transported by HEMS had a hospital LOS <24 hours and an ISS <10.

Conclusion:
HEMS unto itself does not improve outcomes for traumatically injured children. Transport by GEMS and shorter transport distances are both independently associated with shorter hospital stay. Approximately 20% of children transported by HEMS are not severely injured. These factors should be considered when requesting HEMS for the transport of traumatically injured children.
Abstract Title:
SCREENING LABS FOR PEDIATRIC BLUNT ABDOMINAL TRAUMA: A QUANTITATIVE ANALYSIS

Author(s):
C Silva, JC Egan, P Garcia-Filion, R Jamshidi

Background:
The gold standard for evaluation of blunt abdominal trauma is computed tomography (CT). In pediatric patients, however, great efforts are made to minimize radiation exposure. Serum analyses are commonly used to screen patients at risk of intra-abdominal injury. We examined the predictive value of such labs and quantitatively identified the threshold values which warrant imaging.

Methods:
Retrospective analysis of pediatric trauma patients presenting to the only Level I pediatric trauma center in the region. All patients between January 2011 and December 2013 with at least one serum transaminase (ALT or AST) and an abdominal CT were included. Transaminase levels were normalized to the upper limit of the reference range. Receiver operating characteristic (ROC) analyses were conducted to examine the area under the curve (AUC), sensitivity / specificity, and to identify threshold values.

Results:
Of the 582 patients, CT revealed notable abdominal injury in 149 (26%), of which 111 (74%) had solid organ injury. Among the solid organ injuries, 50% (56/111) were low-grade (AAST grade 1 or 2). Receiver operating curves [Figure 1] demonstrate utility of AST (AUC 0.71), ALT (AUC 0.70), and lipase (AUC 0.68), while amylase and alkaline phosphatase were inadequate (AUC 0.53 and 0.44, respectively). Sensitivity and specificity of AST, ALT, and lipase are listed in Table 1 at 1.5, 2, and 2.5 times the upper limit of the reference range.

Conclusion:
Pediatric abdominal injuries from blunt trauma can be screened for by serum analyses at presentation. Routine use of AST, ALT, and lipase with thresholds of 2 times the upper limit of the reference range can be expected to be fairly sensitive while reducing CT use. Consideration may be given to higher threshold values if identification of lower-grade solid organ injuries is not pursued.
Abstract Title:
RISK FACTORS FOR CEREBROVASCULAR INJURY DIAGNOSED BY CT ANGIOGRAPHY IN THE PEDIATRIC POPULATION: IMPLEMENTATION OF A PREDICTION SCORE

Author(s):
Vijay M. Ravindra M.D., Jay K. Riva-Cambrin, M.D., MSc., Walavan Sivakumar M.D., Ryan Metzger PhD., Robert J. Bollo, M.D

Background:
CTA is frequently performed in children after cranial trauma to evaluate for cerebrovascular injury, but patients are exposed to high doses of radiation and the at-risk population is poorly defined. We sought to determine the incidence of carotid and vertebral artery injury following trauma and identify children at high risk.

Methods:
Patients who underwent CTA during evaluation for traumatic cranial injury between 2003 and 2013 were retrospectively reviewed. Demographic, clinical and radiographic data were collected. The primary outcome was carotid or vertebral artery injury on CTA.

Results:
We identified 234 patients (mean age 8.3 years, range 0.04 - 17): 150 (64%) were male, 24 (10%) had a focal neurological deficit, and 167 (71%) had intracranial hemorrhage on head CT. The average radiation DLP was 649mGy-cm. ICA abnormalities were reported in 33 (14%) patients; these patients had three-fold higher mortality. There were 16 (6.8%) deaths. A Rotterdam score of 4-6 was significantly associated with ICA injury. Multivariate regression analysis identified several independent risk factors for carotid injury, including fracture through the carotid canal (OR 4.3 [CI 1.7, 10.8]), temporal bone fracture (OR 6.8 [1.9, 24.6]), GCS less than 9 (OR 2.9 [1.2, 6.9]), focal neurological deficit (OR 4.6 [1.6, 13.0]), and stroke on initial CT (OR 5.8 [1.5, 21.8]). Area under the curve for the model was 0.81, indicating a high degree of accuracy. A prediction model was created including these factors. Based on the model a score ? 2 yields a 7.9% probability of CVI, where as a score of > 2 yields a 39.3% probability of CVI.

Conclusion:
In pediatric cranial trauma, CTA is indicated in the context of a fracture through the temporal bone or carotid canal, focal neurological deficit, stroke, or GCS less than 9. Implementing a prediction score will help risk-stratify patients.
Abstract Title: CAR SEAT EDUCATION FOR PARENTS: DVD-BASED SOCIAL LEARNING VS LIVE EDUCATION

Author(s): R Ragar, E Kuroiwa, A Baker, S Moffat, P Garcia-Filion, DM Notrica

Objective: To determine the best teaching method for parent proficiency in child passenger restraint.

Methods: A randomized controlled trial of 212 parents seeking car seat education. Parents were assigned to didactic (n=102) or DVD-social learning (vSL) (n=110). The didactic class involved live lecture; vSL included a brief lecture and a video utilizing social learning principles Simple Steps to Child Passenger Safety. Proficiency in child passenger safety was evaluated pre- and post-class via: (1) 5-part car seat installation demonstration; (2) 15-question objective test; and (3) 5-question confidence assessment. Data were summarized and compared between groups using nonparametric tests.

Results: Participants were mostly female (95%); 92% reported prior car seat installation; 86% had ≥ 2 children. Test scores are shown. Confidence scores (1-10) increased 2 to 4 units between the pre- and post-assessment.

Conclusion: Both teaching methods improved parent proficiency in child passenger restraint. A DVD-based social learning teaching method, which requires less time and resources, can be used in child passenger safety community outreach programs. Methods should be evaluated to find ways to increase the percentage of participants demonstrating post-class car seat installation proficiency.
Abstract Title: ROLE OF ERCP IN PEDIATRIC BLUNT ABDOMINAL TRAUMA: A CASE SERIES AT A LEVEL ONE PEDIATRIC TRAUMA CENTER

Author(s): Garvey EM, Haakinson DJ, McOmber M, Notrica DM

Background: There is no consensus regarding the role of endoscopic retrograde cholangiopancreatography (ERCP) in the pediatric trauma literature. We report our experience with ERCP for management of pediatric biliary and pancreatic injury following blunt abdominal trauma.

Methods: A prospective trauma database at a single level one pediatric trauma center was reviewed for all patients with blunt abdominal trauma from July 2008 through December 2012. A retrospective chart review was performed on patients who underwent ERCP (n=9). Patient demographics, injury characteristics, diagnostic details, procedures performed, length of stay (LOS), total parenteral nutrition (TPN) use and complications were reviewed.

Results: There were 532 patients with blunt abdominal trauma during the study period: 115 hepatic injuries, 25 pancreatic injuries and one gall bladder injury. Five patients were male. The mean age was 7.8 years. 56% (5/9) had handlebar related injuries. 78% (7/9) had pancreatic injuries (grade 3 [n=6], grade 4 [n=1]) and 22% (2/9) had bilateral hepatic duct injuries. Only 44% (4/9) of injuries were suggested on day of presentation, most commonly with CT scan, 56% (5/9). The median time to diagnosis was 1 day (range 0-7 days). Diagnostic ERCP was performed in three patients, two of which proceeded to distal pancreatectomy. Five patients had stents placed (two biliary and three pancreatic) and four sphincterotomies were performed. Despite pancreatic stenting, one patient required distal pancreatectomy for persistent leak. Another patient with a bile leak required a laparoscopic washout after stent placement. Median TPN duration was eight days, with six days until initiation of enteral feeds. Median LOS was 11 days with four intensive care unit days. Five patients had minor complications. There were no mortalities.

Conclusion: Pediatric pancreatic and biliary ductal injuries following blunt abdominal trauma are uncommon. ERCP can provide adjunctive or definitive treatment, but some patients may still require operative intervention.
Abstract Title:
PREVENTABLE TRANSFERS IN PEDIATRIC TRAUMA: A 10-YEAR EXPERIENCE AT A LEVEL I PEDIATRIC TRAUMA CENTER

Author(s):
Justin Lee, Ryan Metzger, Eric Scaife

Background:
Pediatric trauma patients who are transferred to a tertiary facility and discharged rapidly without surgical procedures or imaging studies may represent preventable transfers. Few studies have assessed the extent of preventable transfer in pediatric trauma. The purpose of this study was to identify and evaluate potentially preventable transfer cases at a level I pediatric trauma center.

Methods:
Data were obtained from the Primary Children’s Hospital’s Trauma Registry on all transferred cases from 2004 to 2013. Preventable transfers were defined as patients discharged within 36 hours without surgical procedures or advanced imaging including computed tomography (CT), magnetic resonance imaging (MRI), or angiography.

Results:
Over the 10 year period, 6389 patients were transferred to our facility. The overall rate of preventable transfer was 27.7% (1769/6389). 21.5% (381/1769) of preventable transfers were transported by air. 28.2% (499/1769) were discharged home from emergency department. 44.1% (552/1253) were discharged without subspecialty consults. Only 6.3% (112/1769) required intensive care unit admission. CT studies were already performed at the referring hospital in 75% (1327/1769) of cases. Most common mechanism of injury was fall (50.4%), and most injuries were head-related (64%). Median injury severity score was 5 (range= 1-25).

Conclusion:
Preventable transfer in pediatric trauma is relatively common within our regional trauma system. Inter-hospital transfer carries significant economic and social burden. Telemedicine and image-sharing technologies may potentially decrease preventable transfers, especially in head injury.
Abstract Title:
PEDIATRIC FACIAL FRACTURES: DEMOGRAPHIC DETERMINANTS INFLUENCING CLINICAL OUTCOMES

Author(s):
Kenny Chan

Background:
Demographic determinants have been linked to etiology and types of facial trauma. There is limited data on linking demographic determinants to clinical outcomes, particularly comparing regional and national datasets. This study aimed at examining cascading effects of demographic differences on clinical outcomes.

Methods:
The medical records of facial fracture patients (<18 years) treated at Children’s Hospital Colorado (CHC) from 1999-2009 were characterized for facial fracture, etiology of injury, length of hospital and intensive-care unit (ICU) stays, and associated injuries. A separate analysis between hospitalized CHC subjects and the national data using the 2013 National Trauma Data Bank (NTDB) was conducted.

Results:
437 subjects with 613 facial fractures were identified in the CHC dataset. Increased hospital stay was predicted by bilateral mandible fracture (p=0.03), skull (p=0.02), intracranial (p=0.0001), spine (p=0.04), thoracic (p=0.03), abdominal (p=0.002), and limb injuries (p=0.03). Sixty-six (15%) patients stayed in ICU. Predictors of increased ICU stay included: skull (p=0.02), spine (p=0.0004), and limb injuries (p=0.04).

In comparing the CHC subgroup requiring hospitalization (n=201) with the NTDB dataset (n=10,749), the CHC group had younger subjects, more females, less African Americans and more Hispanics. Subjects were more likely to be injured by bicycles, fall, sports and animal bites than by altercations. They had more mandibular, orbital and maxillary but less other unclassified types of fractures. They had more skull injuries but less intracranial, spine, thoracic, abdominal and limb injuries.

Multivariate models showed that the length of hospital stay of CHC and NTDB groups were not different (p=.11) but the NTDB group had higher ICU admission (p=.04) and longer length of ICU stay (p=.007).

Discussion:
The demographic disparities (age, ethnicity and mechanism of injury) are driven by geography. They in turn played an important role in disparate facial and associated injury patterns resulting in increased ICU admission and stay.
Abstract Title:
BENCHMARKS FOR SPLENECTOMY IN PEDIATRIC TRAUMA: HOW ARE WE DOING?

Authors:
Stephanie F. Polites, Elizabeth B. Habermann, Abdalla E. Zarroug, Amy E. Wagie, Martin D. Zielinski

Background:
Following publication of hospital benchmarks for the operative management of blunt pediatric splenic trauma, it was found that splenectomy rates exceeded these benchmarks. We sought to determine if benchmarks are being met a decade later and if factors associated with splenectomy in injured children could be identified.

Methods:
Rates of splenic procedures were calculated for children ?19 with a blunt splenic injury (ICD-9 865) using the 2010-2011 National Trauma Data Bank. Patient and hospital characteristics were compared between children who underwent splenectomy and those who did not. Coexisting injury was defined as any non-abdominal Abbreviated Injury Scale (AIS) ?2. Multivariable analysis was performed to determine independent predictors of splenectomy.

Results:
Of 8597 children, 24.3% received care at pediatric trauma centers (PTC) and 36.3% at adult centers (ATC). The overall splenectomy rate was 8.1% (3.3% if age ?14, 6.1% if ?17); 3.0% underwent splenic repair or angiography. Splenectomy rates were higher in children with and without coexisting injuries when treated at ATC and non-trauma centers (NTC) when compared to PTC (coexisting injury: ATC 13.7% vs NTC 10.6% vs PTC 7.2%, p<.001; no coexisting injury: ATC 7.0% vs NTC 4.8% vs PTC 2.3%, p<.001). The splenectomy rate was lower in children treated at hospitals with a pediatric ICU (7.1% vs. 10.6%, p<.001). On multivariable analysis, age >14, coexisting injuries, severity of splenic injury, and care at ATC or NTC were predictive of undergoing splenectomy (Table).

Conclusion:
Splenectomy rates meet APSA benchmarks at PTC yet remain high at other centers after adjustment for age and injury severity. Resources such as pediatric intensive care, may factor into hospitals’ ability to manage splenic injuries nonoperatively. Since most children receive care at ATC and NTC, dissemination of guidelines to these centers is required with consideration to transfer to PTC in children with blunt splenic injuries.
Abstract Title:
NEUROSURGERY FOLLOW-UP IN MILD TRAUMATIC BRAIN INJURY PATIENTS: PRE AND POST IMPLEMENTATION OF A MULTIDISCIPLINARY PEDIATRIC CONCUSSION PROGRAM

Author(s):
B. Villasenor, E.M. Weidler, P. Garcia-Filion, R. Ragar

Background:
Post-concussion syndrome (PCS), a complex process affecting the brain following mild traumatic brain injury (mTBI), includes one or more of the following: nausea, fatigue, concentration deficits, dizziness, memory difficulty, sensitivity to light/sound, and headaches. In 2011, a multidisciplinary pediatric concussion program was implemented to provide outpatient follow up care for mTBI. Objectives were to analyze follow up care prior to and following the implementation of a multidisciplinary pediatric concussion program.

Methods:
We conducted a retrospective analysis of 340 mTBI patients discharged from a pediatric ACS Level I trauma center between May 2009 and July 2013. Parent report surveys were mailed to patients at 1, 3, 6, and 12 months post-injury to assess the presence of PCS symptoms (yes/no). Classification of PCS was based on the presence of two or more symptoms.

Results:
Of the 340 mTBI patients, 118 (35%) completed and returned the survey. Most of the patients were referred for follow up after discharge (92%); of which 61% (n=72) followed up and 41% (n=43) reported PCS symptoms. PCS symptoms were not reported by 55% (n=38) of the referred patients that sought follow up care. There was not a significant difference in follow up referrals or percentage of PCS positive patients between the pre and post-concussion program (89% vs 94%) implementation time periods (p>0.05). However, there was a significant difference in the percentage of referred patients that followed up between the two time periods (p<0.05) with a higher percentage of patients following-up prior to 2011 (78% vs 52%).

Conclusion:
Although follow up referral has not changed with the implementation of the pediatric concussion program, patient follow up has decreased. Further research is needed to determine how to provide continued care for mTBI children after discharge.
Abstract Title:  
TRAUMA NURSING CARE IN THE ICU SETTING AT A LEVEL ONE PEDIATRIC TRAUMA CENTER

Author(s):  
Lori Humphrey

Summary:  
Importance:  Trauma care can be optimized when expert nurses provide the complex, high acuity interventions and the management of situations requiring a level of critical thinking that cannot be measured.

Development of the Trauma Nurse Resource (TNR) Role: An extensive literature review did not identify an existing model for trauma as a specialty for the pediatric critical care nurse. The trauma nurse resource role (TNR) was developed to create a venue for nurses to further define the specialty. The goal of the group was to provide trauma focused education to their peers and develop on-going educational offerings to keep the nurses current with the latest evidence-based practice in pediatric trauma, to participate in quality initiatives and the performance improvement process, and to assure that the protocols for the trauma patients were being met.

Responsibilities of the TNR Role: Each TNR is held accountable for the following responsibilities: assisting in developing and maintaining care guidelines for all PICU trauma patients, performing unit audits to assure the care provided follows the established care guidelines, monitoring all cervical collars on patients and providing unit education as needed, participating in two performance improvement projects a year involving trauma patients, assuring that warming measures are initiated on all trauma patients when appropriate, and designating a representative from the group to attend the surgical critical care monthly multidisciplinary meeting.

Future Implications: Specialized trauma nursing involves knowledge of multilevel injuries as well as various health issues and complications that can arise from different types of trauma. The TNR role was designed to further enhance critical care pediatric trauma expertise and to serve as an organized, coordinated effort to maximize resources available to the trauma patient in the critical care setting so that optimal patient outcomes can be achieved.
Abstract Title:
DEVELOPMENT OF A PEDIATRIC MOBILE SIMULATION LABORATORY FOR USE IN EMS FOR CHILDREN RELATED OUTREACH EDUCATION

Author(s):
Sean Caffrey

Background:
Prehospital pediatric emergency care is a low-frequency event previously identified by EMS providers as an area in which more training opportunities would be advantageous. Traveling significant distances for training is a known barrier for EMS providers. Developing a simulation program for EMS providers involved multiple complexities and considerations.

Methods:
The University of Colorado School of Medicine in collaboration with the Children’s Hospital Colorado EMS and Outreach program have acquired, outfitted and now deploy a pediatric mobile simulation lab for continuing education of EMS providers across the state. Initial funding for the vehicle and equipment was obtained through grant funds from the Colorado Department of Public Health and Environment matched by funds from private sources and the federal EMS for Children State Partnership Program. We describe both anticipated and unanticipated issues faced prior to, during and subsequent to the acquisition of the lab.

Results:
The initial funding for the 1st year provided for the purchase of $30,000 and faculty time to provide 400 of physician-led education. Subsequent funding from the private and public grants provided for up to an additional $81,514 to acquire the simulation lab, tow vehicle and related equipment. Anticipated issues which we identified and managed included vehicle design, outfitting, operator training, business plan development, and policy and risk management concerns. Unanticipated issues included extended timelines, safety related vehicle modifications, adaptation of an audio-video system to existing simulators and commercial driver training. We addressed these issues through extensive collaboration with multiple granters, fleet management specialists, audio-visual technicians, risk managers, and simulation education specialists. We further developed a business plan with a model for cost recovery to include operational, educational, maintenance and insurance costs. We obtained the support of three major healthcare systems that provide pediatric care in the roll out of the laboratory to facilitate its use as a statewide program and resource. Advertising and training request mechanisms were also developed. The laboratory will deliver its first on-site training in rural Colorado in April 2014, and anticipates the training of at least 250 prehospital providers over the course of the next year.

Conclusion:
A comprehensive and cooperative pediatric simulation program for EMS providers is now in active operation following resolution of a variety of anticipated and unanticipated issues involved in establishing the program.
Abstract Title:
TRAUMATIC TENSION CHYLOTHORAX IN A CHILD: A CASE REPORT

Author(s):
Burkley Snow

Summary:
Blunt trauma is the leading cause of death of children and adolescents in the United States. Potentially life-threatening injuries from blunt trauma to the chest must be identified and treated immediately. Clinician familiarity with the range of possible injuries assists in timely diagnosis and therapy. Chylothorax from injury to the thoracic duct is a rare consequence of blunt chest trauma. Tension chylothorax is exceptionally rare. We present a case of a 22-month old boy found to have a traumatic tension chylothorax during initial evaluation in the resuscitation bay after transfer from another facility. There have been no previous reports of a pediatric tension chylothorax after blunt trauma. Management consisted of drainage with tube thoracostomy, parenteral nutrition, and octreotide until the chyle leak resolved. Surgical ligation of the thoracic duct was not required.
Abstract Title:
SUSPECTED NON-ACCIDENTAL TRAUMA IN PEDIATRICS: YOUNG CHILDREN WITH SUSPICIOUS INJURY WARRANT FURTHER EXAMINATION

Author(s):

Background:
Early identification of child abuse is important for intervention. Objectives were to examine patient and injury characteristics associated with suspected non-accidental trauma (sNAT) in preparation for a screening algorithm in an emergency department.

Methods:
Using a child abuse registry, we conducted a retrospective analysis of consecutively enrolled pediatric (<18 years) patients evaluated at a pediatric level I trauma center and classified as a sNAT based on physical, emotional and/or sexual abuse findings. The study time period is January 2007 - December 2013. Descriptive statistics were used and odds ratios (95%CI) estimated.

Results:
The registry contains 916 patients classified as sNAT, constituting one-fifth of annual trauma admissions. Mechanism of injury was unknown in 78% and prior domestic violence was documented in 25%. Physical abuse was identified in 94%: the most common was abusive head trauma (AHT) (56%), followed by extremity fracture (27%), skin findings (19%), and the least common was abdominal injury (4%). Infants (<12months) comprised 61%, 12-24months 18%, preterm gestation 27%, twins 3%, and 82% were uninsured or on medicaid. AHT was more common in younger patients; those <24months were 2.9 times (95%CI: 2.2, 3.8) more likely to have AHT than those older than 24months. Death occurred in 37 (4%) of the patients; of which 60% (n=22) were <24months of age, 81% (n=30) were classified as probable abuse, and 30% (n=11) had prior Child Protective Services involvement.

Conclusion:
Young children, <24 months, comprised over three-quarters of sNAT, identifying an at-risk age group. Head injury in this age group, unknown injury mechanism and/or prior domestic violence should prompt concern for sNAT and warrant an evaluation to rule out abuse. Further research is necessary to assess accompanying socio-behavioral indicators.
Abstract Title:
PREHOSPITAL USE OF Tourniquets AND HEMOSTATIC DRESSINGS IN THE CIVILIAN PEDIATRIC TRAUMA POPULATION

Author(s):
Kathleen Berns

Background:
The use of tourniquets and hemostatic dressings in the adult military population is well established but little is known about the prehospital use of these products in the civilian pediatric trauma patient.

Methods:

Results:
Of the 125 patients identified, 6 were pediatric with 3 tourniquets and 3 hemostatic dressings used with a maximum of one for any patient. Two patients required both interventions. Mechanism of injury for tourniquet use was 67% blunt and 33% penetrating. Tourniquet placement was done twice to the lower extremity proximal to the knee and once to the upper extremity distal to the elbow. Mean tourniquet time was 9 minutes with 100% success in stopping bleeding. Mechanism if injury for hemostatic dressing use was 100% for blunt mechanism. Hemostatic dressing application was done twice to the head/face region and once to the lower extremity proximal to the knee with a 67% success rate. Training for both interventions was hands-on and computer based with maintained proficiency of 95% after two years.

Conclusion:
Application of tourniquets and hemostatic dressings in the prehospital pediatric civilian population is rare but highly effective with proficiency of skills maintained despite infrequent use.
Abstract Title: MORBIDITY OF PEDIATRIC DOG BITES

Author(s): Garvey EM, Twitchell D, Egan JC, Jamshidi R

Background: Pediatric dog bite injuries are not uncommon and can vary in severity. We sought to characterize the predisposing factors and typical morbidity associated with such trauma.

Methods: Institutional review board evaluation was completed. A prospective trauma database at the singular level one pediatric trauma center in the region was reviewed. Dog bite injuries were identified over 74 consecutive months through December 2013. Descriptive statistics were employed.

Results: Over a greater than six year study period, there were 650 dog bite incidents, 282 of which were brought in by ambulance and/or seen by the trauma team and were therefore included in the trauma database. The median victim age was 5 years (range, 2 months to 17 years) and 55% (154/282) were male. Pit bulls were most frequently responsible, accounting for 39% (83/213) of incidents in which the dog breed was documented. 53% of dogs belonged to either immediate or extended family of the patient. 69% (194/282) of patients required operative intervention; 69% were laceration repairs, 12% were tissue transfer repairs, and 2% were neurosurgical interventions. The most severe injuries were depressed skull fractures, intracranial hemorrhage, tracheal transection, and bilateral orchiectomy. The mean length of hospital stay was 1.26 days (range, 0 to 25 days). There were no mortalities.

Conclusion: Pediatric dog bites span a wide range of ages, frequently require operative intervention, and can cause severe chronic morbidity. In this large single-institution series, pit bulls were most commonly responsible, and dog familiarity did not confer safety. These findings have great relevance for child safety.
Abstract Title:
FAMILY SUPPORT COMMITTEE POSITIVELY IMPACTS EMERGENCY DEPARTMENT CARE

Author(s):
Carol Swigart

Presentation Purpose:
To share with other Emergency Departments how our Family Support Committee was formed, how the Family Support Person functions, and some positive benefits we have discovered utilizing the Family Support Person in the Trauma Room assisting with family presence and parents with difficult diagnosis.

Summary:
Family presence during resuscitation in the emergency department has been a position statement of the Emergency Nurses Association since 1995. Our Pediatric Emergency Department, level II trauma center treats approximately 72,000 patients/year. The formation of an Emergency Department (ED) Family Support Committee has facilitated the development of a skilled group of caregivers which has improved the quality of care for patients and families experiencing crisis situations. This team of caregivers has provided a dedicated ED staff member 24/7 to help family members cope when faced with a critical situation. The presence of a family support person has allowed those staff members providing clinical care for the patient to stay focused on their job.

One committee leader obtained a certification in Death and Grief Studies which has provided tools to companion families. The ED benchmarked with another children's hospital designing a room devoted to family support. An ED specific department policy on bereavement was developed to provide guidelines in caring for deceased patients and promotes a safe environment through the bereavement process. The committee members routinely educate staff through presentations and hands-on training. In a survey of 76 staff members, 97% felt family support is important. When asked how often the family support person is appreciated by the family, 63% of staff surveyed stated ‘always’ and 37% stated ‘very often’. All families whose child expired in the ED are sent a letter and survey about one year after the death. Of the returned surveys 90% felt that the support information was beneficial and 80% rated the family support team member excellent.

A trained, dedicated family support staff member assigned to families provides emotional care, support, direction and resources. In addition, the family support team provides collaboration and guidance to members of the care team.
Objective:
Theoretical research has been very little research specifically examining the long-term psychological effects of non-accidental trauma (NAT). Therefore, we examined the demographic characteristics of this population in order to facilitate identification of children most at risk. The aims of this study were to identify the demographic characteristics of child victims of NAT; and examine what psychological services were provided during hospitalization and referrals upon discharge. Understanding the services available to children with NAT during hospitalization is the first step in developing an integrated program of care to address both mental and physical health needs of children with NAT.

Methods:
A retrospective review was performed of the Trauma Registry Service database of our Level I pediatric trauma program. The database was scanned from 1995-2012 for abuse-related ICD codes, patients identified and data extracted and analyzed.

Results:
The majority of NAT patients were under the age of 5 (96%), and of Caucasian (39.4%), Latino (38.8%) or African American (16.9%) decent. Consultations and outpatient referrals for psychological services were minimal. While in the hospital, 1.7% received a Psychiatry consultation and 2.5% were seen by Psychology. Upon discharge, only 3 children (0.4%) were documented to have been referred directly for psychological services.

Conclusion:
The implications of this study are that we are not providing psychological services to children who have experienced NAT during hospitalization or upon discharge. We are using this data to raise awareness of the need for intervention and integration of psychology onto the trauma team at our local children’s hospital. Our hope is that this study will increase awareness of the need for Pediatric Psychologists in other children’s hospitals as well.
Abstract Title:
SOCIAL-BEHAVIORAL CUE ASSESSMENT IN CHILD ABUSE EVALUATIONS

Author(s):
C Silva, S Magoteaux, D Notrica, JC Egan, S Zimmerman, A Raetz, A El-Ahmadiyyah, P Garcia-Filion

Background:
Child abuse is a public health problem making early detection a priority. Past research identified physical findings and social-behavioral cues as risk factors and point to emergency departments (ED) as ideal locations for early detection.

Methods:
Retrospective analysis of patients presenting to an ED with suspected non-accidental trauma (sNAT) between January 2012 and July 2013. Subjects were evaluated by the institution’s Child Protection Team and classified as probable abuse, not probable, or indeterminate. Social-behavioral risk factors included patient’s response to caregiver, caregiver’s response to patient cues and social work, and caregiver’s expectation of patient and concern for injury severity. Descriptive statistics were used. Categorical data compared with chi-square test.

Results:
312 sNAT patients were reviewed [median age: 6 months (interquartile range: 3, 10)]. Social-behavioral risk factors were documented in 74% (n=232). Documentation was more complete in younger patients (5m vs 11m; p<0.001); documentation did not vary by race (p=0.274) or child abuse type (p=0.542). The most and least commonly documented risk factors were responses of caregiver to social worker (n=109; 35%) and patient to caregiver (n=252; 81%), respectively. Documentation of social-behavioral risk factors did not vary between child abuse classification (p=0.583). However, presence of social-behavioral risk factors increased with likelihood of child abuse (p=0.047). The sensitivity to detect child abuse was 57% and specificity 62%.

Conclusion:
A significant proportion of sNATs are not receiving social-behavioral cue assessments. The association of social-behavioral risk factors with probable abuse demonstrates the importance of social-behavioral evaluation. The low sensitivity of social-behavioral risk factors indicates providers need to consider them with other clinical indicators.