January 9-13, 2018

31ST ANNUAL SCIENTIFIC ASSEMBLY

DISNEY'S CONTEMPORARY RESORT
LAKE BUENA VISTA, FLORIDA

east

Eastern Association for the Surgery of Trauma
Advancing Science, Fostering Relationships, and Building Careers

PartnerCME
JOINT PROVIDERSHIP PROGRAM
ACS DIVISION OF EDUCATION

ACCME ACCREDITED WITH COMMENDATION

AMERICAN COLLEGE OF SURGEONS
DIVISION OF EDUCATION

Learning Objectives

This activity is designed for **surgeons, non-surgeon physicians, nurses, advanced practitioners, and other medical professionals involved in the care of the injured patient.** Upon completion of this course, participants will be able to:

1. Examine and implement injury prevention techniques which may lessen the burden of injury
2. Articulate methods to optimize outcomes for the injured patient in austere/military environments
3. Develop leadership skills to enhance his/her ability to work within a multidisciplinary team.
4. Foster a multidisciplinary approach to the care of the injured patient
5. Interpret the presentation of scientific research in the treatment of the injured patient
6. Evaluate and implement the organization and management of an institution's trauma system of care, including the appropriate use of advanced practitioners as part of the trauma team
7. Articulate methods to optimize outcomes and identify differences in management strategies for the geriatric patient population.

CONTINUING MEDICAL EDUCATION CREDIT INFORMATION

Accreditation

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American College of Surgeons and Eastern Association for the Surgery of Trauma. The American College of Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

AMA PRA Category 1 Credits™

The American College of Surgeons designates this live activity for a maximum of **26.00** *AMA PRA Category 1 Credits™.* Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Of the *AMA PRA Category 1 Credits*™ listed above, a maximum of **21.25** credits meet the requirements for Self-Assessment.

Of the *AMA PRA Category 1 Credits*™ listed above, a maximum of **.75** credits may qualify as **Pediatric Trauma**.*

** The content of this activity may meet certain mandates of regulatory bodies. ACS has not and does not verify the content for such mandates with any regulatory body. Individual physicians are responsible for verifying the content satisfies such requirements.*

AMERICAN COLLEGE OF SURGEONS
Inspiring Quality:
Highest Standards, Better Outcomes

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Disclosure Information

In accordance with the ACCME Accreditation Criteria, the American College of Surgeons, as the accredited provider of this activity, must ensure that anyone in a position to control the content of the educational activity has disclosed all relevant financial relationships with any commercial interest. Therefore, it is mandatory that both the program planning committee and speakers complete disclosure forms. Members of the program committee were required to disclose **all** financial relationships and speakers were required to disclose any financial relationship **as it pertains to the content of the presentations**. The ACCME defines a 'commercial interest' as "any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients". It does not consider providers of clinical service directly to patients to be commercial interests. The ACCME considers "relevant" financial relationships as financial transactions (in any amount) that may create a conflict of interest and occur within the 12 months preceding the time that the individual is being asked to assume a role controlling content of the educational activity.

ACS is also required, through our joint providership partners, to manage any reported conflict and eliminate the potential for bias during the activity. All program committee members and speakers were contacted and the conflicts listed below have been managed to our satisfaction. However, if you perceive a bias during a session, please report the circumstances on the session evaluation form.

Please note we have advised the speakers that it is their responsibility to disclose at the start of their presentation if they will be describing the use of a device, product, or drug that is not FDA approved or the off-label use of an approved device, product, or drug or unapproved usage.

The requirement for disclosure is not intended to imply any impropriety of such relationships, but simply to identify such relationships through full disclosure and to allow the audience to form its own judgments regarding the presentation.

Speakers / Moderators / Discussants	Nothing to Disclose	Disclosure		
		Company	Role	Received
Suresh Agarwal, Jr.	*x*			
Lisa Allee Barmak	*x*			
Vince Anto	*x*			
Chase Arbra	*x*			
Scott Armen	*x*			
Hassan Aziz	*x*			
James Bardes	*x*			
Robert Barraco	*x*			
Morgan Barron	*x*			
Jennifer Bath	*x*			
Christopher Bell	*x*			
Matthew Benns	*x*			
Andrew Bernard	*x*			
Cynthia Blank-Reid	*x*			
Melissa Boltz	*x*			
Aravind Bommiasamy	*x*			
Stephanie Bonne	*x*			
Daniel Bonville	*x*			
Kai Bortz	*x*			
Anthony Bottiggi	*x*			
Eric Bradburn	*x*			
Tejal Brahmbhatt	*x*			
Brian Brewer	*x*			
Joshua Brown	*x*			
Nikolay Bugaev	*x*			
Clay Burlew	*x*			

Rachael Callcut		UpToDate, Cayuga Biotech	Author, Medical Advisor	Spouse-Royalties, Honorarium
Margo Carlin	*x*			
Bryan Carr	*x*			
Roberto Castillo	*x*			
Michael Chang	*x*			
Ali Cheaito	*x*			
Julius Cheng	*x*			
William Chiu	*x*			
Ashley Christmas	*x*			
Jeffrey Claridge	*x*			
Jamie Coleman	*x*			
Adrian Coleoglou Centeno	*x*			
Morgan Collom	*x*			
Carnell Cooper	*x*			
James Cooros	*x*			
Marie Crandall	*x*			
Michael Cripps	*x*	Z-Medica		Research supported by a grant from Z-Medica
Bruce Crookes		Bio2Medical	Consultant	Honorarium
Kyle Cunningham	*x*			
Jonathan Dameworth	*x*			
Andrew Dennis	*x*			
Bradley Dennis	*x*			
Linda Ding	*x*			
Priscilla Ding	*x*			
Sharmila Dissanaike	*x*			
Mack Drake	*x*			
Joseph DuBose	*x*			
Ryan Dumas	*x*			
Cecily DuPree	*x*			
Alexander Eastman	*x*	Z-Medica	Advisor/Speaker	Travel Support
Matthew Eckert	*x*			
David Efron	*x*			
Blaine Enderson	*x*			
Kathryn Engelhardt	*x*			
Richard Falcone	*x*			
Paula Ferrada	*x*			
Christopher Foran	*x*			
Shannon Foster	*x*			
Brian Frank	*x*			
Brandon Fumanti	*x*			
Rene Gamboa	*x*			
Jacob Glaser	*x*			
Nina Glass	*x*			
Daniel Grabo	*x*			
Lisa Gray	*x*			
Shea Gregg	*x*			

Jarot Guerra	*x*			
Judith Hagedorn	*x*			
Adil Haider		Patient Doctor Technologies	Co-Founder	Stock
William Hallinan	*x*			
Kristine Hanson	*x*			
Jennifer Hartwell	*x*			
Elliott Haut	*x*			
Joshua Hazelton		Smith-Nephew	Speaker	Honorarium
Cindy Hsu	*x*			
Stephen Humble	*x*			
Ciara Huntington	*x*			
Jonathan Imran	*x*			
Molly Jarman	*x*			
Michael Johnson	*x*			
Christian Jones	*x*			
Bellal Joseph	*x*			
A. Cozette Kale				Conflict of interest: BAC is a paid consultant to Haemonetics Corp. SR reported receiving grant funding from TEM International and CSL Behring. Otherwise, authors report no conflicts of interest. Disclosures of funding: The Pragmatic Randomized Optimal Platelet and Plasma Ratio (PROPPR) trial was sponsored by the U.S. National Heart, Lung, and Blood Institute (U01HL077863) and the U.S. Department of Defense. RC is supported by a T32 fellowship (grant no. 5T32GM008792) from the National Institute of General Medical Sciences.
Alistair Kent	*x*			
Jeffrey Kerby	*x*			
Dennis Kim	*x*			
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Adrian Maung	*x*			
April Mendoza	*x*			
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Jonathan Messing	*x*			
David Meyer	*x*			
Christopher Michetti	*x*			
Rosemarie Milano	*x*			
David Milia	*x*			
Richard Miller	*x*			
Joseph Minei	*x*			
David Morris	*x*			
Amirreza Motameni	*x*			
Mayur Narayan	*x*			
Shawn Nessen	*x*			
Andrea Pakula	*x*			
Viraj Pandit	*x*			
Myung Park	*x*			
Jose Pascual	*x*			
Mayur Patel	*x*			
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Theophilus Pham	*x*			
Joan Pirrung	*x*			
Timothy Plackett	*x*			
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Rishi Rattan	*x*			
Kyle Remick	*x*			
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Shawn Terry	*x*			
Ronald Tesoriero	*x*			
Emily Tibbits		Certus Critical Care	Founders and Stock-Holders	Dr. TK Williams and Dr. MA Johnson are founders and stock-holders for Certus Critical Care, Inc. No other financial interest to disclose for remaining authors on this abstract.
James Tiehen	*x*			
James Turbett	*x*			
Catherine Velopulos	*x*			
Derek Wall	*x*			
David Wang	*x*			
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Sarah West	*x*			
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Franklin Wright	*x*			
Daniel Yeh	*x*	UpToDate	Author	Author Royalties
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Tanya Zakrison	*x*			
Catherine Zatorski	*x*			
Martin Zielinski	*x*			

Planning Committee	**Nothing to Disclose**	**Disclosure**		
		Company	**Role**	**Received**
Scott Armen	x			
Andrew Bernard	x			
Rachael Callcut		UpToDate, Cayuga Biotech	Author, Medical Advisor	Spouse-Royalties, Medical Advisor
Jamie Coleman	x			
Bruce Crookes		Bio2Medical	Consultant	Honorarium
Alexander Eastman		Z-Medica	Consultant	Travel Support
Joshua Hazelton		Smith-Nephew	Speaker	Honorarium
Bellal Joseph	x			
Matthew Martin	x			
R. Shayn Martin	x			
Adrian Maung	x			
Carlos Rodriguez	x			
Joseph Sakran	x			
Mark Seamon	x			
Deborah Stein	x	USAF-Grants, Decisio Health	Pi or CoPI, Advisor	Salary Support, Travel reimbursement
Ronald Tesoriero	x			
Catherine Velopulos	x			
Alison Wilson	x			

The Society of Trauma Nurses is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

The following is a list of possible contact hours for applicable sessions:

Session	Date/Time	CNE
APN Workshop		4.0 Hours
Scientific Session I	Wednesday, January 10, 2018 8:00 am-9:40 am	1.75 Hours
Scientific Session II	Wednesday, January 10, 2018 10:00 am-12:00 pm	2.0 Hours
Parallel Plenary Session*	Wednesday, January 10, 2018 3:30 pm-4:30 pm	1.0 Hour
Parallel Plenary Session*	Wednesday, January 10, 2018 3:30 pm-4:30 pm	1.0 Hour
Plenary Session	Wednesday, January 10, 2018 2:00 pm-3:00 pm	1.0 Hour
Quick Shots I*	Wednesday, January 10, 2018 4:30 pm-5:30 pm	1.0 Hour
Quick Shots II*	Wednesday, January 10, 2018 4:30 pm-5:30 pm	1.0 Hour
Parallel Plenary Session*	Thursday, January 11, 2018 9:15 am-10:15 am	1.0 Hour
Parallel Plenary Session*	Thursday, January 11, 2018 9:15 am-10:15 am	1.0 Hour
Scientific Session III-A*	Thursday, January 11, 2018 10:30 am-12:30 pm	2.0 Hours
Scientific Session III-B*	Thursday, January 11, 2018 10:30 am-12:30 pm	2.0 Hours
Parallel Plenary Session*	Thursday, January 11, 2018 2:45 pm-4:00 pm	1.25 Hours
Parallel Plenary Session*	Thursday, January 11, 2018 2:45 pm-4:00 pm	1.25 Hours
Quick Shots III*	Thursday, January 11, 2018 4:15 pm-5:30 pm	1.25 Hours
Quick Shots IV*	Thursday, January 11, 2018 4:15 pm-5:30 pm	1.25 Hours
Scott B. Frame, MD Memorial Lecture	Friday, January 12, 2018 8:00 am-9:00 am	1.0 Hour
Parallel Plenary Session*	Friday, January 12, 2018 9:15 am-10:15 am	1.0 Hour
Quick Shot V*	Friday, January 12, 2018 9:15 am-10:15 am	1.0 Hour
Scientific Session IV-A*	Friday, January 12, 2018 10:15 am-12:15 pm	2.0 Hours
Scientific Session IV-B*	Friday, January 12, 2018 10:15 am-12:15 pm	2.0 Hours
Plenary – Practice Management Guidelines	Friday, January 12, 2018 12:30 pm-2:30 pm	2.0 Hours

* These are parallel sessions. You may only claim credit for one session in each time slot.

To claim CNE, please complete the evaluations online at http://www.traumanurses.org/east-cne-evaluation-forms
Certificates will be distributed via email. Evaluations must be completed to receive CNE.

Visit the STN Booth in the EAST Exhibit Hall for additional details, or contact Brian Doty, STN Meetings and Education Director, at 859-977-7446 or bdoty@traumanurses.org for more information.

CODE OF CONDUCT FOR EAST MEETINGS

1. Introduction. The Eastern Association for the Surgery of Trauma ("EAST") is a nonprofit corporation, organized for charitable, educational, and scientific purposes. In particular, EAST: (i) fosters advances in the study and practice of the surgery of trauma; (ii) provides a forum for the exchange of knowledge pertaining to injury control, research, practice, and training in prevention, care, and rehabilitation of injury; and (iii) advances research, education, and training regarding the prevention, correction, and treatment of injuries ("Exempt Purpose"). In furtherance of its Exempt Purpose, EAST conducts and/or sponsors educational meetings including, without limitation, Annual Scientific Assemblies and periodic internal and external meetings and programs (collectively "Meeting(s)").

EAST seeks participation in its Meetings by individuals with varied and diverse backgrounds. EAST is committed to providing a friendly, safe and welcoming environment for all Meeting attendees, regardless of gender, sexual orientation, ability, ethnicity, socioeconomic status, religion (or lack thereof), and other individual characteristics. This Code of Conduct ("Code") outlines EAST's expectations of its Meeting attendees (including EAST members, EAST Board members, sponsors, invited guests, and any other person attending a Meeting), as well as the consequences for Unacceptable Behavior (defined below). We expect all Meeting attendees will abide by this Code at all Meetings, and in connection with activities outside of Meetings when such behavior has the potential to adversely affect the safety and/or wellbeing of Meeting attendees.

2. Expected Behavior. EAST expects its Meeting attendees will:

- Exercise consideration and respect in their speech and actions.
- Attempt collaboration before conflict.
- Refrain from demeaning, discriminatory, or harassing behavior and speech.
- Be mindful of their surroundings and fellow attendees.
- Be respectful to all patrons at Meeting venues.

3. Unacceptable Behavior. "Unacceptable Behavior" EAST will not tolerate includes, without limitation:

- Violence, threats of violence, or violent language.
- Disruptive, intrusive, insulting, antagonistic, or any other malicious conduct.
- Sexism, racism, homophobia, transphobia, or other discriminatory conduct.
- Inappropriate photography or recording.
- Inappropriate physical contact.
- Unwelcomed sexual attention and/or advances; including, using sexualized language.
- Intoxication, contributing to inappropriate behavior.
- Deliberate intimidation, stalking or following (online or in person).
- Sustained disruption during Meeting events, including talks and presentations.
- Advocating for, or encouraging, any of the above behavior.
- Any other conduct deemed inappropriate and/or that may jeopardize the success of a Meeting, EAST's reputation and goodwill, or the positive experience of any other Meeting attendee.

4. Consequences of Unacceptable Behavior. Unacceptable Behavior by Meeting attendees will not be tolerated. The determination of whether conduct constitutes Unacceptable Behavior, and the consequences imposed by EAST for the same, rest solely within EAST's discretion, and said determinations are final and not subject to appeal. Anyone asked to stop Unacceptable Behavior is expected to comply immediately. If a Meeting attendee engages in Unacceptable Behavior and/or does not comply with this Code, EAST may take any action deemed appropriate, up to and including a temporary ban or permanent expulsion from a Meeting without warning (and without refund, in the case of a paid event).

5. Reporting Guidelines. If you are subject to, or witness, Unacceptable Behavior, or have any other concerns, please notify EAST as soon as possible by contacting EAST's Executive Director or EAST's Executive Committee. If the subject Unacceptable Behavior involves the Executive Director, please notify EAST's current President. Additionally, Meeting organizers are available to help Meeting attendees engage local law enforcement, or to, otherwise, help those experiencing Unacceptable Behavior feel safe. During Meetings, organizers are available to provide escorts as desired to the Meeting attendee(s) experiencing distress.

Any questions or comments regarding this Code should be directed to EAST's Executive Director.

Adopted: April 30, 2015

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Visit “About EAST” on the EAST website, www.east.org,
for listings of EAST Committees.

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1987-88	Kimball I. Maull	*Dispelling Fatalism in a Cause-and-Effect World*
1989	Burton H. Harris	*Searching for Values in Changing Times*
1990	Lenworth M. Jacobs, Jr.	*Forces Shaping Trauma Care*
1991	Howard R. Champion	*Reflections On and Directions for Trauma Care*
1992	C. William Schwab	*Violence: America's Uncivil War*
1993	Michael Rhodes	*Practice Management Guidelines for Trauma Care*
1994	Carl Boyd	*On Timeless Principles in Changing Times*
1995	James M. Hassett	*Do It Right, Do the Right Thing*
1996	William F. Fallon Jr.	*Surgical Lessons Learned on the Battlefield*
1997	John A. Morris Jr.	*The Evolving Role of the Scientific Society in the New Millennium*
1998	Timothy C. Fabian	*Evidence-Based Medicine in Trauma Care – Whither Thou Goest?*
1999	David B. Reath	*Why Am I Here?*
2000	Paul R. G. Cunningham	*Leadership, Professional Heroism, & the Eastern Association for the Surgery of Trauma*
2001	Eric R. Frykberg*	*Disasters and Mass Casualties – How Can We Cope?*
2002	Blaine L. Enderson	*Can Trauma Surgeons Survive Health Care Business?*
2003	J. Wayne Meredith	*Trauma Surgery: Current Status and Future Directions*
2004	Philip S. Barie	*Leading and Managing in Unmanageable Times*
2005	Michael F. Rotondo	*The Rural Trauma Imperative: A Silent Killer in America's Heartland*
2006	Michael Pasquale	*Outcomes for Trauma: Is There an End (Result) in Sight?*
2007	Kimberly K. Nagy	*Traditions, Innovations, and Legacies*
2008	Ernest FJ Block	*Think Different*
2009	Patrick M. Reilly	*Trauma Fellowship*
2010	Donald H. Jenkins	*Union of Forces*
2011	Erik S. Barquist	*It Matters: The Case for Advocacy*
2012	Jeffrey P. Salomone	*The One Who Applies the First Dressing*
2013	Scott G. Sagraves	*Maintaining Relevance in a Revolving Trauma World*
2014	Kimberly A. Davis	*Look Both Ways*
2015	Stanley J. Kurek	*Resilience*
2016	Nicole A. Stassen	*Pay it Forward*

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Burton H. Harris
Lenworth M. Jacobs, Jr.
Kimball I. Maull

*Deceased

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L. D. Britt	Director at Large
Daniel Diamond	Director at Large
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James Hassett	Director at Large
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Susan Briggs	Director at Large
Sylvia Campbell	Director at Large
Paul Cunningham	Director at Large
Richard Gamelli	Director at Large
Gerardo Gomez	Director at Large
David Reath	Director at Large
Thomas Scalea	Director at Large

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Paul Cunningham	Director at Large
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Paul Cunningham	Director at Large
Brad Cushing	Director at Large
James Hurst	Director at Large
J. Wayne Meredith	Director at Large
M. Gage Ochsner, Jr.	Director at Large
Thomas Scalea	Director at Large
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Steven R. Shackford	Director at Large

1996

William F. Fallon, Jr.	President
John A. Morris, Jr.	President Elect
James Hassett	Past President
David Reath	Secretary/Treasurer
Paul Cunningham	Recorder/Program Chair
Philip S. Barie	Director at Large
C. Gene Cayten	Director at Large
Brad Cushing	Director at Large
Blaine Enderson	Director at Large
Eric Frykberg	Director at Large
Sheryl G. A. Gabram	Director at Large
Rao Ivatury	Director at Large
J. Wayne Meredith	Director at Large
Galen Poole	Director at Large
Michael F. Rotondo	Director at Large
Grace Rozycki	Director at Large

1997

John A. Morris, Jr.	President
Timothy C. Fabian	President Elect
William F. Fallon, Jr.	Past President
David Reath	Secretary/Treasurer
Paul Cunningham	Recorder/Program Chair
Nabil Atweh	Director at Large
Philip S. Barie	Director at Large
C. Gene Cayten	Director at Large
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C. Gene Cayten	Director at Large
Martin Croce	Director at Large
Eric Frykberg	Director at Large
Orlando Kirton	Director at Large
Mary McCarthy	Director at Large
Michael McGonigal	Director at Large
J. Wayne Meredith	Director at Large
Michael Pasquale	Director at Large
Andrew Peitzman	Director at Large
Michael F. Rotondo	Director at Large

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Paul Cunningham	President Elect
Timothy C. Fabian	Past President
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Jack Bergstein	Director at Large
Martin Croce	Director at Large
Orlando Kirton	Director at Large
Mary McCarthy	Director at Large
Michael McGonigal	Director at Large
Kimberly Nagy	Director at Large
Michael Pasquale	Director at Large
Andrew Peitzman	Director at Large

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David Reath	Past President
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Ernest FJ Block	Director at Large
Collin Brathwaite	Director at Large
Martin Croce	Director at Large
Orlando Kirton	Director at Large
Mary McCarthy	Director at Large
Michael McGonigal	Director at Large
Kimberly Nagy	Director at Large
Andrew Peitzman	Director at Large
Patrick Reilly	Director at Large
L. R. “Tres” Scherer, III	Director at Large

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Paul Cunningham	Past President
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Ernest FJ Block	Director at Large
Collin Brathwaite	Director at Large
Samir Fakhry	Director at Large
Heidi Frankel	Director at Large
Fred Luchette	Director at Large
Kimberly Nagy	Director at Large
Lena Napolitano	Director at Large
Patrick Reilly	Director at Large
L. R. “Tres” Scherer, III	Director at Large
Gregory Timberlake	Director at Large

2002

Blaine Enderson	President
J. Wayne Meredith	President Elect
Eric Frykberg	Past President
Michael Pasquale	Secretary/Treasurer
Kimberly Nagy	Recorder/Program Chair
Ernest FJ Block	Director at Large
Collin Brathwaite	Director at Large
Michael Chang	Director at Large
Samir Fakhry	Director at Large
Heidi Frankel	Director at Large
Fred Luchette	Director at Large
Lena Napolitano	Director at Large
Patrick Reilly	Director at Large
L. R. “Tres” Scherer, III	Director at Large
Amy Sisley	Director at Large
Gregory Timberlake	Director at Large

2003

J. Wayne Meredith	President
Philip S. Barie	President Elect
Blaine Enderson	Past President
Michael Pasquale	Secretary/Treasurer
Kimberly Nagy	Recorder/Program Chair
Erik Barquist	Director at Large
Michael Chang	Director at Large
Samir Fakhry	Director at Large
Heidi Frankel	Director at Large
Mark Healey	Director at Large
Fred Luchette	Director at Large
Michael Nance	Director at Large
Lena Napolitano	Director at Large
Amy Sisley	Director at Large
Gregory Timberlake	Director at Large
Jeffery Young	Director at Large

2004

Philip S. Barie	President
Michael F. Rotondo	President Elect
J. Wayne Meredith	Past President
Ernest FJ Block	Secretary/Treasurer
Kimberly Nagy	Recorder/Program Chair
Erik Barquist	Director at Large
Michael Chang	Director at Large
Brian Daley	Director at Large
Thomas Esposito	Director at Large
Jeffrey Hammond	Director at Large
Mark Healey	Director at Large
Fred Luchette	Director at Large
Michael Nance	Director at Large
Jeffrey Salomone	Director at Large
Amy Sisley	Director at Large
Jeffery Young	Director at Large

2005

Michael F. Rotondo	President
Michael Pasquale	President Elect
Philip S. Barie	Past President
Ernest FJ Block	Secretary/Treasurer
Patrick Reilly	Recorder/Program Chair
Erik Barquist	Director at Large
Brian Daley	Director at Large
Thomas Esposito	Director at Large
Henri Ford	Director at Large
Jeffrey Hammond	Director at Large
Michael Nance	Director at Large
Scott Sagraves	Director at Large
Jeffrey Salomone	Director at Large
Glen Tinkoff	Director at Large
Jeffery Young	Director at Large

2006

Michael Pasquale	President
Kimberly Nagy	President-Elect
Michael F. Rotondo	Past President
Ernest FJ Block	Secretary/Treasurer
Patrick Reilly	Recorder/Program Chair
Philip S. Barie	Director at Large
Brian Daley	Director at Large
Henri Ford	Director at Large
Jeffrey Hammond	Director at Large
Stanley Kurek, Jr.	Director at Large
Joseph Minei	Director at Large
Jeffrey Salomone	Director at Large
Paul Taheri	Director at Large
Glen Tinkoff	Director at Large

2007

Kimberly Nagy	President
Ernest FJ Block	President-Elect
Michael Pasquale	Past President
Erik Barquist	Secretary/Treasurer
Patrick Reilly	Recorder/Program Chair
William Charash	Director at Large
Kimberly Davis	Director at Large
Henri Ford	Director at Large
Mark Gestring	Director at Large
Stanley Kurek, Jr.	Director at Large
Lawrence Lottenberg	Director at Large
Joseph Minei	Director at Large
Glen Tinkoff	Director at Large
Paul Taheri	Director at Large

2008

Ernest FJ Block	President
Patrick Reilly	President-Elect
Kimberly Nagy	Past President
Erik Barquist	Secretary/Treasurer
Jeffrey Salomone	Recorder/Program Chair
Robert Barraco	Director at Large
Faran Bokhari	Director at Large
William Charash	Director at Large
Kimberly Davis	Director at Large
Mark Gestring	Director at Large
Stanley Kurek, Jr.	Director at Large
Lawrence Lottenberg	Director at Large
Joseph Minei	Director at Large
Scott Sagraves	Director at Large
Paul Taheri	Director at Large

2009

Patrick Reilly	President
Donald Jenkins	President-Elect
Ernest FJ Block	Past President
Erik Barquist	Secretary/Treasurer
Jeffrey Salomone	Recorder/Program Chair
Robert Barraco	Director at Large
Andrew Bernard	Director at Large
Faran Bokhari	Director at Large
William Charash	Director at Large
William Chiu	Director at Large
Kimberly Davis	Director at Large
Mark Gestring	Director at Large
Andrew Kerwin	Director at Large
Lawrence Lottenberg	Director at Large
Scott Sagraves	Director at Large

2010

Donald Jenkins	President
Erik Barquist	President-Elect
Patrick Reilly	Past President
Kimberly Davis	Secretary/Treasurer
Jeffrey Salomone	Recorder/Program Chair
Robert Barraco	Director at Large
Andrew Bernard	Director at Large
Faran Bokhari	Director at Large
William Chiu	Director at Large
Bruce Crookes	Director at Large
Andrew Kerwin	Director at Large
Herb Phelan	Director at Large
Tarek Razek	Director at Large
Scott Sagraves	Director at Large
Carl Valenziano	Director at Large

2011

Erik Barquist	President
Jeffrey Salomone	President-Elect
Donald Jenkins	Past President
Kimberly Davis	Secretary/Treasurer
Stanley Kurek, Jr.	Recorder/Program Chair
Andrew Bernard	Director at Large
William Chiu	Director at Large
Bruce Crookes	Director at Large
Therese Duane	Director at Large
Juan Duchesne	Director at Large
Andrew Kerwin	Director at Large
Herb Phelan	Director at Large
Tarek Razek	Director at Large
Shahid Shafi	Director at Large
Carl Valenziano	Director at Large

2012

Jeffrey Salomone	President
Scott Sagraves	President-Elect
Erik Barquist	Past President
Kimberly Davis	Secretary/Treasurer
Stanley Kurek, Jr.	Recorder/Program Chair
A. Britton Christmas	Director at Large
Bruce Crookes	Director at Large
Therese Duane	Director at Large
Juan Duchesne	Director at Large
Elliott Haut	Director at Large
Herb Phelan	Director at Large
Tarek Razek	Director at Large
Shahid Shafi	Director at Large
Nicole Stassen	Director at Large
Carl Valenziano	Director at Large

2013

Scott Sagraves	President
Kimberly Davis	President-Elect
Jeffrey Salomone	Past President
Bruce Crookes	Secretary/Treasurer
Stanley Kurek, Jr.	Recorder/Program Chair
A. Britton Christmas	Director at Large
Therese Duane	Director at Large
Joseph DuBose	Director at Large
Juan Duchesne	Director at Large
Samir Fakhry	Director at Large
Oscar Guillamondegui	Director at Large
Elliott Haut	Director at Large
Shahid Shafi	Director at Large
Nicole Stassen	Director at Large

2014

Kimberly Davis	President
Stanley Kurek, Jr.	President-Elect
Scott Sagraves	Past President
Bruce Crookes	Secretary/Treasurer
Andrew Bernard	Recorder/Program Chair
A. Britton Christmas	Director at Large
Joseph DuBose	Director at Large
Samir Fakhry	Director at Large
Oscar Guillamondegui	Director at Large
Elliott Haut	Director at Large
Babak Sarani	Director at Large
Kevin Schuster	Director at Large
Nicole Stassen	Director at Large

2015

Stanley Kurek, Jr.	President
Nicole Stassen	President-Elect
Kimberly Davis	Past President
Bruce Crookes	Treasurer
Elliott Haut	Secretary
Andrew Bernard	Recorder
Joseph DuBose	Director at Large
Samir Fakhry	Director at Large
Oscar Guillamondegui	Director at Large
Babak Sarani	Director at Large
Kevin Schuster	Director at Large
Deborah Stein	Director at Large

2016

Nicole Stassen	President
Bruce Crookes	President-Elect
Stanley Kurek, Jr.	Past President
A. Britton Christmas	Treasurer
Elliott Haut	Secretary
Andrew Bernard	Recorder
William Chiu	Director at Large
Jeffrey Claridge	Director at Large
Babak Sarani	Director at Large
Kevin Schuster	Director at Large
Jason Smith	Director at Large
Deborah Stein	Director at Large

PAST MEETINGS

January 13-16, 1988	*Colony Beach Resort*	Longboat Key, FL
January 12-14, 1989	*Colony Beach Resort*	Longboat Key, FL
January 10-13, 1990	*The Registry Hotel*	Naples, FL
January 17-19, 1991	*Colony Beach Resort*	Longboat Key, FL
January 16-18, 1992	*Hamilton Princess Hotel*	Bermuda
January 13-16, 1993	*Colony Beach & Tennis Resort*	Longboat Key, FL
January 12-15, 1994	*The Princess Hotel & Casino*	Freeport, Bahamas
January 11-14, 1995	*Sanibel Harbour Resort & Spa*	Ft. Myers, FL
January 10-13, 1996	*Walt Disney World Dolphin*	Lake Buena Vista, FL
January 15-18, 1997	*Sanibel Harbour Resort & Spa*	Ft. Myers, FL
January 14-17, 1998	*Sanibel Harbour Resort & Spa*	Ft. Myers, FL
January 13-16, 1999	*Wyndham Palace Resort & Spa*	Orlando, FL
January 12-15, 2000	*Sanibel Harbour Resort & Spa*	Ft. Myers, FL
January 8-13, 2001	*Westin Innisbrook Resort Tampa Bay*	Palm Harbor, FL
January 15-19, 2002	*Wyndham Palace Resort & Spa*	Orlando, FL
January 15-18, 2003	*Sanibel Harbour Resort & Spa*	Ft. Myers, FL
January 14-17, 2004	*Amelia Island Plantation*	Amelia Island, FL
January 12-15, 2005	*Marriott Harbor Beach Resort & Spa*	Ft. Lauderdale, FL
January 11-14, 2006	*Disney's Contemporary Resort*	Lake Buena Vista, FL
January 16-20, 2007	*Sanibel Harbour Resort & Spa*	Ft. Myers, FL
January 15-19, 2008	*Amelia Island Plantation*	Jacksonville, FL
January 13-17, 2009	*Disney's Yacht & Beach Club Resort*	Orlando, FL
January 19-23, 2010	*Sheraton Wild Horse Pass Resort*	Chandler, AZ
January 25-29, 2011	*Naples Grande Resort*	Naples, FL
January 10-14, 2012	*Disney's Contemporary Resort*	Lake Buena Vista, FL
January 15-19, 2013	*JW Marriott Camelback Resort*	Scottsdale, AZ
January 14-18, 2014	*Waldorf Astoria Naples*	Naples, FL
January 13-17, 2015	*Disney's Contemporary Resort*	Lake Buena Vista, FL
January 12-16, 2016	*JW Marriott San Antonio*	San Antonio, TX
January 10-14, 2017	*The Diplomat Beach Resort*	Hollywood, FL

The Presidential Gavel Box
The Eastern Association of the Surgery of Trauma

In 2006, Michael F. Rotondo MD FACS, the 18th President of the Association commissioned Paul Gianino, a master cabinet maker from Greenville, North Carolina to create a box for the presidential gavel of the Eastern Association for the Surgery of Trauma. To this point, the gavel had been housed in a forest green fleece drawstring bag. At the writing of this, there was no institutional memory regarding the origin of the fleece bag. Upon receiving the gavel at the start of his presidency in 2005, Rotondo found this curious and decided to commission the design and construction of a more permanent home for the gavel.

Gianino, originally from Boston, Massachusetts, is a modern master taught exclusively by his father. He is nationally recognized as one of America's most talented cabinet makers. He has extensive experience building such boxes for judges, heads of council and other leaders across the country. Under Rotondo's guidance, he designed the box to hallmark both the organization as well as the time in which the box was constructed.

The box is made from 19th century Honduran mahogany with over 100 separate hand made parts. The top features the rising sun of EAST inlaid with burled elm on a background of Cuban mahogany framed in a rectangular band of holly. The sides of the box feature hand crafted raised panels. The cover of the box is attached with geometric gold plated stop hinges from the 1860's. So that the gavel may be displayed with the cover open, an engraved sterling silver plate with the EAST insignia and the words, "The Presidential Gavel", was applied to the inside cover and an internal glass dust cover was hinged into the box in a hand-crafted frame. Even the inside cover of the frame for the glass has original detailed beveled molding to hold it in place. The gavel and sound block sit in felt covered custom cradles. No traditional stains were used in the development of the piece but rather a series of acid washes applied in such a fashion that the darkness and richness of the wood is maximized. The finish is in simple shellac.

In an effort to hallmark the piece to the time and to EAST's commitment to the care of our wounded warriors, Rotondo asked Colonel Donald H. Jenkins, United States Air Force and Joint Theater Trauma System Chief in the Iraq War at the time, to supply some remembrance of the conflict to incorporate into the design of the gavel box. Colonel Jenkins was serving on the EAST Board of directors as Chairman of the Ad Hoc Military Committee. After a 210 day deployment throughout most of 2006, Jenkins returned with an SOF Technical Tourniquet used on a 22 year old United States Marine whose life was saved as a result of application of the device and subsequent operation by Commander Tracy R. Bilski, United States Navy and a member of EAST. In fact, a number of EAST members deployed at the time cared for this young marine throughout the echelons of care. The tourniquet was incorporated into the box by utilizing the aluminum rotation bar (twister) as a cover handle secured in place with a hand turned mahogany knob. If you examine the handle carefully, you can still see evidence of the marine's dried blood encrusted in the grooves of the twister. A piece of the tourniquet's nylon strap was used to secure the gavel in its cradle and the tourniquet label was preserved to authenticate the piece.

The box was presented as a gift to the organization by Dr. Rotondo to Michael Pasquale, the 19th President of the association on the occasion of the gavel exchange to Kimberly Nagy, the 20th and first woman President of the Eastern Association for the Surgery of Trauma at the Scientific Assembly in 2007.

The History of the **EAST** Gavel Box

The following speech was given by Col. Donald Jenkins, MD
during the 20th EAST Annual Scientific Assembly
January 16-20, 2007 ♦ Fort Myers, Florida

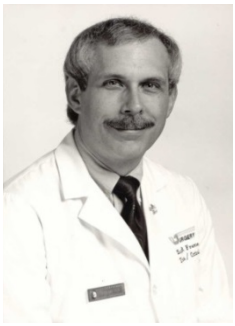
I was asked by President Rotondo to make a brief presentation of a significance which will become apparent shortly. Yesterday, I was surprised to discover that 5% of Active EAST members have been deployed to war in Iraq/Afghanistan in the past year alone. But, let me share with you a story of a 22 y.o. Lance Corporal in the USMC who was injured in October 2006 during operations near Al Taqqadam, Iraq, about 30 miles west of Baghdad in Al Anbar Province, between Fallujah and Ramadi. During a firefight, he sustained both upper and lower extremity gunshot wounds. A Navy Corpsman applied a SOF-T tourniquet on his leg due to massive hemorrhage and he was taken to the US Navy Forward Resuscitative Surgical site in Al Taqqadam, aka, TQ Surgical. There, CDR Tracy Bilski, US Navy and EAST Member, performed life and limb salvage surgery, to include vascular shunt of his femoral artery. The patient was then evacuated to the Air Force Theater Hospital in Balad, Iraq where further resuscitation and salvage surgery were performed and definitive vascular repair was accomplished. Upon entry at Balad, Maj Michelle Park, USAF and an EAST member, oversaw his surgical and critical care.

His presenting blood pressure was 100/62, BD 7, INR 1.6 and Hgb 7; all independent risk factors for massive transfusion and associated with a 40% mortality. Overall, he received 11 units PRBC, 8 units cryo, 1 6-pack of platelets, 5 units of plasma and 5 units of whole blood in addition to 4 doses of recombinant fVIIa.

After this stabilizing surgery, he remained critically ill and ventilator dependent, but was flown by Air Force Critical Care Air Transport Team (trained before their deployment by Col Jay Johannigman, USAF and EAST member and Maj Stephen Barnes, USAF and an EAST member) to Landstuhl Regional Medical Center in Germany, where Col Warren Dorlac, USAF and EAST member assumed his care. This Military Trauma Center is run by Col Stephen Flaherty, USA and EAST member; and the Trauma Program Manager is Ms. Kathie Martin, EAST Associate Member. After several days of critical care and serial wound washouts, during which visiting Senior Surgeon Dr Donald Trunkey, former USA surgeon and Honorary EAST member, participated in his care, thanks to a program spearheaded by Bill Schwab, formerly US Navy and past president of EAST, this Marine was extubated and transferred to Bethesda National Naval Medical Center, to the care of CDR Jim Dunne and CAPT Phil Perdue, US Navy and EAST members. He is now recovering as an outpatient at Camp Pendleton, California.

The care of this Lance Corporal is perhaps the quintessential case of modern combat casualty care and highlights the participation of EAST members in the military: casualty care in echelons; use of tourniquets by field medics; far forward damage control surgery, including the use of vascular shunts; definitive vascular repair in-theater; use of 'damage control resuscitation' (to include ultra-fresh whole blood, PRBC:plasma in 1:1 ratio, use of platelet pheresis platelets collected in combat zone and use of rVIIa), then; CCATT transport out of theater; and rapid transition to care in the continental United States across the continuum of care with multiple surgeries along the way. These protocols, procedures and guidelines have been drafted, published, implemented and refined over the last several years with significant input and oversight from EAST members to include, CAPT Peter Rhee, USN, COL John Holcomb, USA, COL David Burris, USA, COL Brian Eastridge, USA, COL Stephen Flaherty, USA and COL Donald Jenkins, USAF. At every stop, EAST members had a vital role in his care. The SOF-T tourniquet 'built in' to the Presidential Gavel box was used on this Marine. Lance Corporal Paul Bartolome (pictured below) who made this presentation himself at the 25th EAST Annual Scientific Assembly on January 13, 2012 at Disney's Contemporary Resort in Lake Buena Vista, Florida.

Lance Corporal Paul Bartlome addressing the audience (L) and receiving the tourniquet that was used to save his life as described above (R) from the 25th EAST President Erik S. Barquist, MD, FACS



Scott B. Frame, MD Memorial Lecture

Scott Barnhart Frame personified the Eastern Association for the Surgery of Trauma (EAST). He was young, energetic, and an enthusiastic mentor for medical students, surgical residents and his peers. He fought for well-developed comprehensive systems of trauma care and he believed that the disease of trauma did have solutions that could improve its outcome.

Scott Frame was born on January 31, 1952 in Portsmouth, Virginia. However, he grew up in Albuquerque, New Mexico, graduating from high school in 1970 and then attending the University of New Mexico for both his undergraduate training and medical school. He received his MD degree in 1980 from the University of New Mexico. He spent the next 10 years of his life on active duty in the navy. He returned to Portsmouth, Virginia for his internship and residency in general surgery, completing that training in 1986. He did a fellowship in Trauma and Critical Care with Dr. Norman McSwain at Tulane in New Orleans from 1987-1988. He completed two operational tours in the navy—the first on the USS Raleigh as a general medical officer and the second on the USS Theodore Roosevelt (CVN-71), serving as the general surgeon on her commissioning crew, making him a "plankowner" of the Roosevelt. He completed his naval service at the Naval Hospital in San Diego.

In August of 1990, Dr. Frame joined the faculty at the University of Tennessee Medical Center in Knoxville, Tennessee as an Assistant Professor of Surgery. He remained there for 7 years, serving as the Director of the Trauma Service and the Director of Surgical Endoscopy while advancing to Associate Professor of Surgery with tenure. He also worked closely with pre-hospital providers and Lifestar Aeromedical Services. In October of 1997 he resigned from UT-Knoxville to accept a position with the University of Cincinnati as Full Professor of Surgery and Director of the Division of Trauma/Critical Care in the Department of Surgery. He remained in this position until his untimely death from colon cancer in March of 2001 at the age of 49.

Dr. Frame was known as a superb technical surgeon who would do anything necessary to save his injured patient, but also had the judgment that is required to know when not to operate. He believed that all patients needed to be treated the same, to prevent making mistakes. He was an excellent teacher and mentor, winning teaching awards in every program he served. He expected that those he taught would be as passionate about surgery and trauma as he was himself. He was loyal to those he worked with and respected and he was always honest. He would take strong positions and argue for them, but he would also consider opposing points of view. If the logic of the opposition proved correct, he would readily admit that he was wrong.

Dr. Frame was very active in the early days of EAST. He was a charter member of the organization who served in many ways. He was on the membership committee and the program committee, playing an active role in these committees as they helped establish the reputation of EAST and powered its early growth. He was actively involved in the scientific program at EAST, submitting abstracts and manuscripts to the program and encouraging his residents and fellows to do the same. He and his wife Joyce attended every annual meeting of EAST that was held until he became too ill from his cancer to attend.

Dr. Frame's contributions to the scientific literature in trauma were extensive and continued right up to the time of his death. Besides many important articles on trauma, Dr. Frame edited a book on Retroperitoneal Trauma with Dr. McSwain. At the time of his death, Dr. Frame was again serving with Dr. McSwain as editor of the Fifth Edition of the PHTLS training manual. Dr. Frame served as the associate medical director of PHTLS from 1994 on, continuing and expanding his long interest in pre-hospital care and taking the course around the world. He had accepted the position of Medical Director of PHTLS, to be assumed at the time of the publication of the Fifth Edition of the training manual.

Dr. Frame was a mentor, an inspiration, and a friend to many of the early leaders and members of EAST. He and his wife, Joyce, were always together at meetings and at home, and always ready to serve the trauma community in any way that they could. Joyce has continued to serve EAST in supporting this lectureship in Scott's name to ensure that his memory and his contributions to trauma care live on. As his good friend and mentor, Dr. Norman McSwain said, Scott Frame "embodied the trauma surgeon—Outspoken when he believed that he was correct, loving when he was needed, aggressive in the care of his patients and an excellent teacher to residents, other physicians and to the pre-hospital providers of the world."

Scott B. Frame, MD Memorial Lecturers

2003 Charles L. Rice, MD, FACS
2004 Donald D. Trunkey, MD, FACS
2005 Steven R. Shackford, MD, FACS
2006 L.D. Britt, MD, MPH, FACS
2007 Thomas Russell, MD, FACS
2008 Gregory J. Jurkovich, MD, FACS
2009 Will P. Chapleau, EMT-P, RN, TNS
2010 Howard R. Champion, MD, FRCS, FACS
2011 David B. Hoyt, MD, FACS
2012 Richard Carmona, MD, MPH, FACS
2013 Norman E. McSwain, Jr., MD, FACS
2014 David V. Feliciano, MD, FACS
2015 Paul A. Taheri, MD, MBA, FACS
2016 Mark A. Malangoni, MD, FACS
2017 Michael F. Rotondo, MD, FACS
2018 Steven R. Shackford, MD, FACS

The Raymond H. Alexander MD Resident Paper Competition

Raymond H. Alexander MD received his undergraduate degree from Princeton University and his MD from Duke. Following military service to the country, he moved to Jacksonville as one of the first board certified vascular surgeons in the state of Florida.

Dr. Alexander was medical director of the trauma program and Chief of Surgery at the University of Florida Health Science Center in Jacksonville. He also served as medical director of Florida's Emergency Medical Services office. His accomplishments included fostering a statewide trauma system before his untimely death to cancer in 1992.

In addition to the EAST Resident Paper Competition, several other awards and honors bear his name, a testament to his impact on trauma care. The Raymond H. Alexander Medical Director of the Year is given by Florida Department of Health's Bureau of Emergency Medical Services to a physician who assumed a leadership role in EMS with the community or nationally and demonstrates excellence in the areas of quality assurance/improvement and medical control, as well as the promotion and use of new medical trends and technologies. The American College of Surgeons Florida Chapter annually presents the Raymond H. Alexander, MD Award to a surgeon for outstanding dedication and service to the medical profession in the field of surgery, as exemplified by the devoted and unselfish life of Dr. Ray Alexander. The Florida Committee on Trauma holds the Annual Raymond Alexander Visiting Professor, a traveling series of Grand Rounds lectures by a national expert who visits trauma centers across the state over one week.

Dr. Alexander was one of ten surgeons recognized as a Founding Board Member of EAST.

His lifelong dedication to organized care for the injured is an inspiration to the membership and friends of EAST. The Annual EAST Resident Paper Competition held during the Annual Scientific Assembly of the Eastern Association for the Surgery of Trauma is named in his honor.

Visit the EAST website, www.east.org, for a listing of
Raymond H. Alexander, MD Resident Paper Competition recipients.

John M. Templeton, Jr., MD
1940-2015

Introduction written by C. William Schwab, MD; Past President, EAST

Thank you, Jack. Jack and Pina Templeton's dedication to children, education, character, religion, and prayer in our lives and for America is widely known, and the Eastern Association for the Surgery of Trauma is so fortunate to have them. It was my good fortune to have had Jack as a teacher, faculty, colleague, and friend for more than 35 years. In 1975, Jack reported to the Portsmouth Naval Hospital as the Chief of Pediatric Surgery, where I was a chief resident. Our interactions were over the most difficult pediatric cases and through that, I learned of Jack's devotion and determination to help every sick child and their family through their time of crisis. He personalized every case and worked alongside each of us at Portsmouth, to carry each and every child back to health. He lived the meaning of "teamwork." So it was no surprise that when I was recruited to PENN, 20 years later, I found Jack developing the Pediatric Trauma Center at CHOP. Jack was exactly the same: devoted, energetic, and determined. Our relationship flourished as we both struggled to grow and mature these two centers, which were a mere fifty feet apart. Our city was being ravaged with firearm injury at this time. At perhaps the lowest moment of this epidemic, it was Jack Templeton who catalyzed us to seek to understand the root causes and look for some way to lower the devastating toll for Philadelphia youth. In a simple request between friends, Jack seeded the Firearm and Injury Center at Penn and birthed an interdisciplinary group of scholars who some 20 years later continue to advance meaningful dialogue about protecting Americans.

Jack gave up practice to direct the Templeton Foundation several years ago, and I felt a great loss to the surgical community. However, in his passions, he continued forward in even more meaningful ways. In those subsequent years, his leadership supported advancing the public's health, moving medicine toward a broader scientific inquiry of life's big questions, and of course, improving the safety of the public, most particularly our youth. His charge to EAST was lofty: "Understand how injury occurs, and through science identify effective interventions, empower the country through this knowledge." Jack Templeton elevated EAST, and with his distinctive hallmark, given us a unique purpose. We owe Jack a great deal.

Echoing Dr. Schwab's message, EAST is truly appreciative of Drs. Jack and Pina Templeton's support which has aided in the growth and development of both organizations. Through the support of the Templeton's, EAST is able to award on an annual basis, the John M. Templeton, Jr., MD Injury Prevention Research Scholarship, and the Cox-Templeton Injury Prevention Paper Competition. The John M. Templeton, Jr. MD Injury Prevention Research Scholarship's intent is an interventional trial in the field of injury prevention, while in 2012 the award of the Cox-Templeton Injury Prevention Paper Competition was renamed to recognize the contributions of John Templeton, Jr., MD and Ms. Julia Cox-McCarter in the area of Injury Prevention.

As indicated above, John M. Templeton, Jr., MD led an inspirational career and life. Dr. Templeton was President and Chairman of the John Templeton Foundation, and directed all Foundation activities in pursuit of its core mission to serve as a philanthropic catalyst for discovery in areas engaging life's biggest questions in science, theology, philosophy, individual freedom, free enterprise and character virtues. He worked closely with the Foundation's staff and international board of advisors of more than 50 leading scholars, scientists, researchers and theologians to develop substantive programs in these endeavors.

Dr. Templeton was actively involved in the Foundation since its inception in 1987. In 1995, he retired from his medical practice to serve full-time as president of the Foundation. His more than 25-year career as a physician and long-held spiritual beliefs provide both the formal science training and the commitment to advance the Foundation's work.

After receiving a Bachelor of Arts degree from Yale University in New Haven, Connecticut, Dr. Templeton earned his medical degree from Harvard Medical School in Boston. He completed his internship and residency in surgery at the Medical College of Virginia in Richmond and subsequently trained in pediatric surgery under Dr. C. Everett Koop at The Children's Hospital of Philadelphia. After serving two years in the U.S. Navy, he returned to The Children's Hospital of Philadelphia in 1977, where he served on the staff as pediatric surgeon and trauma program director. He also served as professor of pediatric surgery at the University of Pennsylvania.

Dr. Templeton was board certified in pediatric surgery and surgical critical care and was a fellow of the American College of Surgeons. He served as a board member of the American Trauma Society and as a president of its Pennsylvania division. He is a member of the Cradle of Liberty Council of the Boy Scouts of America, the Board of Trustees of Eastern University, the Boards of the Foreign Policy Research Institute, Philadelphia College of Physicians, National Bible Association, the Session for Proclamation Presbyterian Church and the American Association for the Surgery of Trauma. He published numerous papers in medical and professional journals, in addition to three books, *A Searcher's Life* and *Thrift and Generosity: The Joy of Giving*, and an updated version of his autobiography, entitled, *John M. Templeton, Jr: Physician, Philanthropist, Seeker.*

Dr. Templeton is survived by his wife, Dr. Josephine Templeton who is retired from the practice of pediatric anesthesiology at The Children's Hospital of Philadelphia. They have two daughters, Heather and Jennifer, five grandsons and one granddaughter.

Visit the EAST website, www.east.org, for a listing of recipients of the John M. Templeton, Jr., MD Injury Prevention Research Scholarship, the Cox-Templeton Injury Prevention Paper Competition, and the John M. Templeton, Jr., MD Military Call to Service Scholarship.

Major John P. Pryor, MD, FACS
US Army Reserve Medical Corps
Jan 23, 1966–Dec 25, 2008
Killed in action in Mosul, Iraq

Photo taken by: Major Scott J. Pomygalski, CRNA

The John P. Pryor, MD Distinguished Service Award in Military Casualty Care is an annual award presented at the EAST Annual Scientific Assembly. The award recognizes EAST members who have distinguished themselves in the field of military casualty care. EAST members, who through a singular advancement or a body of work in the field of military casualty care or who have demonstrated a commitment to improving outcomes for those who sustain injury in modern military theaters of conflict are considered for this award.

The John P. Pryor, MD Distinguished Service Award in Military Casualty Care was established by the Military Ad Hoc Committee of the Eastern Association for the Surgery (EAST) and approved by the EAST Board of Directors in April, 2011. The first award was presented at the 25th EAST Annual Scientific Assembly, January 10-14, 2012 in Lake Buena Vista, Florida.

Award Recipients

2012 Col. Warren Dorlac, MD, FACS
2013 COL (ret.) John B. Holcomb, MD, FACS
2014 C. William Schwab, MD, FACS
2015 Donald H. Jenkins, MD, FACS, DMCC, Colonel, USAF (retired)
2016 COL Brian J. Eastridge, MD, FACS
2017 COL Kirby R. Gross, MD, FACS

Eastern Association for the Surgery of Trauma (EAST)
31st Annual Scientific Assembly
OVERALL SCHEDULE

TUESDAY, JANUARY 9, 2018

7:00 am-5:00 pm	Speaker Preparation Room	**Pastoral 1**
7:30 am-7:00 pm	Registration	**Fantasia Lobby-East Registration**
7:30 am-4:00 pm	EAST Information Table *Stop by for membership information or to make a contribution to the EAST Development Fund!*	**Fantasia Lobby-West Registration**
7:00 am-4:30 pm	EAST Community Outreach 2018 - *Stop the Bleed*[SM] & Training	**Ballroom of the Americas A-B**
Workshop - Ticketed session, additional fees apply. Pre-registration required.		
8:00 am-4:00 pm	**Leadership in a Complex Medical World** **An EAST Leadership Development Workshop** *Presented by the EAST Career Development Committee*	**Sorcerer's Apprentice Ballrooms 1-2**
12:00 pm-5:00 pm	Exhibit Set-up	**Fantasia Ballroom G**
12:30 pm-4:00 pm	Manuscript and Literature Review Committee Meeting	**Fantasia Ballrooms M-N**
Workshops - Ticketed session, additional fees apply. Pre-registration required.		
1:00 pm-6:00 pm	**Bridging the Gap: A Chief Residents and Fellows Workshop** *Presented by the EAST Career Development Committee*	**Fantasia Ballrooms C-D**
4:00 pm-8:00 pm	EAST Executive Committee & Board of Directors Meetings 4:00 pm-4:30 pm - Executive Committee 4:30 pm-8:00 pm - Board of Directors	**Sorcerer's Apprentice Ballroom 3**
Industry Education Symposia		
6:00 pm-9:00 pm	Z-Medica (Lecture)	**Fantasia Ballrooms E-F**

WEDNESDAY, JANUARY 10, 2018

6:00 am-5:00 pm	Registration	**Fantasia Lobby-East Registration**
6:00 am-5:00 pm	Speaker Preparation Room	**Pastoral 1**
7:00 am-4:30 pm	EAST Information Table *Stop by for membership information or to make a contribution to the EAST Development Fund!*	**Fantasia Lobby-West Registration**
7:00 am-8:30 am	Continental Breakfast provided in the Exhibit Hall	**Fantasia Ballroom G**
7:00 am-4:30 pm	Exhibits	**Fantasia Ballroom G**
7:30 am-8:00 am	**Opening Ceremony - Flag Ceremony and Opening Remarks**	**Fantasia Ballroom J**
8:00 am-9:40 am	**Scientific Session I: Raymond H. Alexander, MD Resident Paper Competition** *(Papers 1-5)* Moderators: Bruce A. Crookes, MD & Joshua B. Brown, MD, MSc *(2017 Clinical Science Paper Recipient)*	**Fantasia Ballroom J**
9:40 am-10:00 am	Morning Break - Refreshments provided in the Exhibit Hall	**Fantasia Ballroom G**
10:00 am-12:00 pm	**Scientific Session II: Raymond H. Alexander, MD Resident Paper Competition** *(Papers 6-11)* Moderators: Andrew C. Bernard, MD & Matthew L. Leatherman, DO *(2017 Basic Science Paper Recipient)*	**Fantasia Ballroom J**

WEDNESDAY, JANUARY 10, 2018 (CONTINUED)

12:00 pm-1:00 pm	Lunch on your own	
1:00 pm-2:00 pm	**Opening Keynote - Presidential Address** ***It is a Sin to be Good When You Were Sent to be Great: Quality in Trauma Care*** **Bruce A. Crookes, MD, FACS**	**Fantasia Ballroom J**
2:15 pm-3:15 pm	***EAST Annual Business Meeting - Open to All EAST Members And Gavel Exchange***	**Fantasia Ballroom J**
3:15 pm-3:30 pm	Afternoon Break - Visit the exhibit hall!	**Fantasia Ballroom G**
3:30 pm-4:30 pm	**Parallel Plenary Session** Scientific Papers That Should Have Changed Your Practice *Presented by the EAST Manuscript and Literature Review Committee*	**Fantasia Ballroom J**
3:30 pm-4:30 pm	**Parallel Plenary Session** Turning Trauma Research into Community-Level Advocacy *Presented by the EAST Injury Control & Violence Prevention Committee*	**Fantasia Ballroom H**
4:30 pm-5:30 pm	**Quick Shots Parallel Session I - Basic Science & Performance Improvement** *(Quick Shots 1-10 Presented)* Moderators: Jason W. Smith, MD, PhD & Mark J. Seamon, MD	**Fantasia Ballroom J**
4:30 pm-5:30 pm	**Quick Shots Parallel Session II - Clinical Trauma** *(Quick Shots 11-20 Presented)* Moderators: William C. Chiu, MD & Robert D. Barraco, MD, MPH	**Fantasia Ballroom H**

EAST Receptions & Special Events

5:45 pm-7:00 pm	EAST Development Donor & Exhibitor Appreciation Reception *(By invitation only)*	**Sorcerer's Apprentice Ballroom 3**
6:30 pm-8:30 pm	Opening Reception - Ticketed Event *(RSVP Requested)*	**Fantasia Lobby & Convention Porte Cochére**

THURSDAY, JANUARY 11, 2018

6:30 am-7:30 am	**EAST Committee Meetings**	
	Development Committee	**Fantasia Ballroom E**
	Guidelines Committee	**Fantasia Ballrooms A-B**
	Injury Control & Violence Prevention Committee	**Fantasia Ballrooms C-D**
	Member Recruitment & Retention Committee	**Fantasia Ballrooms M-N**
	Online Education Committee	**Fantasia Ballroom K**
	Research-Scholarship Committee	**Fantasia Ballroom F**
6:00 am-5:00 pm	Speaker Preparation Room	**Pastoral 1**
7:00 am-4:00 pm	Registration	**Fantasia Lobby-East Registration**
7:30 am-4:00 pm	EAST Information Table *Stop by for membership information or to make a contribution to the EAST Development Fund!*	**Fantasia Lobby-West Registration**
7:45 am-9:00 am	**No Suit, No Problem: Fostering Relationships & Building Careers** Networking & Attendee Continental Breakfast *Presented by the EAST Career Development Committee*	**Sorcerer's Apprentice Ballrooms 1-3**
8:30 am-9:45 am	Continental Breakfast provided in the Exhibit Hall	**Fantasia Ballroom G**
8:45 am-4:15 pm	Exhibits	**Fantasia Ballroom G**
9:15 am-10:15 am	**Parallel Plenary Session** Engage the Masters *Presented by the EAST Career Development Committee*	**Fantasia Ballroom J**
9:15 am-10:15 am	**Parallel Plenary Session** Launching the 2018 EAST Multicenter Trials *Presented by the EAST Multicenter Trials Committee*	**Fantasia Ballroom H**

THURSDAY, JANUARY 11, 2018 (CONTINUED)

10:15 am-10:30 am	Morning Break - Refreshments provided in the Exhibit Hall	**Fantasia Ballroom G**
10:30 am-12:30 pm	**Scientific Session III-A: Resuscitation & Transfusion** *(Papers 12-17)* Moderators: A. Britton Christmas, MD & Nicole A. Stassen, MD	**Fantasia Ballroom J**
10:30 am-12:30 pm	**Scientific Session III-B: Cox-Templeton Injury Prevention Paper Competition** *(Papers 18-23)* Moderators: Alexander L. Eastman, MD, MPH & Eric H. Bradburn, DO, MS *(2017 Recipient)*	**Fantasia Ballroom H**
12:30 pm-1:45 pm	Lunch on your own	
1:45 pm-2:30 pm	**EAST Annual Oriens Presentations** *Presented by the EAST Career Development Committee* *Supported by an unrestricted grant from the Polk Family Charitable Foundation* 1:45 pm-2:15 pm Keynote Address - *Life Lessons Learned on the Way to the Operating Room* Speaker: J. Wayne Meredith, MD, FACS 2:15 pm-2:30 pm - 2018 EAST Oriens Essay Presentations Resident Winner – Christopher P. Foran, MD Fellow Winner – Lourdes Swentek, MD	**Fantasia Ballroom J**

Workshop - Ticketed session, additional fees apply. Pre-registration required.

2:00 pm-6:00 pm	**Advanced Practitioners in Trauma Workshop** Addressing Professional & Clinical Development: Moving Ideas to Publication, Ventilator Management, and Cardiac Emergencies *Presented by EAST and Society of Trauma Nurses (STN)*	**Fantasia Ballrooms C-D**

2:45 pm-4:00 pm	**Parallel Plenary Session** EAST Master Class Surgical Video Session *Presented by EAST*	**Fantasia Ballroom J**
2:45 pm-4:00 pm	**Parallel Plenary Session** Integration of a Palliative Care Guideline in the Trauma Population *Presented by the Society of Trauma Nurses (STN)*	**Fantasia Ballroom H**
4:00 pm-4:15 pm	Afternoon Break - Visit the exhibit hall!	**Fantasia Ballroom G**
4:15 pm-5:30 pm	**Quick Shots Parallel Session III - Clinical & Trauma Systems** *(Quick Shots 21-32 Presented)* Moderators: Daniel J. Bonville, DO & Paula Ferrada, MD	**Fantasia Ballroom J**
4:15 pm-5:30 pm	**Quick Shots Parallel Session IV - Trauma Education, Performance Improvement, Emergency General Surgery** *(Quick Shots 33-44 Presented)* Moderators: Daniel J. Grabo, MD & David S. Morris, MD	**Fantasia Ballroom H**

EAST Receptions & Special Events

5:30 pm-10:30 pm	Kids Klub Party - Pre-Registration Required!	**Ballroom of the Americas A-B**
5:30 pm-7:30 pm	Society of Trauma Nurses (STN) Networking Reception *(By invitation only)*	**Sorcerer's Apprentice Ballroom 3**
6:00 pm-10:00 pm	EAST President's Reception & Dinner *(By invitation only)* *Buses Depart Contemporary Convention Center at 6:00 pm*	**Epcot, American Adventure Rotunda West Side Bus Pick-Up**

FRIDAY, JANUARY 12, 2018

6:30 am-7:15 am	**EAST Committee Meetings**	
	Annual Scientific Assembly Committee	**Fantasia Ballroom E**
	Career Development Committee	**Fantasia Ballroom F**
	Emergency General Surgery Committee	**Fantasia Ballrooms C-D**
	Manuscript & Literature Review Committee	**Fantasia Ballrooms M-N**
	Mentoring Committee	**Fantasia Ballroom L**
	Military Committee	**Fantasia Ballroom K**
	Multicenter Trials Committee	**Fantasia Ballroom B**
	Seniors Committee	**Fantasia Ballroom A**
6:30 am-12:30 pm	Registration	**Fantasia Lobby-East Registration**
7:00 am-12:30 pm	Speaker Preparation Room	**Pastoral 1**
7:30 am-12:00 pm	EAST Information Table *Stop by for membership information or to make a contribution to the EAST Development Fund!*	**Fantasia Lobby-West Registration**
7:00 am-9:30 am	Exhibits	**Fantasia Ballroom G**
7:00 am-8:30 am	Continental Breakfast provided in the Exhibit Hall	**Fantasia Ballroom G**
7:30 am-8:00 am	**EAST Awards Ceremony & Recognition** *Open to all meeting attendees* • EAST Milestone Donors Recognition • EAST Mentor Recognition • Raymond H. Alexander, MD Resident Paper Competition • Best Manuscript Award • EAST Oriens Award • John P. Pryor, MD Distinguished Service in Military Casualty Care Award • John M. Templeton, Jr., MD Military Call to Service Scholarship • Cox-Templeton Injury Prevention Paper Award • 2018 John M. Templeton, Jr., MD Injury Prevention Research Scholarship • 2018 Trauma Research Scholarship • 2018 Multicenter Trials Junior Investigator Award • 2017 Health Policy and Management Scholarship Recipient • 2018 Society of Trauma Nurses/EAST Nurse Fellow Recipient • 2018 Leadership Development Workshop Scholarship Recognition	**Fantasia Ballroom J**
8:00 am - 9:00 am	**Scott B. Frame, MD Memorial Lecture** *The Poverty of Theory: Evidence Based Medicine and the Social Contract* Steven R. Shackford, MD, FACS	**Fantasia Ballroom J**
9:00 am-9:15 am	Morning Break - Last call in the Exhibit Hall!	**Fantasia Ballroom G**
9:15 am - 10:15 am	**Parallel Plenary Session** Case Records of the Joint Trauma System: Integrating Lessons Learned from the Battlefield *Presented by the EAST Military & Online Education Committees*	**Fantasia Ballroom J**
9:15 am - 10:15 am	**Quick Shots Session V - Clinical Science & Trauma Critical Care** *(Quick Shots 45-54 Presented)* Moderators: Elliott R. Haut, MD, PhD & Jennifer C. Knight, MD	**Fantasia Ballroom H**
10:15 am-12:15 pm	**Scientific Session IV-A: Emergency General Surgery & Critical Care** *(Papers 24-29)* Moderators: Jeffrey A. Claridge, MD, MS & D. Dante Yeh, MD	**Fantasia Ballroom J**
10:15 am-12:15 pm	**Scientific Session IV-B: Trauma & Trauma Systems** *(Papers 30-35)* Moderators: Deborah M. Stein, MD, MPH & Mayur B. Patel, MD, MPH	**Fantasia Ballroom H**

FRIDAY, JANUARY 12, 2018 (CONTINUED)

12:30 pm-2:30 pm	**Practice Management Guidelines (PMGs) Plenary Session** *Presented by the EAST Guidelines Committee* Moderator: Bryce R.H. Robinson, MD, MS PMGs scheduled to be presented (*subject to change*): • Pediatric Renal Trauma – Judith Hagedorn, MD, MHS • Adult Genito-Urinary Trauma – Lawrence Yeung, MD • IVC Filter Placement – Myung Park, MD, MS • Pro-motility Agents for Ileus – Nikolay Bugaev, MD • Affordable Care Act – Adil Haider, MD, MPH • Blunt Cerebrovascular Injury (BCVI) – Dennis Kim, MD • Geriatric Trauma Teams – Marie Crandall MD, MPH	**Fantasia Ballroom H**

EAST Receptions & Special Events

3:00 pm-6:30 pm	Annual EAST Development Committee Fundraiser Dodgeball Tournament & Tailgate Party	**Fantasia Ballrooms A-G**

SATURDAY, JANUARY 13, 2018

7:00 am-8:30 am	EAST Board of Directors Meeting *(By invitation only)*	**Sorcerer's Apprentice Ballroom 3**

Workshops - Ticketed session, additional fees apply. Pre-registration required.

7:00 am-11:30 am	**Rib Fixation Industry Education Symposium** DePuy Synthes	**Sorcerer's Apprentice Ballroom 2**

Eastern Association for the Surgery of Trauma (EAST)
31st Annual Scientific Assembly
SCIENTIFIC SESSIONS

WEDNESDAY, JANUARY 10, 2018

7:30 am - 8:00 am **Flag Presentation and Opening Remarks**
Location: Fantasia Ballroom J

SCIENTIFIC SESSION I – RAYMOND H. ALEXANDER, MD RESIDENT PAPER COMPETITION
Presiding: Bruce A. Crookes, MD & Joshua B. Brown, MD, MSc
Social Q/A Moderator: Joseph V. Sakran, MD, MPH
8:00 am – 9:40 am
Location: Fantasia Ballroom J

8:00 am #1 OVER RESUSCITATION WITH PLASMA IS ASSOCIATED WITH SUSTAINED FIBRINOLYSIS SHUTDOWN AND DEATH IN PEDIATRIC TBI
Presenter: Christine M. Leeper, MD
Discussant: Rachael Callcut, MD

8:20 am #2 PLASMA CO-ADMINISTRATION IMPROVES RESUSCITATION WITH TRANEXAMIC ACID OR PROTHROMBIN COMPLEX IN A PORCINE HEMORRHAGIC SHOCK MODEL
Presenter: John P. Kuckelman, DO
Discussant: Martin A. Schreiber, MD

8:40 am #3 BLOOD PRODUCT AGE VERSUS MORTALITY: RESULTS FROM THE PRAGMATIC RANDOMIZED OPTIMAL PLATELET AND PLASMA RATIO (PROPPR) TRIAL
Presenter: A. Cozette Kale, MD, MPH
Discussant: Ali Salim, MD

9:00 am #4 DO ALL HEAD INJURED PATIENTS ON ANTIPLATELET DRUGS REALLY NEED PLATELETS?
Presenter: Christopher Bell, MD
Discussant: Jose L. Pascual, MD, PhD

9:20 am #5 EARLY PREDICTION OF HEMODYNAMIC INSTABILITY IN CRITICALLY ILL PATIENTS: A PROSPECTIVE STUDY
Presenter: Jarot Guerra, MD
Discussant: Robert D. Winfield, MD

9:40 am - 10:00 am Break – Refreshments in the Exhibit Area

SCIENTIFIC SESSION II – RAYMOND H. ALEXANDER, MD RESIDENT PAPER COMPETITION
Presiding: Andrew C. Bernard, MD & Matthew L. Leatherman, DO
Social Q/A Moderator: Rachael Callcut, MD, MSPH
10:00 am – 12:00 pm
Location: Fantasia Ballroom J

10:00 am #6 MOBILE FORWARD LOOKING INFRARED TECHNOLOGY ALLOWS RAPID ASSESSMENT OF RESUSCITATIVE ENDOVASCULAR BALLOON OCCLUSION OF THE AORTA IN HEMORRHAGE AND BLACKOUT CONDITION
Presenter: Morgan R. Barron, MD
Discussant: Joseph J. DuBose, MD

10:20 am #7 EXTERNAL VALIDATION OF A 5-VARIABLE CLINICAL PREDICTION RULE FOR IDENTIFYING CHILDREN AT VERY LOW RISK FOR INTRA-ABDOMINAL INJURY FOLLOWING BLUNT ABDOMINAL TRAUMA
Presenter: Chase A. Arbra, MD
Discussant: Richard A. Falcone, Jr. MD, MPH

10:40 am	#8	CONTINUOUS REMOTE ISCHEMIC CONDITIONING ATTENUATES COGNITIVE AND MOTOR DEFICITS AFTER MODERATE TRAUMATIC BRAIN INJURY Presenter: Viraj Pandit, MD Discussant: Carlos J. Rodriguez, DO, MBA
11:00 am	#9	FVC <1: A MARK FOR HIGH RISK PATIENTS Presenter: Rachel L. Warner, DO Discussant: Bryce R.H. Robinson, MD, MS
11:20 am	#10	BEDSIDE DYSPHAGIA SCREENS IN PATIENTS WITH TRAUMATIC CERVICAL INJURIES: AN IDEAL TOOL FOR AN UNDER-RECOGNIZED PROBLEM Presenter: Sarah E. Posillico, MD Discussant: Suresh K. Agarwal, Jr., MD
11:40 am	#11	PROSPECTIVE VALIDATION OF A GRADING SCALE FOR CHOLECYSTITIS Presenter: Tarik Madni, MD Discussant: Martin D. Zielinski, MD

End of Raymond H. Alexander, MD Resident Paper Competition

12:00 pm – 1:00 pm **Lunch On Your Own**

1:00 pm – 2:00 pm **Opening Keynote – Presidential Address**
It is a Sin to be Good When You Were Sent to be Great: Quality in Trauma Care
Bruce A. Crookes, MD, FACS
Location: Fantasia Ballroom J

2:15 pm – 3:15 pm **EAST Annual Business Meeting –** *Open to all EAST Members*
Location: Fantasia Ballroom J

3:15 pm – 3:30 pm Afternoon Break – Visit the Exhibit Hall – Fantasia Ballroom G

3:30 pm – 4:30 pm **Parallel Plenary Sessions**

Scientific Papers That Should Have Changed Your Practice
Presented by the EAST Manuscript & Literature Review Committee
Location: Fantasia Ballroom J
Moderator: Mark Seamon, MD
Speakers:
Julius Cheng, MD – Papers That Should Change Your Practice of Surgical Critical Care
Christian Jones, MD – Papers That Should Change Your Practice of Emergency Surgery Management
Ariel Santos, MD – Papers That Should Change Your Practice of Trauma Management

Turning Trauma Research into Community-Level Advocacy
Presented by the EAST Injury Control & Violence Prevention Committee
Location: Fantasia Ballroom H
Moderators: Alexander Eastman, MD, MPH & Stephanie Bonne, MD
Marie Crandall, MD, MPH – Beyond "Scared Straight": Effective and Evidence-Based Community Based Education Programs, and Adapting these Programs to Your Population
Shannon Foster, MD – Hey Partner! Learning How to Interact and Develop Partnerships and Plan Events with Community Based Organizations
Lisa Allee Barmak, MSW, LICSW – Advocacy 101: How to Interact with Your Local, State, or National Representation to Encourage Funding and Resources for Trauma Care

QUICK SHOTS PARALLEL SESSION I – Basic Science & Performance Improvement
Presiding Jason W. Smith, MD, PhD & Mark J. Seamon, MD
Social Q/A Moderator: Ronald B. Tesoriero, MD
4:30 pm – 5:30 pm
Location: Fantasia Ballroom J

4:30 pm	#1	EXCESS SODIUM IS DELETERIOUS TO ENDOTHELIAL AND GLYCOCALYX BARRIER FUNCTION: A MICROFLUIDIC STUDY Presenter: Jonathan Martin, MD
4:36 pm	#2	HYPOBARIA DURING LONG RANGE FLIGHT RESULTED IN SIGNIFICANTLY INCREASED HISTOPATHOLOGICAL EVIDENCE OF LUNG AND BRAIN DAMAGE IN A SWINE MODEL Presenter: Debra L. Malone, MD
4:42 pm	#3	LOCATION IS EVERYTHING: THE HEMODYNAMIC EFFECTS OF REBOA IN ZONE 1 VERSUS ZONE 3 OF THE AORTA Presenter: Emily M. Tibbits, MD
4:48 pm	#4	INCREASE IN NEUTROPHIL/LYMPHOCYTE RATIO IS ASSOCIATED WITH EVOLUTION OF HEMORRHAGE AFTER TBI Presenter: Margo N. Carlin, DO
4:54 pm	#5	FRAILTY SCREENING AND A FRAILTY PATHWAY DECREASE LENGTH OF STAY, LOSS OF INDEPENDENCE, AND 30-DAY READMISSION RATES IN FRAIL TRAUMA AND EMERGENCY GENERAL SURGERY PATIENTS Presenter: Katherine E. Engelhardt, MD
5:00 pm	#6	PIC SCORE: AN EFFECTIVE TOOL TO GUIDE MANAGEMENT OF BLUNT CHEST WALL INJURY (ANALYSIS OF THE FIRST TWO YEARS OF APPLICATION AT A LEVEL I TRAUMA CENTER) Presenter: Shawn M. Terry, MD
5:06 pm	#7	HEALTH LITERACY AND QUALITY OF PHYSICIAN-TRAUMA PATIENT COMMUNICATION: OPPORTUNITY FOR IMPROVEMENT Presenter: Jonathan Dameworth, MD
5:12 pm	#8	INCREASED TRAUMA ACTIVATION IS NOT EQUALLY BENEFICIAL FOR ALL ELDERLY TRAUMA PATIENTS Presenter: Bryan Carr, MD
5:18 pm	#9	THE UTILITY OF ADDITIONAL IMAGING IN TRAUMA CONSULTS WITH MILD TO MODERATE INJURY AFTER INITIAL ED WORKUP Presenter: Andrew L. Plaster, BS
5:24 pm	#10	BENCHMARKING EMERGENCY DEPARTMENT THORACOTOMY: USING TRAUMA VIDEO REVIEW TO GENERATE PROCEDURAL NORMS Presenter: Ryan P. Dumas, MD

Quick Shots Parallel Session II – Clinical Trauma
Presiding William C. Chiu, MD & Robert D. Barraco, MD, MPH
Social Q/A Moderator: Catherine Velopulos, MD, MHS
4:30 pm – 5:30 pm
Location: Fantasia Ballroom H

4:30 pm	#11	EXPANDING TRAUMA FRAILTY STRATIFICATION: THE ARE-FIT SCORE Presenter: Margaret H. Lauerman, MD
4:36 pm	#12	OVERTRIAGE FROM PROXIMAL PENETRATING EXTREMITY INJURIES Presenter: Grace E. Martin, MD
4:42 pm	#13	THE MAGIC NUMBER: ARE IMPROVED OUTCOMES OBSERVED AT TRAUMA CENTERS WITH UNDERTRIAGE RATES BELOW 5 PERCENT? Presenter: Eric H. Bradburn, DO, MS
4:48 pm	#14	THE COMBINED UTILITY OF EFAST AND CXR IN BLUNT THORACIC TRAUMA Presenter: Morgan Schellenberg, MD, MPH
4:54 pm	#15	CAN TRAUMA SURGEONS KEEP UP? A COMPARISON OF OUTCOMES BETWEEN PATIENTS CARED FOR IN A TRAUMA-ICU VERSUS A DEDICATED NEURO-ICU Presenter: Derek Roberts, MD, PhD
5:00 pm	#16	NATIONWIDE COMPARISON OF INFECTIOUS COMPLICATIONS AFTER BLUNT SPLENIC INJURY Presenter: Rishi Rattan, MD
5:06 pm	#17	ARE TEG ASSAYS INTERCHANGEABLE? A COMPARISON OF RAPID AND KAOLIN THROMBELASTOGRAPHY IN MASSIVE TRANSFUSION PATIENTS Presenter: James Turbett, MBBS, BSc
5:12 pm	#18	CERVICAL SPINE FRACTURES IN GERIATRIC BLUNT TRAUMA: IS NEXUS ENOUGH? Presenter: Katelyn Young, BS
5:18 pm	#19	COMPENSATORY RESERVE INDEX AND PULSE CHARACTER: ENHANCED POTENTIAL TO PREDICT CASUALTY URGENCY AFTER INJURY Presenter: Michael C. Johnson, MD
5:24 pm	#20	F.R.I.E.N.D. OR F.O.E.: A PROSPECTIVE EVALUATION OF RISK FACTORS FOR REINTUBATION IN SURGICAL AND TRAUMA PATIENTS Presenter: Christopher P. Michetti, MD

THURSDAY, JANUARY 12, 2017

7:45 am – 9:00 am **No Suit, No Problem Networking Breakfast**
Presented by the EAST Career Development Committee
Location: Sorcerer's Apprentice Ballrooms 1-3

9:15 am – 10:15 am **Parallel Plenary Sessions**

Engage the Masters
Presented by the EAST Career Development Committee
Location: Fantasia Ballroom J
Moderators: Eric Bradburn, DO, Gary T. Marshall, MD, Ayodele T. Sangosanya, MD
Masters: Lawrence Lottenberg, MD, J. Wayne Meredith, MD and Martin Schreiber, MD
Case Presentations:

- Penetrating Liver Catastrophe– Roberto C. Castillo, DO, MPH, Virginia Commonwealth University
- Blunt Airway Gone Awry – Alessandra Landmann, MD, University of Oklahoma Health Sciences Center
- When Domain is Lost – Zachary D. Warriner, MD, USC + LAC Medical Center

Launching the 2018 EAST Multicenter Trials
Presented by the EAST Multicenter Trials Committee
Location: Fantasia Ballroom H
Speaker: Jose L. Pascual, MD, PhD

10:15 am – 10:30 am Morning Break – Visit the Exhibit Hall – Fantasia Ballroom G

PARALLEL SCIENTIFIC SESSION III-A – Resuscitation & Transfusion
Presiding: A. Britton Christmas, MD & Nicole A. Stassen, MD
Social Q/A Moderator: Bellal Joseph, MD
10:30 am – 12:30 pm
Location: Fantasia Ballroom J

10:30 am	# 12	THE ROLE OF 4-FACTOR PROTHROMBIN COMPLEX CONCENTRATE (4-PCC) IN COAGULOPATHY OF TRAUMA: A PROPENSITY MATCHED ANALYSIS Presenter: Hassan Aziz, MD Discussant: Ryan A. Lawless, MD
10:50 am	#13	IN VITRO EFFECTS OF A KAOLIN BASED HEMOSTATIC DRESSING ON ANTICOAGULATED BLOOD Presenter: Michael W. Cripps, MD Discussant: Andrew J. Dennis, DO
11:10 am	#14	MAR RATIO PREDICTS SHOCK VOLUME : TWO METRICS TO UNDERSTAND BURDEN OF INJURY Presenter: Brian L. Brewer, MD Discussant: Franklin Lee Wright, MD
11:30 am	#15	ASSOCIATION OF FRESH WHOLE BLOOD AND SURVIVAL AT ROLE 2 MEDICAL TREATMENT FACILITIES IN AFGHANISTAN Presenter: Shawn C. Nessen, DO Discussant: Matthew Eckert, MD
11:50 am	#16	A COMPARISON OF RESUSCITATION INTENSITY (RI) AND CRITICAL ADMINISTRATION THRESHOLD (CAT) IN PREDICTING EARLY MORTALITY AMONG BLEEDING PATIENTS: A MULTICENTER VALIDATION IN 680 MAJOR TRANSFUSION PATIENTS Presenter: David Meyer, MD Discussant: Ronald B. Tesoriero, MD
12:10 pm	#17	BLEEDING AND THROMBOEMBOLISM AFTER TBI IN THE ELDERLY: A REAL CONUNDRUM Presenter: Nina Glass, MD Discussant: Ali Cheaito, MD

PARALLEL SCIENTIFIC SESSION III-B –
COX-TEMPLETON INJURY PREVENTION PAPER COMPETITION
Presiding: Alexander L. Eastman, MD, MPH & Eric H. Bradburn, DO, MS
Social Q/A Moderator: Jamie J. Coleman, MD
10:30 am – 12:30 pm
Location: Fantasia Ballroom H

10:30 am	#18	CAN PLANNED TRAFFIC PATTERNS IMPROVE SURVIVAL AMONG THE INJURED DURING MASS CASUALTY MOTORCYCLE RALLIES? Presenter: Cecily E. DuPree, DO Discussant: Allan B. Peetz, MD
10:50 am	#19	MAPPING AREAS WITH CONCENTRATED RISK OF TRAUMA MORTALITY: A FIRST STEP TOWARD MITIGATING DISPARITIES IN TRAUMA Presenter: Molly P. Jarman, PhD, MPH Discussant: Mayur Narayan, MD, MPH, MBA, MPHE
11:10 am	#20	IMPLEMENTATION IS NOT ENOUGH: GRADUATED DRIVERS LICENSING BENEFITS FROM PUBLIC AWARENESS CAMPAIGNS Presenter: Stephanie Bonne, MD Discussant: Linda Ding, MD
11:30 am	#21	EVALUATING THE EFFECTIVENESS OF TRANSLATED A MATTER OF BALANCE FALL PREVENTION PROGRAM MATERIALS FOR NON-ENGLISH SPEAKING PARTICIPANTS Presenter: Elizabeth S. Wolfe, CAGS, ATC Discussant: Cindy Blank-Reid, RN, MSN, CEN
11:50 am	#22	MIAMI-DADE COUNTY YOUTH WEAPONS OFFENDER PROGRAM: A POTENTIAL MODEL TO REDUCE FIREARM CRIME RECIDIVISM NATION-WIDE Presenter: Rene Gamboa, MS, LMHC Discussant: Anthony Bottiggi, MD
12:10 pm	#23	INTIMATE PARTNER AND SEXUAL VIOLENCE: A FOCUS ON MALE PATIENTS Presenter: Tanya L. Zakrison, MD, MPH Discussant: Carnell Cooper, MD

End of Cox-Templeton Injury Prevention Paper Competition

12:30 pm – 1:45 pm **Lunch on your own**

1:45 pm – 2:30 pm **EAST Annual Oriens Presentations**
Presented by the EAST Career Development Committee
Supported by an unrestricted grant from the Polk Family Charitable Foundation
Location: Fantasia Ballroom J

1:45 pm-2:15 pm Keynote Address
Life Lessons Learned on the Way to the Operating Room
J. Wayne Meredith, MD, FACS

2:15 pm-2:30 pm 2018 EAST Oriens Essay Presentations
Resident Winner – Christopher P. Foran, MD
Fellow Winner – Lourdes Swentek, MD

2:45 pm – 4:00 pm **Parallel Plenary Sessions**

EAST Master Class Surgical Videos
Presented by the EAST Annual Scientific Assembly Committee
Location: Fantasia Ballroom J
Emergency General Surgery Videos – Moderator: Joshua P. Hazelton, DO
Andrea Pakula, MD, MPH – MIS Approach for Incarcerated or Strangulated Inguinal Hernias
Matthew J. Martin, MD – Laparoscopic Exploration for Acute SBO: Tips and Tricks
Tejal S. Brahmbhatt, MD – The Challenging Gallbladder – Subtotal Cholecystectomy

Trauma Videos – Moderator: Matthew J. Martin, MD
James M. Bardes, MD – Tracheoesophageal Injuries: Principles for Success
Clay Cothren Burlew, MD – Preperitoneal Pelvic Packing and Hemorrhage Control
JuLin Wang, MD – Advanced Hemostatic Agents: Intracavitary Applications

Integration of a Palliative Care Guideline in the Trauma Population
Presented by the Society of Trauma Nurses
Location: Fantasia Ballroom H
Moderator: Joan Pirrung, MSN, RN, APRN-BC
Speakers:
Kai L. Bortz, MSN, RN-BC, CMSRN, CNL
Richard S. Miller, MD

PARALLEL QUICK SHOTS SESSION III – Clinical & Trauma Systems
Presiding Daniel J. Bonville, DO & Paula Ferrada, MD
Social Q/A Moderator: Scott B. Armen, MD
4:15 pm – 5:30 pm
Location: Fantasia Ballroom J

4:15 pm	#21	LOGISTICS OF AIR MEDICAL TRANSPORT: WHEN & WHERE DOES HELICOPTER TRANSPORT REDUCE PREHOSPITAL TIME? Presenter: Joshua B. Brown, MD, MSc
4:21 pm	#22	COMPARISON OF UNCROSSMATCHED WHOLE BLOOD AND BLOOD COMPONENT THERAPY DURING TRAUMA RESUSCITATIONS IN A LEVEL I TRAUMA CENTER: A CASE MATCH CONTROLLED STUDY Presenter: Catherine M. Zatorski, BA
4:27 pm	#23	A NOVEL PREHOSPITAL TRAUMA SMARTPHONE APP FOR IMPROVED EMS TO HOSPITAL COMMUNICATION Presenter: William M. Hallinan, RN, MSBA
4:33 pm	#24	GERIATRIC INJURY INSTITUTE: THE VALUE OF A MULTIDISCIPLINARY, COORDINATED CARE MODEL FOCUSED ON THE NEEDS OF INJURED ELDERS Presenter: Shea C. Gregg, MD
4:39 pm	#25	DETERMINING SUICIDE RISK IN TRAUMA PATIENTS USING A UNIVERSAL SCREENING PROGRAM Presenter: Jonathan Imran, MD
4:45 pm	#26	A CALL TO FOLLOW UP; FOLLOW-UP PRACTICES OF THE MEMBERS OF THE EASTERN ASSOCIATION FOR THE SURGERY OF TRAUMA Presenter: James Cooros, MD
4:51 pm	#27	COMBAT NEUROSURGERY IN RECENT CONFLICTS: 2002-2016 Presenter: Zsolt T. Stockinger, MD

4:57 pm	#28	ASSOCIATION OF THE AFFORDABLE HEALTHCARE ACT WITH INSURANCE STATUS AT A LEVEL I TRAUMA CENTER IN A MEDICAID NON-EXPANSION STATE Presenter: Kyle Cunningham, MD, MPH
5:03 pm	#29	NATIONWIDE TRENDS IN MORTALITY FOLLOWING PENETRATING TRAUMA: ARE WE UP FOR THE CHALLENGE? Presenter: Joseph V. Sakran, MD, MPH, MPA
5:09 pm	#30	HEALTHCARE UTILIZATION & COST OF POST-TRAUMATIC ARDS CARE Presenter: Anamaria J. Robles, MD
5:15 pm	#31	30-DAY TRAUMA READMISSIONS: A CLINICAL ANALYSIS Presenter: Sarah K. West, MS, RN, ACNP-BC
5:21 pm	#32	"THAT CAN'T BE!" PERCEPTIONS OF HIV AND HEPATITIS C SCREENING DURING ADMISSION TO AN ACS SERVICE Presenter: Alicia R. Privette, MD

PARALLEL QUICK SHOTS SESSION IV –
Trauma Education, Performance Improvement, Emergency General Surgery
Presiding Daniel J. Grabo, MD & David S. Morris, MD
Social Q/A Moderator: Deborah M. Stein, MD, MPH
4:15 pm – 5:30 pm
Location: Fantasia Ballroom H

4:15 pm	#33	EVALUATING SWALLOWING FUNCTION IN THE ELDERLY REQUIRING CERVICAL COLLARS: A NEW STANDARD OF CARE Presenter: Nicholas M. Sich, MD
4:21pm	#34	DOES IT WORK: A CRITICAL ASSESSMENT OF THE "STOP THE BLEED" EDUCATION PROGRAM Presenter: Brian L. Frank, MD
4:27 pm	#35	HEALTH LITERACY AND ITS IMPACT ON OUTCOMES IN TRAUMA PATIENTS: A PROSPECTIVE COHORT STUDY Presenter: Tianyi Swartz, BS
4:33 pm	#36	SEE ONE, DO ONE, BUT NEVER TEACH ONE? AN ACUTE CARE SURGERY MODEL WITH GRADUATED SUPERVISION SAFELY FACILITATES SENIOR RESIDENT AUTONOMY Presenter: Joshua P. Smith, DO
4:39 pm	#37	EFFECT OF RELAXED LEGISLATION OF FIREWORKS-RELATED INJURIES IN DOUGLAS COUNTY, NEBRASKA Presenter: James Tiehen, MD
4:45 pm	#38	MISCONCEPTIONS - GUN VIOLENCE IN AMERICA Presenter: Matthew Benns, MD
4:51 pm	#39	THE USE OF ABC SCORE IN ACTIVATION OF MASSIVE TRANSFUSION: THE YIN AND THE YANG Presenter: Amirreza Motameni, MD
4:57 pm	#40	THE PRESENCE OF AN APPENDICOLITH ON PREOPERATIVE CT IS ASSOCIATED WITH A SEVERE CLINICAL COURSE AND FAILURE OF NON-OPERATIVE THERAPY IN PATIENTS WITH ACUTE APPENDICITIS Presenter: David Wang, BS

5:03 pm	#41	TRAUMA SURGEON PERFORMANCE OF APPENDECTOMY IN 5-10 YEAR-OLD CHILDREN IS SAFE AND DECREASES LENGTH OF HOSPITAL STAY Presenter: Derek B. Wall, MD
5:09 pm	#42	NASOGASTRIC TUBE (NGT) OUTPUT AFTER TWO DAYS PREDICTS THE NEED FOR OPERATION IN SMALL BOWEL OBSTRUCTION (SBO) Presenter: D. Dante Yeh, MD
5:15 pm	#43	NON-TRAUMA SERVICE ADMISSIONS: SHOULD WE CARE? Presenter: Brandon J. Fumanti, MD
5:21 pm	#44	TRENDS IN CIVILIAN PENETRATING BRAIN INJURY; A REVIEW OF 26,871 PATIENTS Presenter: David J. Skarupa, MD

FRIDAY, JANUARY 12, 2018

7:30 am – 8:00 am **EAST Awards Ceremony & Recognition**
Location: Fantasia Ballroom J

8:00 am – 9:00 am **Closing Keynote – Scott B. Frame, MD Memorial Lecture**
The Poverty of Theory: Evidence Based Medicine and the Social Contract
Steven R. Shackford, MD, FACS
Location: Fantasia Ballroom J

9:00 am – 9:15 am Break – Refreshments in the Exhibit Area

9:15 am – 10:15 am **Parallel Plenary Session & Quick Shots Session V**

Case Records of the Joint Trauma System: Integrating Lessons Learned from the Battlefield
Presented by the EAST Military Committee
Location: Fantasia Ballroom J
Moderator: Kyle N. Remick, COL, US Army
Speakers:
Scott Armen, COL, US Army Reserve – One Bullet, One Surgeon, Two Cavities: Multicavity GSW in the Austere Environment
Jacob Glaser, LCDR, US Navy – REBOA in Kandahar: A New Tool in the Bag for the War Surgeon
Timothy Plackett, LTC, US Army – Familiar Injury but a Different System: Back in Iraq
Valerie Sams, Maj, US Air Force – Delay in Care and Transfer Inadequate Management of Blast Injury in a Civilian

QUICK SHOTS SESSION V – Clinical Science & Trauma Critical Care

Presiding Elliott R. Haut, MD, PhD & Jennifer C. Knight, MD

Social Q/A Moderator: Matthew J. Martin, MD

9:15 am – 10:15 am

Location: Fantasia Ballroom H

9:15 am	#45	EARLY VITAL CAPACITY PREDICTS THE NEED FOR TRACHEOSTOMY IN CERVICAL SPINAL CORD INJURIES Presenter: Kaitlin Ritter, MD
9:21 am	#46	USE OF "SEPSIS ADVISOR TOOL" IMPROVES MORTALITY IN HIGH-ACUITY SEPTIC PATIENTS Presenter: Theophilus Pham, MBA, MS2
9:27 am	#47	UNSEEN BURDEN OF INJURY: POST HOSPITALIZATION MORTALITY IN GERIATRIC TRAUMA PATIENTS Presenter: Ciara R. Huntington, MD
9:33 am	#48	A SELECTIVE PLACEMENT STRATEGY FOR SURGICAL FEEDING TUBES BENEFITS TRAUMA PATIENTS Presenter: Joseph H. Marcotte, MD
9:39 am	#49	PROGNOSIS OF DIFFUSE AXONAL INJURY (DAI) WITH TRAUMATIC BRAIN INJURY (TBI) Presenter: Stephen Humble, BS, MD(c)
9:45 am	#50	EMERGENT TRANSFUSION IN LEVEL 1 TRAUMA PATIENTS: ARE WE PULLING THE TRIGGER TOO SOON? Presenter: Adrian A. Coleoglou Centeno, MD
9:51 am	#51	EXAMINATION OF HEMODYNAMICS IN PATIENTS UNDERGOING RESUSCITATIVE ENDOVASCULAR OCCLUSION OF THE AORTA (REBOA) Presenter: Philip J. Wasicek, MD
9:57 am	#52	BLUNT CEREBRAL VASCULAR INJURY IN ELDER FALL PATIENTS: ARE WE SCREENING ENOUGH AND IS IT WORTH THE RISK Presenter: Vince Anto, BS
10:03 am	#53	LIMITED PRE-HOSPITAL CRYSTALLOID ADMINISTRATION IS ASSOCIATED WITH A DECREASED INCIDENCE OF ARDS: A SECONDARY ANALYSIS OF THE PROPPR TRIAL Presenter: Aravind K. Bommiasamy, MD
10:09 am	#54	MULTICENTER STUDY OF CRYSTALLOID BOLUSES AND TRANSFUSION IN PEDIATRIC TRAUMA- WHEN TO GO TO BLOOD? Presenter: Stephanie F. Polites, MD

PARALLEL SCIENTIFIC SESSION IV-A – Emergency General Surgery & Critical Care
Presiding: Jeffrey A. Claridge, MD, MS & D. Dante Yeh, MD
Social Q/A Moderator: Carlos J. Rodriguez, DO, MBA
10:15 am – 12:15 pm
Location: Fantasia Ballroom J

10:15 am	#24	DECONSTRUCTING DOGMA: NON-OPERATIVE MANAGEMENT OF SMALL BOWEL OBSTRUCTION IN THE VIRGIN ABDOMEN Presenter: Morgan L. Collom, DO Discussant: April E. Mendoza, MD, MPH
10:35 am	#25	CAN ACUTE CARE SURGEONS PERFORM WHILE FATIGUED? AN EAST MULTICENTER PROSPECTIVE STUDY Presenter: Kevin M. Schuster, MD, MPH Discussant: Lawrence Lottenberg, MD
10:55 am	#26	RAPID RECOVERY OF PROTEIN DEBT IS ASSOCIATED WITH FEWER COMPLICATIONS IN CRITICALLY INJURED ADULTS Presenter: Mack D. Drake, DO Discussant: Jennifer L. Hartwell, MD
11:15 am	#27	COMPARISON OF TWO WATER-SOLUBLE CONTRAST PROTOCOLS FOR SMALL BOWEL OBSTRUCTION Presenter: Priscilla Ding, BS Discussant: Melissa M. Boltz, DO, MBA
11:35 am	#28	THE OPIOID EPIDEMIC IN ACUTE CARE SURGERY—CHARACTERISTICS OF OVERPRESCRIBING FOLLOWING LAPAROSCOPIC CHOLECYSTECTOMY Presenter: Kristine T. Hanson, MPH Discussant: Jeffrey D. Kerby, MD, PhD
11:55 am	#29	EAST MULTICENTER TRIAL ON TARGETED TEMPERATURE MANAGEMENT FOR HANGING-INDUCED CARDIAC ARREST Presenter: Cindy H. Hsu, MD, PhD Discussant: David T. Efron, MD

PARALLEL SCIENTIFIC SESSION IV-B – Trauma & Trauma Systems
Presiding: Deborah M. Stein, MD, MPH & Mayur B. Patel, MD, MPH
Social Q/A Moderator: Adrian A. Maung, MD
10:15 am – 12:15 pm
Location: Fantasia Ballroom H

10:15 am	#30	CONTEMPORARY UTILIZATION OF ZONE III REBOA FOR TEMPORARY CONTROL OF PELVIC AND LOWER JUNCTIONAL HEMORRHAGE RELIABLY ACHIEVES HEMODYNAMIC STABLITY IN SEVERELY INJURED PATIENTS Presenter: Joseph J. DuBose, MD Discussant: Alistair Kent, MD, MPH
10:35 am	#31	OCCUPATIONAL EXPOSURE DURING EMERGENCY DEPARTMENT THORACOTOMY: A PROSPECTIVE, MULTI-INSTITUTION STUDY Presenter: Andrew Nunn, MD Discussant: Jacques Mather, MD, MPH
10:55 am	#32	FIT-TO-FLY? PREDICTING ADVERSE EVENTS IN SEVERE TRAUMATIC BRAIN INJURY Presenter: Christine L. Ramirez, MD Discussant: Stephanie Streit, MD
11:15 am	#33	SUBSEQUENT LEARNING AND MEMORY RECOVERY IS DELAYED IF TBI IS ACCOMPANIED BY A CONCOMITANT BONE FRACTURE Presenter: Yujin Suto, MD, PhD Discussant: Deborah M. Stein, MD, MPH

11:35 am #34 THE RUSH TO PRE-HOSPITAL CERVICAL SPINE CLEARANCE: ARE WE AT BREAKNECK SPEED?
Presenter: Robert Laskowski, MD, PhD
Discussant: Alicia R. Privette, MD

11:55 am #35 IMPLEMENTING A CALL BACK PROGRAM IN THE TRAUMA POPULATION
Presenter: Jennifer Bath, MSN, RN, AGCNS-BC, CEN, TCRN
Discussant: Lisa Gray, BSN, MHA, RN, CPN

12:30 pm – 2:30 pm **EAST Practice Management Guidelines Plenary Session**
Presented by the EAST Guidelines Committee
Location: Fantasia Ballroom H
Moderator: Bryce R.H. Robinson, MD, MS

PMG s scheduled to be presented (subject to change):

- Pediatric Renal Trauma – Judith Hagedorn, MD, MHS
- Adult Genito-Urinary Trauma – Lawrence Yeung, MD
- IVC Filter Placement – Myung Park, MD, MS
- Pro-motility Agents for Ileus – Nikolay Bugaev, MD
- Affordable Care Act – Adil Haider, MD, MPH
- Blunt Cerebrovascular Injury (BCVI) – Dennis Kim, MD
- Geriatric Trauma Teams – Marie Crandall MD, MPH

2:30 pm Scientific Program Adjourns

Scientific Session I - Raymond H. Alexander, MD Resident Paper Competition

Paper #1
January 10, 2018
8:00 am

OVER RESUSCITATION WITH PLASMA IS ASSOCIATED WITH SUSTAINED FIBRINOLYSIS SHUTDOWN AND DEATH IN PEDIATRIC TBI

Christine M. Leeper, MD, Matthew Neal, Timothy Billiar, MD,
Jason L. Sperry, MD, MPH*, Barbara A. Gaines, MD*
University of Pittsburgh Medical Center

Presenter: Christine M. Leeper, MD

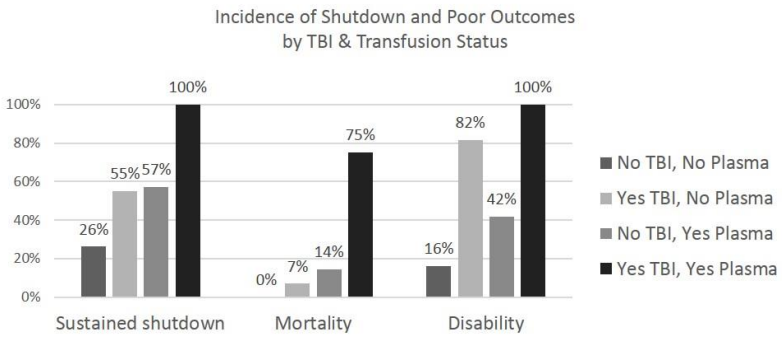
Discussant: Rachael Callcut, MD, University of California San Francisco

Objectives: Elevated INR is a marker of poor outcome, but not necessarily bleeding or clinical coagulopathy, in injured children. Conversely, children with traumatic brain injury (TBI) tend to be hypercoagulable based on thromboelastography(rTEG) parameters. Many clinicians continue to utilize INR as a treatment target.

Methods: Prospective observational study of children age<18 with rTEG on arrival and daily thereafter for 7 days. Standard TEG definitions of hyperfibrinolysis(HF; LY30=3) and fibrinolysis shutdown (SD; LY30=0.8) were applied. AIS score=3 defined severe traumatic brain injury. 24-hour blood product transfusion volumes were documented. Outcomes were death and disability.

Results: 101 patients were included: median (IQR) age=8(4-13), injury severity score=25(16-30), 47% severe TBI, 16% mortality, 45% discharge disability. Neither total volume nor any single product volume transfused (mL/kg; all p>0.1) differed between TBI and non-TBI groups. On univariate analysis, transfusion of PRBC (p=0.016), plasma (p<0.001) and platelets (p=0.006) were associated with sustained shutdown; however, in a regression model that included all products and controlled for TBI, only plasma remained an independent predictor of sustained SD (OR=1.15, p=0.033). Every mL/kg plasma was associated with a 15% increased odds of sustained SD. Patients with both severe TBI and plasma transfusion had 100% sustained SD, 75% mortality, and 100% disability in survivors. Admission INR was elevated in TBI patients, but did not correlate with TEG-ACT(p=NS) and was associated with sustained SD(p=0.006).

Conclusions: Plasma transfusion is associated with sustained fibrinolysis SD and poor outcome, particularly in patients with severe TBI. This may be an indicator of over resuscitation; plasma transfusion should be directed by evidence of clinical bleeding or abnormalities in TEG-ACT, rather than an arbitrary INR threshold.



Patients with severe traumatic brain injury who received plasma have the highest incidence of sustained fibrinolysis shutdown and poor outcomes.

Logistic Regression Model to predict sustained shutdown			
Product (mL/kg)	**Odds Ratio**	**95% Confidence Interval**	**p value**
Plasma	1.15*	1.04-1.31	0.036
Platelets	1.16	0.74-1.82	0.518
Red Blood Cells	0.98	0.91-1.04	0.481
Traumatic Brain Injury	4.26	1.8-10.8	0.002
*Every mL/kg plasma is associated with 15% increased odds of sustained SD			

Plasma is the only blood product that independently predicts sustained shutdown after controlling for traumatic brain injury.

Scientific Session I - Raymond H. Alexander, MD Resident Paper Competition

Paper #2
January 10, 2018
8:20 am

PLASMA CO-ADMINISTRATION IMPROVES RESUSCITATION WITH TRANEXAMIC ACID OR PROTHROMBIN COMPLEX IN A PORCINE HEMORRHAGIC SHOCK MODEL

John P. Kuckelman, DO, Morgan R. Barron, MD, Donald Moe, Michael S. Lallemand, MD, John McClellan, Shannon Marko, Matthew J. Eckert, MD*, Matthew J. Martin, MD*
Madigan Army Medical Center

Presenter: John P. Kuckelman, DO

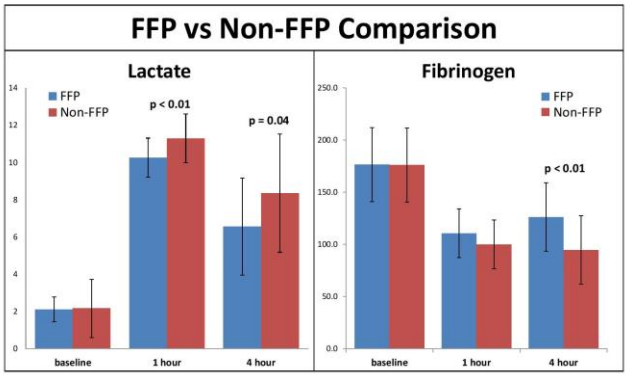
Discussant: Martin A. Schreiber, MD, Oregon Health and Science University

Objectives: Traumatic coagulopathy has been well characterized, but still carries high rates of mortality due to bleeding. A "factor-based" resuscitation strategy using pro-coagulant drugs and factor concentrates in lieu of plasma is being used, but with little evidentiary support. We sought to evaluate and compare resuscitation strategies using combinations of tranexamic acid (TXA), prothrombin complex concentrate (PCC), and fresh frozen plasma (FFP).

Methods: A 35% blood volume hemorrhage combined with a truncal ischemia-reperfusion injury was utilized in 60 adult swine to produce uniform shock and coagulopathy. Animals were randomized to control (N=12), a single agent group (TXA, N=10, PCC, N=8, or FFP, N=6) or combination groups (TXA-FFP, N=10, PCC-FFP, N=8, TXA-PCC, N=6). Resuscitation was continued to 6 hours. Outcomes included hemodynamics, lab values, and thromboelastometry (ROTEM). Results were compared between all groups, with additional comparisons between FFP and non-FFP groups.

Results: All 60 animals survived to 6 hours. Shock was seen in all animals, with hypotension (MAP 44mmHg), tachycardia (HR 145), acidosis (pH 7.18, lactate 11), anemia (HCT 17), and coagulopathy (Fibrinogen 107). There were clear differences between groups for mean pH ($p=0.02$), INR ($p<0.01$), clotting time (CT, $p<0.01$), lactate ($p=0.01$), creatinine ($p<0.01$), and fibrinogen ($p=0.02$). FFP groups had improved resuscitation and clotting parameters (Figures), with lower lactate 6.5 vs 8.4 ($p=0.04$), and increased fibrinogen at 126 vs 95 ($p<0.01$). ROTEM showed shortened CT at 60s in the FFP group vs 65s in the non-FFP group ($p=0.04$).

Conclusions: When correcting traumatic coagulopathy, combinations of FFP with TXA or PCC were superior in improving acidosis, coagulopathy, and clotting time over these agents alone or in combo without plasma. Further validation of pure "factor-based" strategies is needed.



Scientific Session I - Raymond H. Alexander, MD Resident Paper Competition

Paper #3
January 10, 2018
8:40 am

BLOOD PRODUCT AGE VERSUS MORTALITY: RESULTS FROM THE PRAGMATIC RANDOMIZED OPTIMAL PLATELET AND PLASMA RATIO (PROPPR) TRIAL

A. Cozette Kale, MD, MPH, Ronald Chang, MD, Erin Fox, Mohammad Rahbar, Rachel Mitchell, Stacia DeSantis, Eileen M. Bulger, MD, Mitchell J. Cohen, MD, FACS, Bryan A. Cotton, MD, MPH*, Timothy C. Fabian, MD*, Kenji Inaba, MD, Jeffrey D. Kerby, MD, PhD*, Peter Muskat, Terence O'Keeffe, MD, MSPH*, Sandro Rizoli, MD, PhD, FRCSC, FACS*, Thomas M. Scalea, MD, FACS, FCCM*, Martin A. Schreiber, MD, FACS*, Karen Brasel, MD, MPH, Jeanette M. Podbielski, RN BSN, Michael Swartz, Charles E. Wade, PhD, John B. Holcomb, MD*
PROPPR Study Group
University of Texas Health Science Center at Houston

Presenter: A. Cozette Kale, MD, MPH

Discussant: Ali Salim, MD, Brigham & Women's Hospital

Objectives: The storage lesion of red blood cells (RBC), plasma (PLAS), and platelets (PLT) has been described. However, few studies have evaluated the independent effects of blood product age in seriously injured patients. We hypothesized that transfusion of older blood products was associated with increased mortality at 6hr, 24hr, and 30d in massively bleeding trauma patients.

Methods: Blood product and outcomes data prospectively collected during the PROPPR trial were analyzed. PLAS (FFP and thawed plasma) age was defined as days since thawing. "Old" was defined based on the median blood product age: RBC at least 20 days, PLAS at least 2 days, and PLT at least 4 days of storage. The total products and proportion of old RBC, PLAS, and PLT prior to the end of active resuscitation were calculated. We constructed a mixed-effects parametric survival model (Weibull distribution) controlling for age, ISS, mechanism, treatment arm, and total products transfused as fixed effects and study site as a random effect.

Results: There were 680 patients who received 7,776 RBC units (median 12 days, IQR [12, 27]), 4,489 PLAS units (median 2 days, IQR [1, 3]), and 940 PLT units (median 4 days, IQR [3, 5]). PLAS age significantly decreased with increasing units transfused while mortality increased (Figure). Conversely, there was no such change in the RBC or PLT age. Higher proportion of old RBC and young PLAS, but not old or young PLT, were associated with mortality (Table). Receiving any old RBC was associated with increased 6hr (HR 3.4, 95% CI 1.3-8.8) and 24hr (HR 2.2, 95% CI 1.1-4.5), but not 30d, mortality.

Conclusions: Transfusion of a higher proportion of old RBC, or receiving any RBC a>20 days old, was associated with increased mortality. Young PLAS, but not old or young PLT, was associated with mortality. This finding is potentially confounded by decreasing PLAS age with increasing units transfused.

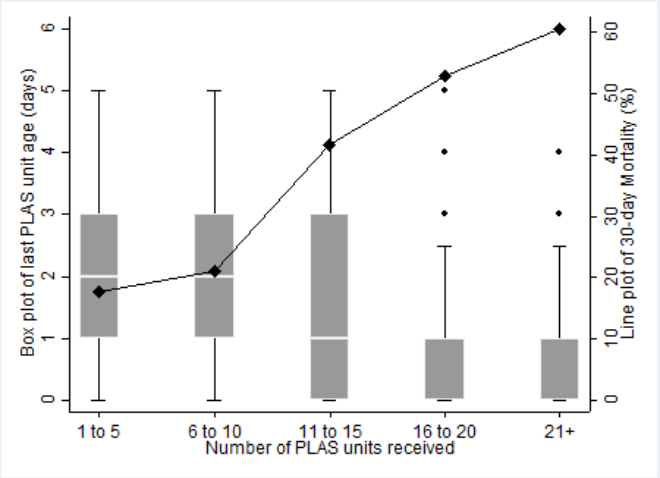


Figure. PLAS age decreased with increasing transfusions while mortality increased.

6h mortality	HR*	95% CI	30d mortality	HR*	95% CI
↑Old RBC	1.09	1.02 – 1.18	↑Old RBC	1.06	1.01 – 1.12
↑Old PLAS	0.91	0.85 – 0.98	↑Old PLAS	0.93	0.88 – 0.97
↑Old PLT	0.96	0.91 – 1.02	↑Old PLT	0.99	0.95 – 1.03
24h mortality	**HR***	**95% CI**	* Hazard ratios for every 10% increase in proportion of old product		
↑Old RBC	1.08	1.01 – 1.16			
↑Old PLAS	0.91	0.86 – 0.98			
↑Old PLT	0.96	0.92 – 1.01			

Table. Increasing proportion of old RBC and young PLAS, but not old/young PLT, were associated with mortality at 6h, 24h, and 30 days.

Scientific Session I - Raymond H. Alexander, MD Resident Paper Competition

Paper #4
January 10, 2018
9:00 am

DO ALL HEAD INJURED PATIENTS ON ANTIPLATELET DRUGS REALLY NEED PLATELETS?

Christopher Bell, MD, Carlos Pelaez, MD*, Sarah K Spilman, MA, Darla Eastman,
Richard A. Sidwell, MD, FACS*, Joseph Sherrill
Iowa Methodist Medical Center

Presenter: Christopher Bell, MD

Discussant: Jose L. Pascual, MD, PhD, University of Pennsylvania

Objectives: It is common for patients with traumatic intracranial hemorrhage (ICH) taking antiplatelet medications to receive platelet transfusion after the ICH is identified. There is no high-quality evidence to guide platelet transfusion for these types of patients. In an effort to standardize the approach to platelet transfusion, a Level I trauma center adopted a targeted platelet transfusion guideline. Platelet reactivity test (PRT) results (Accriva Diagnostics, San Diego, CA) were used to determine need for transfusion, and patients who were non-therapeutic on antiplatelet medication (Aspirin or P2Y12 inhibitors) were not transfused, regardless of severity of head injury.

Methods: The protocol was analyzed retrospectively to evaluate outcomes during the study period (June 2014–December 2016). All patients had moderate to severe ICH (head abbreviated injury score > 1), received a PRT for known or suspected antiplatelet medication use, and had at least two head CT scans. Differences were assessed with Kruskal-Wallis and chi-square tests.

Results: 167 patients met study inclusion criteria and 49 patients (29%) had non-therapeutic PRT results. The groups did not differ by injury severity score and approximately 40% of patients in each group had a severe to critical ICH (head AIS>3). Regardless of ICH type or severity, 92% of patients with a non-therapeutic PRT were not transfused, and only 2 patients (4%) had clinically significant progression of the bleed. Implementation of this protocol reduced platelet transfusions by 56% and associated healthcare costs by 50%.

Conclusions: Using a targeted platelet transfusion protocol for ICH patients with non-therapeutic platelet reactivity significantly reduced platelet usage, particularly for patients with known or suspected antiplatelet medication use and unreconciled home medications. Results demonstrate that not all head injured patients taking antiplatelet drugs need to be transfused.

Table 1. Patients with intracranial hemorrhage (ICH), broken down by platelet reactivity test (PRT) result, June 2014 to December 2016 (N=167)

	Non-Therapeutic PRT N=49	Therapeutic PRT N=118	p-value
Age, median (IQR)	69 (57, 86)	79 (67, 84)	.06
Unstable physiology in emergency department (ED), n (%)	13 (27%)	13 (11%)	.02
Severe or critical head bleed, n (%)	19 (39%)	48 (41%)	.87
Injury severity score (ISS), median (IQR)	14 (10, 22)	14 (9, 21)	.46
Antiplatelet therapy home medication, n (%)	24 (49%)	108 (92%)	<.001
Received platelet transfusion, n (%)	4 (8%)	94 (80%)	<.001
ICU days, median (IQR)	3 (2, 5)	3 (2, 4)	.32
Hospital length of stay, median (IQR)	5 (3, 7)	4 (2, 7)	.28
Mortality, n (%)	6 (12%)	10 (9%)	.56
Clinically significant worsening of ICH, n (%)	4 (8%)	7 (6%)	.73

Table 1. Patients with intracranial hemorrhage (ICH), broken down by platelet reactivity test (PRT) result, June 2014 to December 2016 (N=167)

Figure 1. Clinically significant worsening of intracranial hemorrhage (ICH), compared by head abbreviated injury severity score (AIS) and initial platelet reactivity test (PRT) result.

Key: Black bars denote patients with non-therapeutic PRT. Gray bars denote patients with therapeutic PRT. In the stacked bars, red indicates clinically significant worsening.

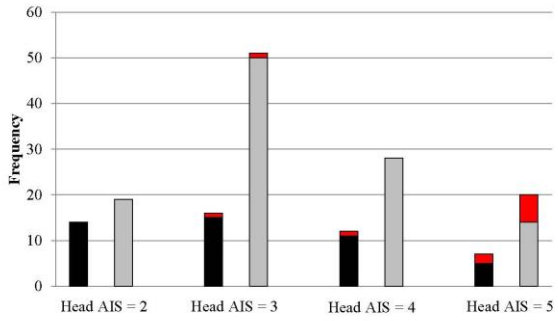


Figure 1. Clinically significant worsening of intracranial hemorrhage (ICH), compared by head abbreviated injury severity score (AIS) and initial platelet reactivity test (PRT) result.

Key: Black bars denote patients with non-therapeutic PRT. Gray bars denote patients with therapeutic PRT. In the stacked bars, red indicates clinically significant worsening.

Scientific Session I - Raymond H. Alexander, MD Resident Paper Competition

Paper #5
January 10, 2018
9:20 am

EARLY PREDICTION OF HEMODYNAMIC INSTABILITY IN CRITICALLY ILL PATIENTS: A PROSPECTIVE STUDY

Jarot Guerra, MD, Asif Rahman, Larry Eshelman, Szymon Bieganski, Brian Gross,
Kelly Bochicchio, Minnan Xu-Wilson, Grant V. Bochicchio, MD, MPH*
Washington University in St. Louis

Presenter: Jarot Guerra, MD

Discussant: Robert D. Winfield, MD, University of Kansas Medical Center

Objectives: Earlier identification of patients at risk of hemodynamic instability has the potential to improve outcome. We previously developed a real time risk score, the hemodynamic instability indicator (HII), which predicts the need for cardiovascular support in ICU patients. We set out to validate this score in a trauma/surgical ICU.

Methods: We prospectively enrolled patients who were expected to stay in the ICU for at least 24 hours, hemodynamically stable, and expected to survive at least 48 hours and not DNI/DNR. HII was continuously calculated in real time by integrating risk factors such as vitals and laboratory values using a previously developed machine learning algorithm. All hemodynamic interventions were collected. The 24 hours before intervention is labeled as the pre-intervention true positive region. The region following resuscitation and until ICU discharge is considered the stable or false positive region. For each intervention segment, we evaluated how well our score predicted that episode of hemodynamic instability in the pre-intervention segment

Results: 126 patients were enrolled. The majority (64%) were male and acute care surgery patients (55%) with a median age of 60. 49% were eventually started on inotropes/pressors. ICU mortality was 9.4% and median ICU length of stay was 5.8 days. Of the enrollees, 60 patients (with sufficient data to calculate the pre-intervention score) were included for further analysis of HII performance. HII significantly predicted the need for pressors/inotropes within 24 hours of the event with sensitivity of 0.56, specificity of 0.76, ($p<0.01$) with increasing probability as time approached intervention initiation.

Conclusions: HII strongly predicted the need for pressor/inotrope use with increasing predictability as time approached pressor/inotrope initiation. Earlier identification of instability could potentially initiate earlier intervention and improve outcome.

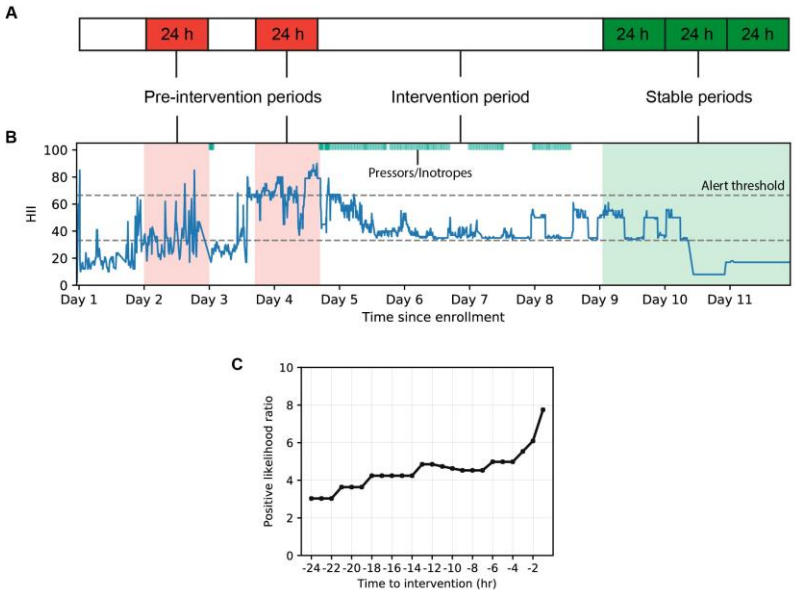


Figure 1. A) Pre-intervention, Intervention and stable periods. B) HII tracks therapy response. C) The positive likelihood ratio shows that the index predicts episodes of hemodynamic instability with increasing likelihood approaching the time of intervention.

Scientific Session II - Raymond H. Alexander, MD Paper Competition

Paper #6
January 10, 2018
10:00 am

MOBILE FORWARD LOOKING INFRARED TECHNOLOGY ALLOWS RAPID ASSESSMENT OF RESUSCITATIVE ENDOVASCULAR BALLOON OCCLUSION OF THE AORTA IN HEMORRHAGE AND BLACKOUT CONDITIONS

Morgan R. Barron, MD, John P. Kuckelman, DO, John McClellan, Michael Derickson, Cody Phillips, Shannon Marko, Joshua Smith, Matthew J. Eckert, MD*, Matthew J. Martin, MD*
Madigan Army Medical Center

Presenter: Morgan R. Barron, MD

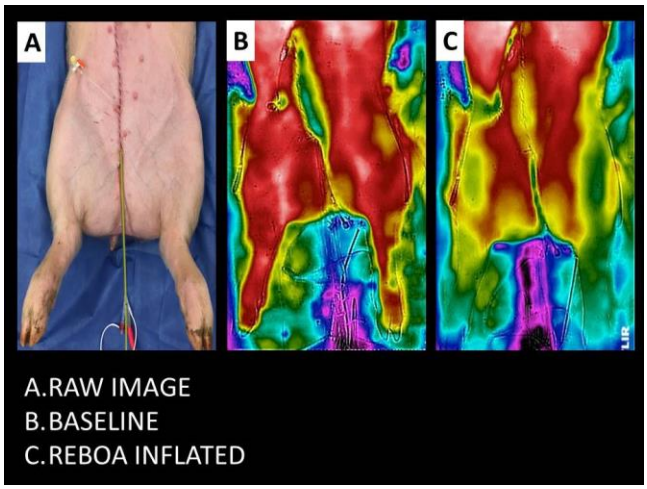
Discussant: Joseph J. DuBose, MD, R Adams Cowley Shock Trauma Center

Objectives: Objective assessment of final REBOA position and adequate distal occlusion is clinically limited. We propose that mobile forward looking infrared (FLIR) thermal imaging is a fast, reliable, and non-invasive method to assess REBOA position and efficacy in scenarios applicable to battlefield care.

Methods: Ten swine were randomized to a 40% hemorrhage group (H, n=5) or non-hemorrhage group (NH, n=5). Three experiments were completed after zone one placement of a REBOA catheter. REBOA was deployed for 30 minutes in all animals followed by randomized continued deployment vs sham in both light and blackout conditions. FLIR images and hemodynamic data were obtained. Images were presented to 62 blinded observers for assessment of REBOA inflation status.

Results: There was no difference in hemodynamic or laboratory values at baseline. The H group was significantly more hypotensive (MAP 44 vs 60, $p<0.01$), vasodilated (SVR 634 vs 938, $p=0.02$), and anemic (HCT 12 vs 23.2, $p<0.01$). H animals remained more hypotensive, anemic, and acidotic throughout all 3 experiments. There was a significant difference in the temperature change (Δ_{Temp}) measured by FLIR between animals with REBOA inflated vs not inflated (5.7°C vs 0.7°C, $p<0.01$). There was no significant difference in FLIR Δ_{Temp} between NH and H when balloon was inflated or deflated. Blinded observer analysis of FLIR images correctly identified adequate REBOA inflation and aortic occlusion 95.4% at 5 minutes and 98.8% at 10 minutes (PPV_{5min} = 99% and PPV_{10min} = 100%).

Conclusions: Mobile thermal imaging is an easy, rapid, and reliable method for assessing distal perfusion after occlusion by REBOA. Smart phone based FLIR technology allows for confirmation of adequate REBOA placement at the point of care, and performance was not degraded in the setting of major hemorrhage or blackout conditions.



Group	Subgroup	Percent Correct
Overall	5 Minutes	95.4%
	10 Minutes	98.2%
5 Minutes	Light	94.4%
	Blackout	96.8%
	Healthy	92.6%
	Hemorrhage	97.6%
10 Minutes	Light	98.4%
	Blackout	97.9%
	Healthy	97.9%
	Hemorrhage	98.4%

Blinded Evaluator Analysis

Scientific Session II - Raymond H. Alexander, MD Paper Competition

Paper #7
January 10, 2018
10:20 am

EXTERNAL VALIDATION OF A 5-VARIABLE CLINICAL PREDICTION RULE FOR IDENTIFYING CHILDREN AT VERY LOW RISK FOR INTRA-ABDOMINAL INJURY FOLLOWING BLUNT ABDOMINAL TRAUMA

Chase A. Arbra, MD, Adam M. Vogel, MD*, Leah Plumblee, Jingwen Zhang, Melvin S. Dassinger, Robert T. Russell, MD, MPH, Martin L. Blakely, Christian J. Streck, Jr., MD*
Medical University of South Carolina

Presenter: Chase A. Arbra, MD

Discussant: Richard A. Falcone, Jr., MD, MPH, Cincinnati Children's Hospital

Objectives: A clinical prediction rule was developed by the Pediatric Surgery Research Collaborative (PedSRC) to identify patients at very low risk for intra-abdominal injury (IAI) and IAI receiving acute intervention (IAI-I) who could avoid abdominal computed tomography (CT). Our objective was to test the validity of this rule in an external dataset.

Methods: A public use pediatric blunt trauma dataset was obtained from the Pediatric Emergency Care Applied Research Network (PECARN). Patients 16 years of age and younger with all five elements of the clinical prediction model: chest x-ray (CXR), abdominal history and physical exam, aspartate aminotransferase (AST), and amylase or lipase collected within 6 hours of arrival were included in the study. We excluded patients presenting greater than 6 hours after injury. The primary outcome was IAI and secondary outcome was IAI-I.

Results: We included 2,435 patients from the PECARN dataset, with a median age of 10 [5,14] years. There were 235 patients with IAI (9.7%) and 60 patients with IAI-I (2.5%). Test characteristics for the clinical prediction rule can be found in Table 1. In patients with no abnormality in any of the five prediction rule variables (complaint of abdominal pain; tenderness, distension, or contusion on abdominal exam; abnormal CXR; AST>200; elevated pancreatic enzymes), the rule had a negative predictive value (NPV) of 99.3% for IAI and 100.0% for IAI-I. In patients identified as very low risk by the clinical prediction rule, 46.8% underwent CT scanning.

Conclusions: A highly-sensitive clinical prediction rule using history, physical exam, labs and x-ray was successfully validated using a large public access dataset of pediatric patients. Following blunt trauma, abdominal CT scans are commonly performed in the very low risk population identified by the prediction rule with little benefit.

Validation of PedSRC 5-Variable Clinical Prediction Model for IAI and IAI-I		
	IAI [Percent (95% CI)]	**IAI-I** [Percent (95% CI)]
Prediction rule sensitivity	97.5% (94.3, 99.0)	100% (92.5, 100.0)
Prediction rule specificity	37.0% (34.9, 39.0)	34.5% (32.6, 36.4)
Negative predictive value	99.3% (98.3, 99.7)	100% (99.4, 100.0)
Positive predictive value	14.2% (12.5, 16.0)	3.7% (2.9, 4.8)
Negative likelihood ratio	0.07 (0.03, 0.15)	0.0 (0.0, -)

Figure Legend: IAI = intra-abdominal injury, IAI-I = intra-abdominal injury requiring intervention

Scientific Session II - Raymond H. Alexander, MD Paper Competition

Paper #8
January 10, 2018
10:40 am

CONTINUOUS REMOTE ISCHEMIC CONDITIONING ATTENUATES COGNITIVE AND MOTOR DEFICITS AFTER MODERATE TRAUMATIC BRAIN INJURY

Viraj Pandit, MD, Muhammad Khan, MD, ElRasheid Zakaria, Tally Largent-Milnes,
Terence O'Keeffe, MD, MSPH*, Todd Vanderah, Bellal Joseph, MD*
The University of Arizona

Presenter: Viraj Pandit, MD

Discussant: Carlos J. Rodriguez, DO, MBA, Walter Reed National Military Medical Center

Objectives: Remote Ischemic Conditioning (RIC) has shown to improve outcomes in different clinical settings. However, the role of continuous (daily) RIC has not been studied. Aim of our study is to assess impact of continuous RIC on cognitive and motor function following traumatic brain injury (TBI).

Methods: We subjected 24 male C57BL mice to a cortical-controlled TBI. 2-hrs after TBI, animals were randomly allocated to either continuous RIC group (n=12) or Sham group (n=12). RIC was induced by non-invasive external compression of the femoral artery using tourniquet (six 4-min cycles) every 24 hour for 5 days. A baseline rotarod test (measured by latency to fall) and novel object recognition (NOR) was done before induction of TBI. Post-TBI rotarod and NOR tests were performed on day 1 through 5, 7, 14 & 21. Animals were sacrificed on day 21 and brain sections were analyzed using Hematoxylin & Eosin (H&E) staining to evaluate hippocampal CA1 area for neuronal injury.

Results: Post TBI, both groups had lower latency to fall compared to baseline at all-time points. RIC group had higher latency to fall compared to Sham at all-time points and statistically significant after day 4, till day 21 **(Figure 1)**. Similary, Both groups had lower recognition index compared to baseline post TBI at all-time points. RIC animals had significantly higher recognition index than the Sham after day 2 till day 21 post TBI **(Figure 2)**. H&E sectioning of brain samples of sham group revealed that more neurons in the hippocampal CA1 area appeared shrunken with eosinophilic cytoplasm and pyknotic nuclei compared to RIC group.

Conclusions: This is the first study to report the impact of continuous RIC on outcomes post TBI. Continuous RIC post-injury results in improved cognitive functions and motor coordination in a mouse model of moderate TBI. In addition, RIC also preserves the neuronal viability post TBI. Further studies are required to determine optimum dosage and frequency to maximize its beneficial effects following TBI.

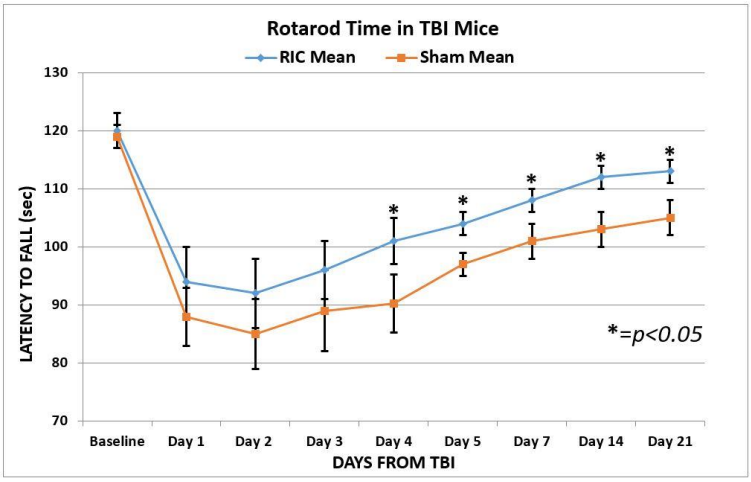


Figure 1. Rotarod test time in the RIC and the Sham group

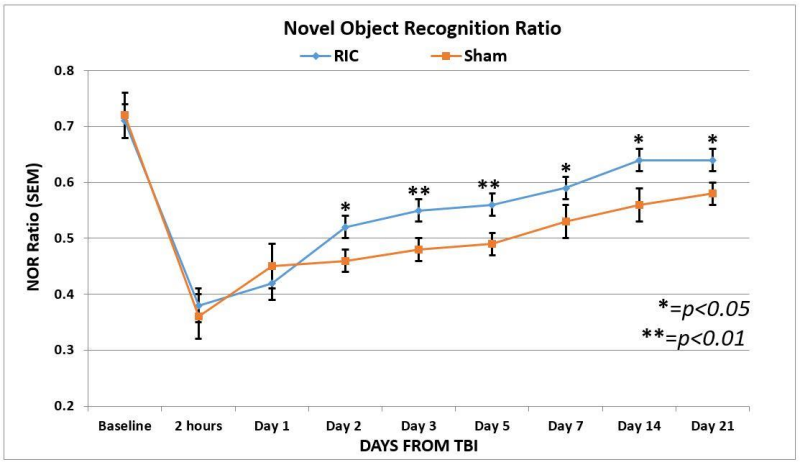


Figure 2. Novel object recognition test time in the RIC and the Sham group

Scientific Session II - Raymond H. Alexander, MD Paper Competition

Paper #9
January 10, 2018
11:00 am

FVC <1: A MARK FOR HIGH RISK PATIENTS

Rachel L. Warner, DO, Nicole Cornell, Porter Knollinger, Stanley B Wolfe, BS,
Gerald Hobbs, Alison M. Wilson, MD*
West Virginia University

Presenter: Rachel L. Warner, DO

Discussant: Bryce R. H. Robinson, MD, MS, Harborview Medical Center

Objectives: Rib fractures (RFx) continue to be a source of morbidity and mortality. A RFx care pathway has been used based on Forced Vital Capacity (FVC). Previous studies have validated FVC in triaging pts to admission level of care (FVC: <1, 1-1.5, > 1.5). The objective of this study was to test the hypothesis that deterioration of FVC to < 1 after admission is a marker for high risk patients and impacts outcomes.

Methods: A retrospective study of pts enrolled in a RFx Care pathway at a level 1 trauma center from 2009-2014. All pts had an admission FVC (aFVC) > 1. Two groups were analyzed: pts with a lowest inpt FVC < 1 (grpA) compared to pts with lowest inpt FVC > 1 (grpB). Complications [pneumonia (PNA), upgrade to the ICU, re-admission (ReAdm) and intubation (Int)] and demographics were examined. Pts without documented FVCs and those with aFVC < 1 were excluded. P-value < 0.05 was considered significant.

Results: 1106 pts were analyzed (GrpA 187, GrpB 919). Pts whose FVC dropped < 1 during admission (GrpA) had a higher complication rate [15% (GrpA) vs 3.2% (GrpB); P<0.001]. Rates of PNA, ReAdm, unplanned upgrade and Int were all significantly higher in GrpA [PNA: 9% (GrpA) vs 1.4% (GrpB), p<0.001; ReAdm: 4% (GrpA) vs 1.7% (GrpB), p=0.04; Upgrade 3.7% (GrpA) vs 0.2% (GrpB), p<0.001; Int: 1.6% (GrpA) vs 0.1% (GrpB), p=0.02]. Hospital length of stay was longer in pts whose FVC dropped <1 during admission [10 days (GrpA) vs 4 days (GrpB) p<0.001].

Conclusions: FVC predicts complications in pts with Rfx. Pts whose FVC falls <1 during admission are at high risk for pulmonary complications. Daily FVC testing for pts admitted with Rfx can predict outcomes. FVC <1 should be implemented as a marker for complications. Once FVC drops <1 pts should be considered for increased interventions. Even if the pt has not yet clinically deteriorated, consideration for higher level of care is warranted. Limitations include retrospective analysis and not excluding concomitant injuries.

Table 1. Complication Rates		
Complications	GrpA lowest FVC <1	GrpB (lowest FVC >1)
	n=187	n=919
Pneumonia	17 (9%)	13 (1.4%)
Re-Admission	8 (4.2%)	16 (1.7%)
Intubation	3 (1.6%)	1 (0.1%)
Unplanned Upgrade to ICU	7 (3.7%)	2 (0.2%)
Any Complication	29(15.5%)	30 (3.2%)
Hospital LOS	10 days	4 days

Table 1. Complication Rates of Pts with any FVC <1 during admission vs Pts with FVC >1

Table 2. Patient Characteristics		
Characteristics	GrpA lowest FVC <1	GrpB lowest FVC >1
	n=187	n=919
Age	58	48
Gender (F,M)	72 (39%), 115 (61%)	191(21%), 731 (79%)
AIS Chest	3	2
ISS	17	13
Chest tube present	11 (5%)	95 (10%)
COPD	33 (17.6%)	78 (8.4%)
Avg admission FVC	1.3	1.6
Avg highest FVC	1.6	2.1
Avg lowest FVC	0.7	1.4

Table 2. Characteristics of Pts with FVC <1 during admission vs Pts with FVCs >1 during admission

Scientific Session II - Raymond H. Alexander, MD Paper Competition

Paper #10
January 10, 2018
11:20 am

BEDSIDE DYSPHAGIA SCREENS IN PATIENTS WITH TRAUMATIC CERVICAL INJURIES: AN IDEAL TOOL FOR AN UNDER-RECOGNIZED PROBLEM

Sarah E. Posillico, MD, Joseph F. Golob, MD*, Andrea Rinker, Laura Kreiner, MD*, Rebecca S. West, Kristen Conrad-Schnetz, DO*, Michael L. Kelly, MD, Jeffrey A. Claridge, MD, MS*
MetroHealth Medical Center

Presenter: Sarah E. Posillico, MD

Discussant: Suresh K. Agarwal, Jr., MD, University of Wisconsin Hospitals and Clinics

Objectives: We initiated a prospective interventional study utilizing a nurse-driven bedside dysphagia screen (BDS) in patients with cervical spine injury (CI) to address three objectives: 1) determine the incidence of dysphagia; 2) determine the utility of the new BDS as a screening tool; and 3) compare patient outcomes, specifically dysphagia-related complications, in the study period to a retrospective cohort.

Methods: All patients with CI admitted to a Level I Trauma Center were enrolled in a prospective 12-month study (June 2016-June 2017) and then compared to a prior 14-month cohort of like patients. Our new protocol directed that every patient underwent a BDS prior to oral intake. If the patient failed the BDS, a modified barium swallow (MBS) was obtained. Exclusion criteria were Emergency Department discharge, inability to participate in a BDS, leaving against medical advice, or death prior to BDS. A failed MBS was defined as a change in diet and a need for a repeat MBS. Dysphagia was defined as a failed MBS or the presence of a dysphagia-related complication.

Results: Of 221 consecutive prospective patients identified, 114 met inclusion criteria without BDS protocol violations (Table 1). The incidence of dysphagia was 16.7% in all prospective study patients, 14.9% in patients with isolated CI, and 30.8% in patients with spinal cord injury. The BDS demonstrated 84.2% sensitivity, 95.8% specificity, 80.0% positive predictive value, and 96.8% negative predictive value. There were no dysphagia-related complications. The prospective study patients demonstrated less dysphagia-related complications ($p=0.037$) when compared to the retrospective cohort of 214 patients (Table 2).

Conclusions: The introduction of the BDS resulted in increased dysphagia diagnoses, with a significant reduction in dysphagia-related complications. We recommend incorporating BDS into care pathways for patients with CI.

Demographic Data	Total N= 114
Female Gender	55 (48.2%)
Median Age (IQR)	66 (53.8-81.3)
Blunt Mechanism of Injury	113 (99.1%)
Same Level Falls	45 (39.5%)
Patients with Neurologic Comorbidity	31 (27.2%)
Cervical Spine Fracture	107 (93.9%)
Central Cord Syndrome	7 (6.1%)
Spinal Cord Injury	13 (11.4%)
Operative Intervention Needed	43 (37.7%)

Table 1. Demographic data of 114 prospective patients with cervical injuries that underwent complete screens without violations.

	Retrospective (n=214)	Prospective (n=168)	*p*-value
Female Gender	102 (47.7%)	75 (44.6%)	0.557
Median Age (IQR)	60 (39.8-81.3)	66 (48.8-80)	0.122
Operative Repair	51 (23.8%)	49 (29.2%)	0.239
MBS Performed	21 (9.8%)	34 (20.2%)	0.004
Dysphagia Diagnosed	19 (8.9%)	24 (14.3%)	0.097
Pts with Dysphagia-related Complications	**6 (2.8%)**	**0 (0.0%)**	**0.037**
Deaths	7 (3.3%)	3 (1.8%)	0.523
Deaths due to Dysphagia	4 (1.9%)	0 (0.0%)	0.134
*To match retrospective cohort, these are patients who met inclusion criteria minus central cord syndrome patients.			

Table 2. Comparison of demographic and outcomes data for retrospective and prospective* patient cohorts.

Scientific Session II - Raymond H. Alexander, MD Paper Competition

Paper # 11
January 10, 2018
11:40 am

PROSPECTIVE VALIDATION OF A GRADING SCALE FOR CHOLECYSTITIS

Tarik Madni, MD, Evan Barrios, Jonathan Imran, Audra Clark, Alana Christie, Alexander L. Eastman, MD, MPH, FACS*, Christian T. Minshall, MD, PhD*, Stephen S.Y. Luk, MD, FACS, FCCP*, Joseph P. Minei, MD, MBA, FACS*, Herb A. Phelan III, MD, FACS*, Michael W. Cripps, MD*
University of Texas Southwestern Medical Center

Presenter: Tarik Madni, MD

Discussant: Martin D. Zielinski, MD, Mayo Clinic

Objectives: Surgical reimbursement and resident case entry for Laparoscopic Cholecystectomy (LC) is largely uniform regardless of case complexity. A grading scale for cholecystitis was previously developed to stratify the severity of gallbladder (GB) disease in response to these pitfalls. This five-tiered grading system based on anatomy and inflammatory changes has been demonstrated to be highly reproducible with an Intraclass Correlation Coefficient of 0.804. We aimed to prospectively validate this scale as a measure of LC difficulty.

Methods: Eleven Acute Care Surgeons were asked to grade the initial view of GBs during LC between 9/2016 and 3/2017. These raters then filled out a post-operative questionnaire regarding the difficulty of the surgery. Primary outcome was difficulty of surgery, rated between 1(least difficult) and 5(most difficult). The Jonckheere-Terpstra test, Mantel-Haenzel Chi-Square test, or ANOVA was used to test for association between peri-operative data and gallbladder grade. Multinomial logistic regression was used to analyze the odds of increasing difficulty and length of surgery for each grade. All tests were performed at the two-sided 0.05 significance level with Bonferonni-adjusted *p*-values.

Results: A total of 667 LC were performed, with a survey response rate of 48%(317). There were 60 grade 1 GBs(19%), 90 Grade 2(28%), 102 Grade 3(32%), 28 Grade 4(9%), and 37 Grade 5(12%). Diagnosis of acute cholecystitis, surgical difficulty, partial cholecystectomy and open conversion rates, pre-op WBC, and length of operation all significantly increased with increasing grade (Table 1). Increased odds of greater difficulty and length of surgery were found between each grade on multinomial logistic regression (Table 2).

Conclusions: This study successfully validates this grading scale for cholecystitis as an accurate measure of LC difficulty. Further studies are required to integrate this scale into reimbursement and case entry practices.

Table 1. Association of perioperative gallbladder grade with other surgical parameters

	Perioperative Gallbladder Grade					
	1 (n = 60)	2 (n = 90)	3 (n = 102)	4 (n = 28)	5 (n = 37)	*q*
N (%)						
Diagnosis						
Acute cholecystitis	22 (36.7)	35 (38.9)	58 (56.9)	20 (71.4)	31 (83.8)	<0.0001
Other diagnosis	38 (63.3)	55 (61.1)	44 (43.1)	8 (28.6)	6 (16.2)	
Difficulty of surgery*						
1	39 (65.0)	23 (25.6)	7 (6.9)	0 (0.0)	0 (0.0)	<0.0001
2	17 (28.3)	53 (58.9)	36 (35.3)	5 (17.9)	2 (5.4)	
3	3 (5.0)	10 (11.1)	42 (41.2)	5 (17.9)	1 (2.7)	
4	1 (1.7)	4 (4.4)	13 (12.7)	14 (50.0)	12 (32.4)	
5	0 (0.0)	0 (0.0)	4 (3.9)	4 (14.3)	22 (59.5)	
Abnormal anatomy						
No	56 (93.3)	81 (90.0)	82 (80.4)	24 (85.7)	31 (83.8)	0.5953
Yes	4 (6.7)	9 (10.0)	20 (19.6)	4 (14.3)	6 (16.2)	
Partial cholecystectomy						
No	60 (100.0)	90 (100.0)	98 (96.1)	28 (100.0)	25 (67.6)	<0.0001
Yes	0 (0.0)	0 (0.0)	4 (3.9)	0 (0.0)	12 (32.4)	
Converted to open						
No	60 (100.0)	90 (100.0)	102 (100.0)	27 (96.4)	29 (78.4)	<0.0001
Yes	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.6)	8 (21.6)	
Bile duct leak post-op						
No	60 (100.0)	89 (98.9)	102 (100.0)	28 (100.0)	32 (88.9)	0.0105
Yes	0 (0.0)	1 (1.1)	0 (0.0)	0 (0.0)	4 (11.1)	
Mean ± Std. Dev.						
Pre-op total bilirubin	0.6 ± 0.6	0.7 ± 0.7	0.6 ± 0.6	0.6 ± 0.3	1.1 ± 1.2	0.0257
Pre-op WBC count	8.8 ± 3.0	9.0 ± 3.2	9.6 ± 3.5	10.7 ± 3.8	12.3 ± 4.4	<0.0001
Length of op., min	63.3 ± 22.5	69.8 ± 22.5	79.8 ± 28.0	89.1 ± 28.8	108.1 ± 41.7	<0.0001

Except where indicated, the Mantel-Haenzel Chi-Square test for ordinally-scaled response was used to analyze the association of grade with categorical variables, and ANOVA was used to analyze the association of grade with continuous measures. Provided *q*-values are Bonferonni-adjusted *p*-values.
*Jonckheere-Terpstra test for doubly-ordered categorical data was used.

Table 2. Multinomial logistic regression analysis of perioperative gallbladder grade with other surgical parameters

	Odds Ratio (95% CI)				*p*
	Grade 1 VS Grade 5	Grade 2 VS Grade 5	Grade 3 VS Grade 5	Grade 4 VS Grade 5	
Difficulty of surgery (per increase of 1)	0.01 (0.01, 0.03)	0.04 (0.02, 0.09)	0.12 (0.06, 0.24)	0.31 (0.16, 0.59)	<0.0001
Length of surgery (per increase of 10 minutes)	0.57 (0.48, 0.69)	0.67 (0.58, 0.77)	0.79 (0.71, 0.89)	0.87 (0.76, 1.004)	<0.0001

Table 2 contains the results from the multinomial logistic regression analysis of perioperative gallbladder grade with difficulty of surgery and length of surgery. The odds of being grade 1 were 0.01 times the odds of being grade 5 when difficulty increases by 1. Similarly, the odds of being grade 2 are 0.04 times lower, odds of being grade 3 are 0.12 times lower, and the odds of grade 4 are 0.31 times lower than those of being grade 5. The odds of being grade 1 when length of surgery increases by 10 minutes are 0.57 times the odds of being grade 5. As with difficulty, the odds ratios increase the closer the grade is to 5; as surgery increases by 10 minutes, the odds are 0.67, 0.79, and 0.87 times the odds of being grade 5 for grades 2, 3, and 4, respectively.

Scientific Session III-A

Paper #12
January 11, 2018
10:30 am

THE ROLE OF 4-FACTOR PROTHROMBIN COMPLEX CONCENTRATE (4-PCC) IN COAGULOPATHY OF TRAUMA: A PROPENSITY MATCHED ANALYSIS

Hassan Aziz, MD, Faisal S Jehan, MD, Lynn Gries, Muhammad Khan, MD, Terence O'Keeffe, MD, MSPH*, El Rasheid Zakaria, Andrew L. Tang, MD*, Narong Kulvatunyou, MD*, Bellal Joseph, MD*
The University of Arizona

Presenter: Hassan Aziz, MD

Discussant: Ryan A. Lawless, MD, Denver Health Medical Center

Objectives: Coagulopathy is a common complication after severe trauma. 3-factor PCC has shown to be effective in reversing coagulopathy of trauma (COT), however, the role of 4-factor PCC is still unclear. The aim of our study is to compare 4-PCC+FFP vs. FPP alone for the treatment of COT.

Methods: We reviewed all trauma patients >18y of age who received PCC+FFP or FFP alone at our Level I trauma center from 2014-16. We excluded patients on preinjury oral anticoagulants. Patients were divided into two groups (4-PCC+FFP: FFP alone) and were matched in a 1:2 ratio using propensity score matching (PSM) for demographics, vital and injury parameters, and initial INR. COT was defined as admission INR>1.5. Corrected INR was defined as INR<1.5. Outcome measures were time to correction of INR, pRBC units transfused, thromboembolic complications, and mortality.

Results: 516 patients analyzed, of which 120 patients (4-PCC+FFP: 40, FFP: 80) were matched. Mean age was 58+/-20 y; 60% were male, median ISS was 29 [14?38]. Mechanism of injury was blunt in 87% patients. 4-PCC+FFP was associated with an accelerated correction of INR (373 vs. 955 min; *p*=0.001), decrease in pRBC units (7 vs. 9 units; *p*=0.04), and FFP units (5 vs. 7 units; *p*=0.03) transfused as compared to FFP alone. 4-PCC+FFP was associated with lower mortality rate (25% vs. 33% *p*=0.04) as compared to FFP alone, however, there was no difference in the thromboembolic complications (2.5% vs. 1.2%, *p*=0.5) between the two groups. Administration of PCC+FFP led to an earlier correction of the INR compared to FFP alone (**Figure 1**).

Conclusions: Results of our study demonstrated that the use of 4-factor PCC in conjunction with FFP is associated with rapid reversal of INR and reduction in transfusion requirements as compared to FFP alone. 4-PCC is an effective therapy for the reversal of COT without increasing the risk of thromboembolic complications.

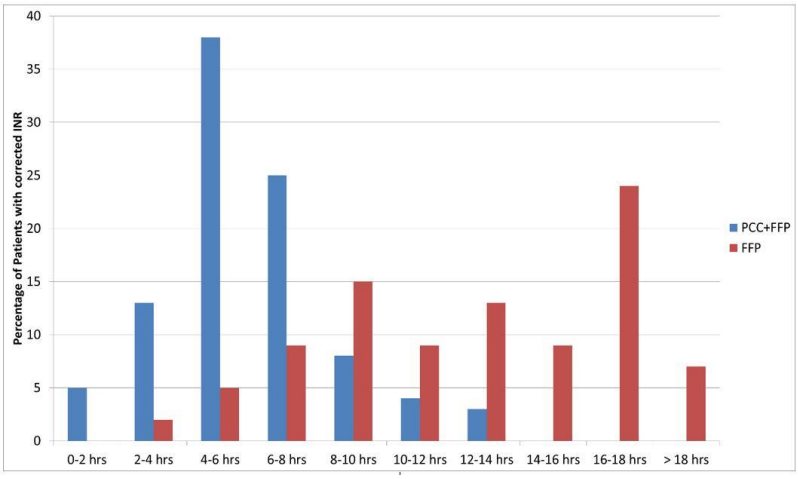


Figure 1. Proportion of patients with corrected INR and time to correction of INR

Scientific Session III-A

Paper #13
January 11, 2018
10:50 am

IN VITRO EFFECTS OF A KAOLIN BASED HEMOSTATIC DRESSING ON ANTICOAGULATED BLOOD

Michael W. Cripps, MD*, Canon Cornelius, Natalia Vasquez, Jocelyn Wey, Peter Gales
University of Texas Southwestern Medical Center

Presenter: Michael W. Cripps, MD

Discussant: Andrew J. Dennis, DO, Cook County Hospital

Objectives: The use of kaolin coated dressings has become common in hemostatic treatment algorithms and have efficacy in normal patients, but their increased use will inevitably include patients on anticoagulants. We hypothesize that kaolin coating material (KCM) will improve clotting regardless of anticoagulation medication.

Methods: A prospective study was performed on blood from 45 patients on anticoagulation agents and 5 healthy controls. 10 patients were on a vitamin K antagonist (VKA), 10 on unfractionated heparin (UH), 10 on an anti-platelet (AP) agent, 10 on a Xa inhibitor (Xa), and 5 on a direct thrombin inhibitor (DTI). None were on more than one type of anticoagulation medication. Viscoelastic (VE) testing was performed with and without KCM. All p-values were adjusted for multiple comparisons.

Results: The addition of KCM significantly decreased the time for initial clot formation (CT) in all groups (Figure 1). The mean CT for controls was decreased from 692 to 190.8 sec($p<0.001$). KCM decreased the initial clot formation time by about 1.5 times in those on DTI ($p=0.043$) and 2.5 times in those taking AP medication ($p<0.001$). The most profound effect was seen in those on UH (No KCM 1602 secs vs KCM 440 secs;$p<0.001$), VKA (No KCM 1152 secs vs 232 secs;$p<0.01$), and Xa (No KCM 1342 secs vs 287 secs;$p<0.001$). Analysis of other clot formation parameters revealed that KCM significantly improved the clot formation kinetics (CFT) only in patients taking Xa ($p=0.03$). KCM improved maximum clot strength in patients on UH and Xa ($p=0.05$). Patients on UH had a larger effect size with an increase in clot strength from 24.35mm to 43.35mm while those on Xa had an increase of 38.7mm to 49.85mm.

Conclusions: In this in vitro analysis, the addition of KCM to the blood of patients taking any of these anticoagulation medications significantly improved the time to initial clot formation, indicating that kaolin based hemostatic dressings will be effective in initiating clot formation in patients on anticoagulants.

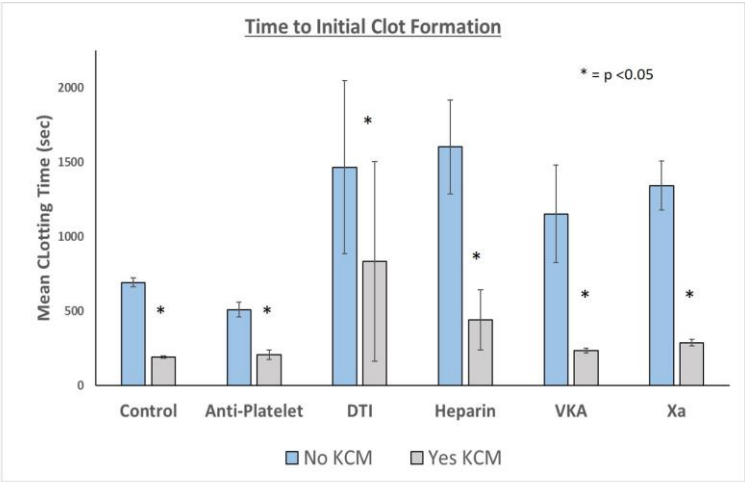


Figure 1. The addition of kaolin coating material (KCM) improved the time it takes to start forming a clot in all test groups.

Scientific Session III-A
Paper #14
January 11, 2018
11:10 am

MAR RATIO PREDICTS SHOCK VOLUME: TWO METRICS TO UNDERSTAND BURDEN OF INJURY

Brian L. Brewer, MD, Stephanie Savage, MD, MS*, Ben L. Zarzaur, MD, MPH*,
Tyler McCarroll, Greg Gaski, Todd McKinley
Indiana University

Presenter: Brian L. Brewer, MD

Discussant: Franklin Lee Wright, MD, University of Colorado Denver

Objectives: Shock volume (SV) is a novel metric designed to quantify global oxygen debt over time. SV temporally integrates serial shock indices to reflect critical illness and hypoperfusion, as in increased base deficit and multisystem organ dysfunction following injury. Recent research has demonstrated that the ratio of MA to R on admission thromboelastography (TEG) not only reflects underlying coagulation dysfunction, it is an excellent predictor of mortality attributable to hemorrhage. We hypothesized that a relationship exists between admission MAR ratio and subsequent shock volume.

Methods: Injured patients admitted to a Level 1 trauma center were included. Demographic data, injury characteristics and laboratory values were collected. The SV at 3, 6, 12 and 24 hours from admission was calculated from serial shock indices. The MAR ratio was calculated from admission TEG as follows:

MA/R = MAR ratio

Correlation analysis was used to determine the relationship between serial shock volumes and the admission MAR ratio.

Results: 80% of patients were male, mean age was 37 years(SD 12) and mean ISS was 29.4(SD 12.5). 32% had a positive critical administration threshold (CAT) within the first 24 hours and overall mortality was 7%. Correlation between the admission MAR ratio and the shock volume are displayed in Figure 1. There was a significant negative association with decreasing MAR ratio correlating with increased shock volumes (3 hours -0.3284, p=0.0046; 6 hours -0.4170, p=0.0002; 24 hours -0.3154, p=0.0066).

Conclusions: The true burden of injury is often difficult to anticipate immediately after injury. Shock volume quantifies cumulative volume of shock but utility is limited as it may take up to 24 hours to accurately calculate. The MAR ratio, which is calculated from the admission TEG, has a significant inverse relationship with shock volume at 3, 6 and 24 hours. The MAR ratio may serve as an immediate indicator of severity of shock and the potential downstream physiologic effects prior to other indicators.

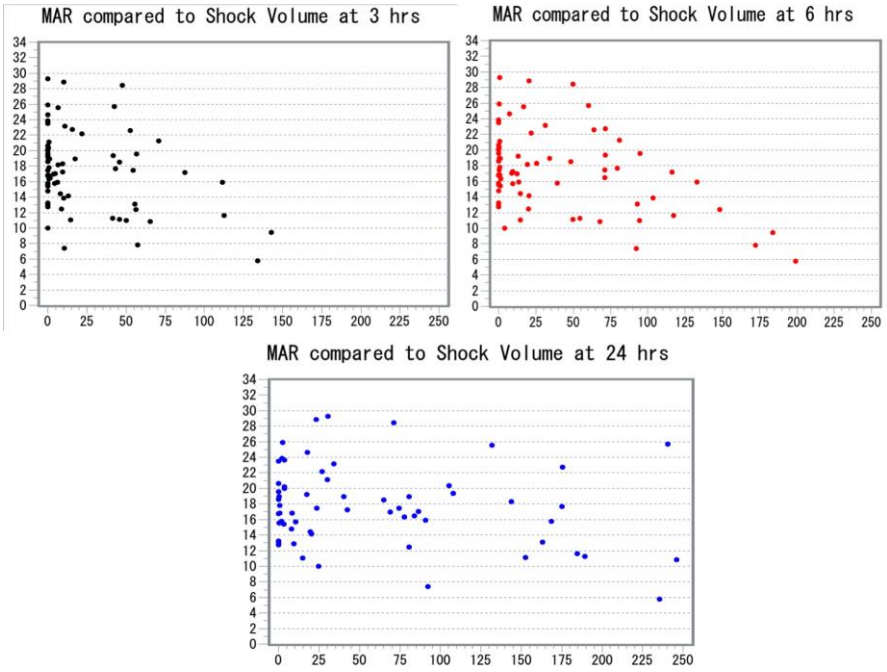


Figure 1 - Correlation between MAR ratio and Shock Volume at 3, 6 and 24 hours following admission.

Scientific Session III-A

Paper #15
January 11, 2018
11:30 am

ASSOCIATION OF FRESH WHOLE BLOOD AND SURVIVAL AT ROLE 2 MEDICAL TREATMENT FACILITIES IN AFGHANISTAN

Jennifer M. Gurney, MD*, Amanda M Staudt, PhD, MPH, Shawn C. Nessen, DO, FACS*, Tuan Le, MD, DrPH, Philip C. Spinella, MD, FCCM*, Andrew Cap, Zsolt T. Stockinger, MD, FACS*, Stacy A. Shackelford, MD*, Heather Pidcoke, Elizabeth A Mann-Salinas, PhD, RN
US Army Institute of Surgical Research

Presenter: Shawn C. Nessen, DO

Discussant: Matthew J. Eckert, MD, Madigan Army Medical Center

Objectives: The objective of this study was to compare mortality in combat casualties who received fresh whole blood (FWB) as compared to those who received no FWB and partial or complete component therapy at forward deployed (Role 2) medical treatment facilities (MTFs) with surgical capability.

Methods: Patients were separated into two groups: 1) received FWB (n=215) and 2) did not receive FWB (n=896); moreover, both groups potentially received plasma, Red Blood Cells (RBCs), and occasionally platelets. Kaplan-Meier plot, log rank test, and multivariate cox regression were performed to compare survival of patients 8 hours after Role 2 admission. A subgroup analysis was conducted among patients requiring a massive transfusion (FWB n=132, no FWB n=98).

Results: In FWB patients, 30.5% of total median blood volume transfused was FWB. In the Kaplan-Meier plot, survival was similar between FWB (93.5%) and no FWB (94.6%) groups (p=0.6434); however, after controlling for combat mortality index (i.e. physiological injury severity), base deficit, casualty classification, patient affiliation, and volume of blood product and crystalloid, the risk of mortality was elevated in patients who did not receive FWB (HR=2.0, 95% CI 1.1-3.8) versus patients who received FWB. For massive transfusion patients, the Kaplan-Meier plot showed increased survival in patients who received FWB (89.4%) as compared to patients who did not (79.6%)(p=0.0385); although, after adjusting for covariates, the difference in mortality between the study groups was only marginally significant (HR=1.9, 95% CI 0.9-4.0).

Conclusions: These results corroborate previous studies demonstrating, in environments where platelets are largely unavailable, patients who received FWB had lower mortality. Further analysis is needed to elucidate other factors (e.g. traumatic brain injury, temperature) that may result in improved survival in patients who receive FWB.

Scientific Session III-A

Paper #16
January 11, 2018
11:50 am

A COMPARISON OF RESUSCITATION INTENSITY (RI) AND CRITICAL ADMINISTRATION THRESHOLD (CAT) IN PREDICTING EARLY MORTALITY AMONG BLEEDING PATIENTS: A MULTICENTER VALIDATION IN 680 MAJOR TRANSFUSION PATIENTS

David Meyer, MD, Bryan A. Cotton, MD, MPH, Erin Fox, Deborah M. Stein, MD, MPH, FACS, FCCM*,
John B. Holcomb, MD*, Mitchell J. Cohen, MD, FACS,
Kenji Inaba, MD, Elaheh Rahbar
University of Texas Health Science Center at Houston

Presenter: David Meyer, MD

Discussant: Ronald B. Tesoriero, MD

Objectives: We sought to evaluate the performance of the Critical Administration Threshold (CAT) and Resuscitation Intensity (RI) as more appropriate replacements for massive transfusion (MT) in defining mortality risk in patients undergoing major transfusions.

Methods: Patients predicted to receive MT at 12 Level-1 trauma centers were randomized in the PROPPR trial. MT: ≥10 U RBC in 24 hours; CAT+: ≥3 U RBC in first hour; RI: total products in the first 30 minutes (1 U RBC, 1 U plasma, 1.0 L crystalloid, 0.5 L colloids each assigned 1 unit). RI was evaluated as a continuous variable as well as dichotomized at ≥4 units. Each of these models was evaluated for their ability to predict mortality at 3, 6, and 24 hours.

Results: Of 680 patients randomized, 301 patients met MT, 521 met CAT+, and 445 had RI ≥4. Of those that died, 23% never reached MT threshold, but were all captured by CAT+ and RI ≥4. Half of patients who were CAT+ or RI ≥4 met MT criteria. The 30-day mortality was similar between CAT+ (28%) and RI ≥4 patients (29%). Predictive values for 24-hour mortality are represented in the TABLE below. In addition, when RI was evaluated as a continuous variable, each unit increase was associated with a 20% increase in hemorrhage-related mortality (OR 1.20, 95% CI 1.15-1.29).

Conclusions: Both RI and CAT may serve as valid surrogates for early mortality in severely injured patients undergoing major transfusion, capturing patients who be lost using MT definition. While CAT+ showed the best sensitivity overall, RI ≥4 consistently demonstrated better specificity and similar PPV and NPV. While CAT+ may better capture those patients receiving a RBC-dominant resuscitation, RI≥4 captures other resuscitation fluids and blood products, and can be used as a continuous variable to provide quantitative as well qualitative risk of death.

3-hour mortality				
	PPV	NPV	Sensitivity	Specificity
MT	9%	92%	51%	56%
CAT+	9%	97%	92%	25%
RI ≥4	9%	95%	77%	36%
6-hour mortality				
MT	16%	92%	64%	58%
CAT+	13%	96%	91%	25%
RI ≥4	14%	93%	78%	36%
24-hour mortality				
MT	21%	90%	63%	59%
CAT+	17%	94%	90%	26%
RI ≥4	18%	92%	80%	37%

A comparison of early mortality prediction by MT, RI and CAT

Scientific Session III-A

Paper #17
January 11, 2018
12:16 pm

BLEEDING AND THROMBOEMBOLISM AFTER TBI IN THE ELDERLY: A REAL CONUNDRUM

Nina Glass, MD*, Aparna Vadlamani, Franchesca Hwang, MD, Ziad C. Sifri, MD*, Anastasia Kunac, MD*,
Stephanie Bonne, MD*, Sri Ram Pentakota, Peter Yonclas,
Anne C. Mosenthal, MD*, David H. Livingston, MD*, Jennifer Albrecht
Rutgers-New Jersey Medical School

Presenter: Nina Glass, MD

Discussant: Ali Cheaito, MD, University of California Los Angeles

Objectives: Studies suggest that up to 50% of elderly traumatic brain injury (TBI) patients are on anticoagulant therapy at the time of injury. Both trauma surgeons and neurosurgeons question whether anticoagulation should be stopped to prevent bleeding or recurrent TBI or continued to prevent thromboembolic (TE) events. Our objectives were 1) to evaluate the risks of bleeding and recurrent TBI vs. TE events following an initial TBI in older adults, and 2) to identify risk factors for TBI, bleeding, and TE events in this setting.

Methods: A retrospective analysis of 52,228 Medicare beneficiaries hospitalized with TBI from 2006 to 2010 was performed. We calculated unadjusted risk of post-injury TBI, GI bleeding, or hemorrhagic stroke (bleeding events) and TE events (stroke or MI) over twelve months of follow-up and identified risk factors for these events.

Results: Among beneficiaries with TBI, risk of TE events (4.9 events/100 person-years; 95% confidence interval (CI) 4.7, 5.1) was significantly higher than bleeding events (4.0 events/100 person-years; CI 3.8, 4.2). Several common risk factors (liver disease, COPD) predisposed to all of these complications (Table). Atrial fibrillation and coagulopathy were risk factors for thromboembolic events. Alcohol use and previous history of bleeding were associated with higher risk of bleeding events after TBI. In addition, depression and previous stroke were associated specifically with recurrent TBI.

Conclusions: For elderly patients admitted with TBI, the incidence of thromboembolism is significantly higher than that of bleeding and caution regarding restarting anticoagulation in high-risk patients may be detrimental. Specific risk factors for bleeding and TE events were identified and can help guide care of older adults following TBI. Further studies are needed to establish the optimal management of elderly TBI patients, in particular with respect to anticoagulation.

Risk Factor	Any Bleed	Thromboembolic Events
Race (Black/Other)	X	
Male	X	
Cataracts	X	
Alcohol dependence	X	
Pre-TBI history of bleeding	X	
Disability/End Stage Renal Disease	X	
Discharge to a nursing facility	X	
COPD	X	X
Hyperlipidemia	X	
Liver disease	X	X
Coagulation defect		X
Ischemic heart disease		X
Neurologic disease		X
Rheumatoid arthritis		X
Atrial fibrillation		X

Risk Factors for Adverse Events among Medicare beneficiaries following Traumatic Brain Injury

Scientific Session IV-B - Cox-Templeton Injury Prevention Paper Competition

Paper #18
January 11, 2018
10:30 am

CAN PLANNED TRAFFIC PATTERNS IMPROVE SURVIVAL AMONG THE INJURED DURING MASS CASUALTY MOTORCYCLE RALLIES?

Cecily E. DuPree, DO, Aaron Pinnola, DO, Stefanie Gibson, Keely Muertos, Andrea Romano, John Davis, MD, FACS, Antonio Pepe, MD*, Jason D Sciarretta, MD, FACS
University of South Carolina

Presenter: Cecily E. DuPree, DO

Discussant: Allan B. Peetz, MD, Vanderbilt

Objectives: The objective of this study was to determine whether the implementation of a scheduled controlled “traffic loop” could improve overall mortality and impact patient outcomes during the city's high volume motorcycle rally.

Methods: All motorcycle-related injuries during the city’s May "Bike Week" were retrospectively reviewed over a 4-year period. Comparative analysis was completed between "non-traffic loop" Memorial Day weekends of 2013 through 2016 and the city's scheduled 23-mile 3-day "traffic loop" (10pm to 2am) during years 2015 and 2016. The two groups were compared for age, gender, injuries, ISS, GCS, length of stay (LOS), ventilator free days, and mortality. The primary outcome was mortality.

Results: 139 injured patients were reviewed. Non-traffic loop group included 120 patients and 19 patients in the traffic loop group. Mean age was 36.1?11.2 years, 72.1% male. Helmet use observed in 11.5% and 27% were legally intoxicated. Comparison groups were equivalent in age, gender, ISS, and GCS; however, traffic loop patients required longer ICU LOS (17.0 vs 5.2 days, p=0.047) and ventilator days (29.5 vs 6.0 days, p=0.024). Traffic loop injury patterns were significantly more likely to involve abdominal trauma (p=0.002). A 7% decrease in helmet use and a 15% increase in head injuries was seen during traffic loop hours but not statistically significant. All patients were equally as likely to experience chest, extremity, and craniofacial injuries. Although no statistical difference was observed in mortality rates of comparison groups, no deaths occurred during traffic loop hours (0% vs 5%).

Conclusions: The implementation of a controlled traffic loop improved motorcyclist survival with no reported mortalities and suggest planned control traffic patterns during high city volume events can be successful however follow up study over a prolonged period is warranted to confirm our early findings.

Demograpghic & Outcomes	Non-Traffic Loop	Traffic Loop	p-value
Age, years [Mean (SD)]	36.5 (11.1)	34.0 (11.9)	0.376
Male [*n* (%)]	83 (69.2)	15 (78.9)	0.589
ICU admission [*n* (%)]	14 (11.7)	3 (15.8)	0.705
Loss Control [*n* (%)]	54 (45.0)	7 (36.8)	0.506
Collision with vehicle [*n* (%)]	61 (50.8)	10 (52.6)	0.114
ETOH ≥ legal limit [*n* (%)]	30 (25.0)	7 (36.8)	0.278
LOS, days [Mean (SD)]	3.1 (7.7)	5.6 (16.6)	0.291
ICU LOS, days [Mean (SD)]	5.2 (5.2)	17.0 (22.0)	**0.047**
Vent days [Mean (SD)]	6.0 (4.8)	29.5 (27.6)	**0.024**
Abdominal injury [*n* (%)]	4 (3.3)	4 (21.1)	**0.002**
Mortality [*n* (%)]	6 (5.0)	0 (0%)	0.319

Demographics and Outcomes

23-mile Traffic loop

Scientific Session IV-B - Cox-Templeton Injury Prevention Paper Competition

Paper #19
January 11, 2018
10:50 am

MAPPING AREAS WITH CONCENTRATED RISK OF TRAUMA MORTALITY: A FIRST STEP TOWARD MITIGATING DISPARITIES IN TRAUMA

Molly P. Jarman, PhD, MPH, Elliott R. Haut, MD, PhD, FACS*, Frank Curriero, Renan Castillo
Johns Hopkins School of Public Health

Presenter: Molly P. Jarman, PhD, MPH

Discussant: Mayur Narayan, MD, MPH, MBA, MPHE, Weil Cornell Medicine/NY Presbyterian Hospital

Objectives: Many rural, minority, and low-income communities face geographic barriers to trauma care, which may contribute to health disparities in injury. The built and social environment at the injury scene may also contribute to these disparities, and may compound risk from individual patient demographic and injury characteristics. The objectives of this study were to classify injury events based on features of the injury scene, and to examine patient demographic, injury characteristic, and mortality patterns by location class.

Methods: Data from the 2015 Maryland Adult Trauma Registry and eMEDS pre-hospital Patient Care Reporting System (n = 16,082) were used in a latent class analysis of injury scene characteristics (trauma center distance, trauma center type, land use, community level income, and median age). Distributions of individual patient characteristics and outcomes were examined by location class. Odds of death by location class were estimated with logistic regression, with and without adjustment for demographic and injury characteristics.

Results: Eight classes were identified: rural, exurban, young middle suburb, aging middle suburb, inner suburb, urban fringe, high income urban core, and low income urban core. Patient demographic and injury characteristics varied across classes. Odds of death varied by class, with and without adjustment for individual patient characteristics, and were highest for rural, middle suburban, and low income urban locations. Individual characteristics appear to mask the relationship between location class and mortality.

Conclusions: Characteristics of injury scenes can be categorized into distinguishable classes, and odds of death vary significantly by location class. Identifying areas with highest risk of mortality and patterns of individual risk factors may guide targeted primary injury prevention and clinical treatment interventions.

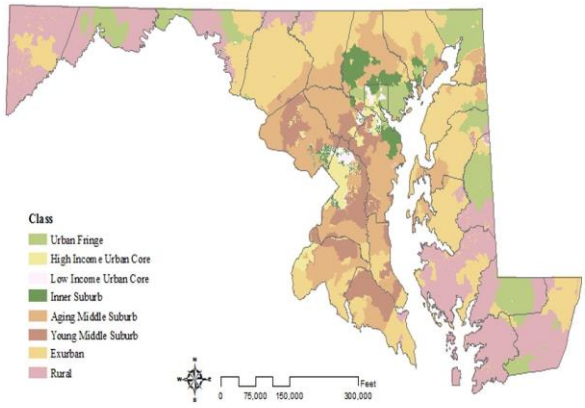


Figure 1: Geographic Distribution of Latent Classes

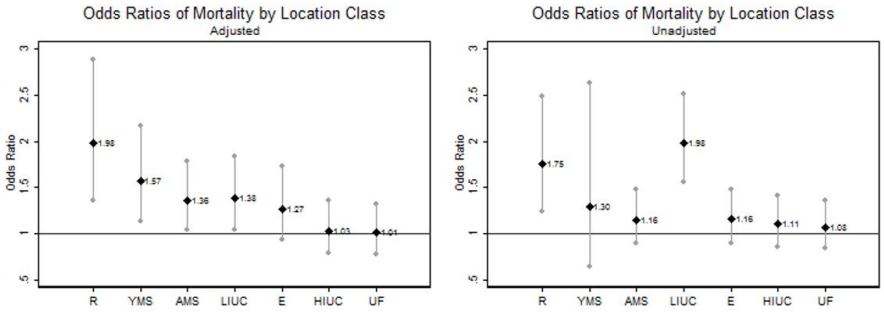


Figure 2: Mortality Odds Ratios by Location Class. Inner Suburb is the reference class. Adjusted model included age, sex, race/ethnicity, insurance status, CCI, severity, mechanism, prehospital time, and mechanism/time interaction. R = Rural, YMS = Young Middle Suburb, AMS = Aging Middle Suburb, LIUC = Low Income Urban Core, E = Exurban, HIUC = High Income Urban Core, UF = Urban Fringe.

Scientific Session IV-B - Cox-Templeton Injury Prevention Paper Competition

Paper #20
January 11, 2018
11:10 am

IMPLEMENTATION IS NOT ENOUGH: GRADUATED DRIVERS LICENSING BENEFITS FROM PUBLIC AWARENESS CAMPAIGNS

Stephanie Bonne, MD*, Iesha Suber, Arnold Anderson, David H. Livingston, MD*
Rutgers-New Jersey Medical School

Presenter: Stephanie Bonne, MD

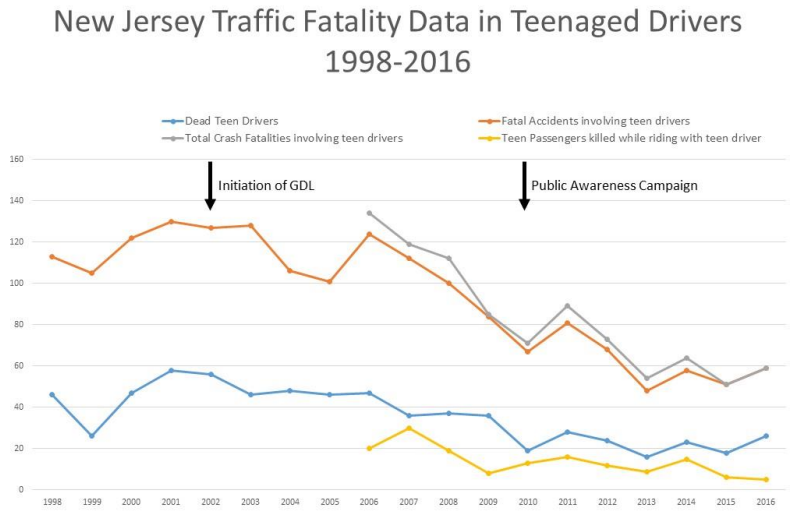
Discussant: Linda Ding, MD, University of South Alabama

Objectives: Graduated Drivers License (GDLs) are required in most states. GDLs involve a staged approach to licensing teen drivers with a supervisory period followed by a restricted, then full license. Surveys suggest that parents have poor acceptance of restrictions imposed by GDLs and poor compliance. NJ initiated GDLs in 2002, however, fatal crash data showed minimal effect on teen-driver deaths until a subsequent public awareness and enforcement campaign was launched.

Methods: Data from 1998-2016 was obtained from New Jersey's Fatal Accident Investigation Unit. State Police data on total crash fatalities and teen passenger deaths were available after 2005. Data before and after GDL and implementation in 2006 and the state-wide awareness campaign in 2010 were evaluated. Paired t-tests were performed; $p<0.001$ considered significant.

Results: Initiation of GDL had minimal effect with no change in numbers of dead teen drivers or fatal crashes in the 4 years before and after the law (44 vs. 49 dead teen drivers, 117 vs.115 for fatal crashes, $p>0.05$). After a comprehensive public and law enforcement campaign in 2010, fatal crashes declined. Comparing the 7 years prior and after the campaign, decreases are seen in dead teenaged drivers (42 vs. 22, $p<0.001$) and total fatal teen crashes (107 vs. 61, $p<0.001$). Comparing 4 years before and 6 years after there were decreases in crash fatalities in teen drivers (112 vs 66, $p<0.001$) and in number of dead teen passengers in a vehicle operated by a teen (19 vs 11 $p<0.001$).

Conclusions: GDL laws are common, but implementation alone may be insufficient in decreasing teen MVC fatalities. A comprehensive, public-health based awareness campaign involving the public and law enforcement is needed to ensure compliance and educate about benefits of GDLs in decreasing deaths. Additional studies in other states are needed to assess the validity of these findings.



Scientific Session IV-B - Cox-Templeton Injury Prevention Paper Competition

Paper #21
January 11, 2018
11:30 am

EVALUATING THE EFFECTIVENESS OF TRANSLATED A MATTER OF BALANCE FALL PREVENTION PROGRAM MATERIALS FOR NON-ENGLISH SPEAKING PARTICIPANTS

Elizabeth S. Wolfe, CAGS, ATC, Sandra Strack Arabian, CSTR, CAISS, Janis Breeze, Nikolay Bugaev, MD*
Tufts Medical Center

Presenter: Elizabeth S. Wolfe, CAGS, ATC

Discussant: Cindy Blank-Reid, RN, MSN, CEN, Temple University Hospital

Objectives: A Matter of Balance (MOB) is an evidence-based fall prevention program shown to reduce fear of falling (FOF) in English speaking participants. The effectiveness of translated Chinese and Spanish MOB materials in reducing FOF is unknown. The purpose of this study was to evaluate if MOB reduced FOF in Chinese- and Spanish-speaking participants.

Methods: This Institutional Review Board approved, prospective interventional study recruited participants from MOB classes in 2 northern states from November 2014 to October 2015. The Falls Efficacy Scale-International (FES-I) (16-64 point scale; 16= not concerned [about falling] to 64= very concerned) and a demographic questionnaire were used to survey participants at the first class (baseline), last class, and 6 months after the MOB course. FES-I means were compared across and within the language groups using ANOVAs or paired t-tests. Statistical significance was defined by $p < 0.05$.

Results: Ninety participants enrolled, 77 (85.6%) completed the course (Chinese [n=37, 48%]; Spanish [n=19; 25%], English [n=21, 27%]), and 54 (60%) completed the 6-month survey (Chinese [n=33, 61%], English [n=21, 39%]). Most participants were female (n=77, 86%) and had a high school education or less (n=76, 84%, p=<0.0001) (Tables 1 &2). Baseline FES-I scores were higher in the Chinese (40.9±12.6) compared to Spanish (32.0±10.8) and English (28.9±10.0) (p=0.0001). Chinese FES-I scores significantly increased at the last class (+7.1, p=0.009) and 6 month survey (+6.7, p=0.0088). FES-I scores decreased in the Spanish (-6.6, p=0.016) and English groups (-2.7, p=0.14) at last class, and English 6 month FES-I scores were slightly lower than baseline (-0.4, p=0.8) (Table 2).

Conclusions: Chinese had higher FOF at the end the course and 6 months after MOB compared to baseline. The MOB did show promise in reducing FOF in both the Spanish and English groups.

Table 1: Demographic Characteristics by Language among Matter of Balance (MOB) Participants

Language of MOB Class (n)	Chinese (37)	Spanish (25)	English (28)	p-value
Female Gender (n, %)	28 (78)	22 (88)	27 (96)	0.057
Age Category (n, %)*				
<75	9 (25.0)	12 (42.9)	15 (65.2)	
75-79	14 (38.9)	10 (35.7)	4 (17.4)	0.042
>79	13 (36.1)	6 (21.4)	4 (17.4)	
Countries of Origin (n)	China (34) Hong Kong (1) Philippines (1) Taiwan (1)	Bolivia (1) Cuba (4) Dominican Republic (11) Peru (1) Puerto Rico (3) No Answer (5)	United States (27) Cuba (1)	N/A
Mean Years in the US (SD)	27.5 (12.3)	22.3 (17.8)	N/A	N/A

*missing n=3

Table 1: Demographic Characteristics by Language among Matter of Balance (MOB) Participants

Table 2: Survey Answers by Language for Participants Who Completed the MOB Course

	Chinese (37)	Spanish (25)*	English (28)	p-value
Education (n, %)				
Less than high school	23 (64)	14 (67)	3 (12)	<0.0001
High school	4 (11)	7 (33)	18 (69)	
College and higher	9 (25)	0	5 (19)	
Mean number of health problems (SD)**	1.5 (0.9)	1.3 (0.9)	1.5 (1.2)	0.8352
Use of an assistive device (n, %)***	13/33 (39)	13/20 (65)	11/23 (48)	0.1942
Baseline: Had ≥ 1 fall in past 6 months (n, %)	6/36 (17)	3/22 (14)	5/26 (19)	0.8744
Completed final class FES-I (n, %)	37 (100)	19 (76)	21 (75)	0.0009
Baseline FES-I Mean (SD)	40.9 (12.6)	32.0 (10.8)	28.9 (10.0)	0.0001
Final Class FES-I Mean (SD)	48.0 (12.3)	27.5 (8.3)	25.0 (7.2)	<0.0001
Mean change from baseline (paired t-tests)	7.1 (15.6) p=0.009	-6.6 (10.9) p=0.016	-2.7 (7.9) p=0.14	-
Completed 6-month follow-up FES-I (n, %)	33 (89)	-	21 (75)	0.18
6 month FES-I Mean (SD)	47.2 (14.3)	-	27.0 (9.6)	<0.0001
Mean change from baseline to 6 month (paired t-tests)	6.7 (13.8) p=0.0088	-	-0.4 (5.8) p=0.8	-
6 month f/u: Had ≥ 1 fall in past 6 months (n, %)	10/33 (30.3)	-	3/21 (14.3)	0.18

*Six-month follow-up surveys were not available from Spanish-speaking MOB group
**Diabetes, hyper- and hypotension, heart condition, neuropathy, lung condition, stroke, other
***Walker, cane, hearing device, vision device, other

Table 2: Survey Answers by Language for Participants Who Completed the MOB Course

Scientific Session IV-B - Cox-Templeton Injury Prevention Paper Competition

Paper #22
January 11, 2018
11:50 am

MIAMI-DADE COUNTY YOUTH WEAPONS OFFENDER PROGRAM: A POTENTIAL MODEL TO REDUCE FIREARM CRIME RECIDIVISM NATION-WIDE

Rene Gamboa, MS, LMHC, Anjali Sarver, Marilyn Sutherland, Enrique Ginzburg, MD*
University of Miami Miller School of Medicine

Presenter: Rene Gamboa, MS, LMHC

Discussant: Anthony Bottiggi, MD, University of Kentucky College of Medicine

Objectives: **Objectives:** Homicide is the third leading cause of death among youth aged 15 to 24 years in the United States. 86% of the deaths are due to firearms (CDC). The Juvenile Gun Court in Birmingham, Alabama reported a recidivism rate of 41% for its first 100 participants in 1995 and the Juvenile Gun Program in Minneapolis, MN reported 49% of its graduates had new criminal charges. The goal of this study is to evaluate and compare Miami Dade County's juvenile weapon offender program (JWOP) efficacy in preventing recidivism of high-risk youth.

Methods: **Methods:** This study is a retrospective analysis of 79 graduates surveyed by the MDC Juvenile Services Department (JSD) of GATE Program graduates over a ten-year period of 1999-2009. The GATE Program is an intervention based program conducted at Jackson Memorial Hospital/ Ryder Trauma Center for males ages 13 to 17 convicted of weapons possession charges or other non-violent weapon offenses. Experiential education and cognitive behavioral interventions are used to achieve the goal of deterring violence and future weapon use.

Results: **Results:** Re-arrest data from the MDC JSD demonstrated the lowest nation-wide recidivism re-arrest rate of 29% of GATE clients who graduated between 1999-2009.

Conclusions: **Conclusion:** The GATE Program exhibits the most promising recidivism rate of youth weapons offenders nation-wide. A more robust analysis of recent GATE graduates is underway to assure continued success of the program. If continued efficacy is identified, there is a need for expansion and adaptation of this program to inner city communities around the United States to reduce recidivism of youth weapons offenders and prevent potential death and disability.

Scientific Session IV-B - Cox-Templeton Injury Prevention Paper Competition

Paper #23
January 11, 2018
12:10 pm

INTIMATE PARTNER AND SEXUAL VIOLENCE: A FOCUS ON MALE PATIENTS

Tanya L. Zakrison, MD, MPH, FRCSC, FACS*, Rondi Gelbard, MD*, Xian Luo-Owen,
David Turay, MD, PhD*, Brian H. Williams, MD, FACS*
Ryder Trauma Center, University of Miami Miller School of Medicine

Presenter: Tanya L. Zakrison, MD, MPH, FRCSC, FACS

Discussant: Carnell Cooper, MD, Prince George's Hospital Center

Objectives: A recent EAST-supported, multicenter trial demonstrated a similar rate of intimate partner and sexual violence (IPSV) between male and female trauma patients, regardless of mechanism. Our objective was to perform a subgroup analysis of our affected male cohort as this remains an understudied group in the trauma literature.

Methods: We conducted a recent EAST-supported, cross-sectional, multicenter trial over one year (03/15-04/16) involving four Level I trauma centers throughout the United States. We performed universal screening of adult trauma patients using the validated HITS (Hurt, Insult, Threaten, Scream) and SAVE (sexual violence) screening surveys. Risk factors for male patients were identified. Chi-squared test compared categorical variables with significance at $p<0.05$. Parametric data is presented as mean +/-standard deviation.

Results: A total of 2034 trauma patients were screened, of which 1281 (63%) were men. Of this cohort, 119 men (9.3%) screened positive for IPSV, 10.4% for intimate partner violence and 6.5% for sexual violence. On categorical analysis of the HITS screen, the proportion of men that were physically hurt was 4.8% compared to 4.3% for women ($p = 0.896$). A total of 4.9% of men screened positive for both intimate partner and sexual violence.

Conclusions: One out of every twenty men that present to trauma centers are survivors of both intimate partner and sexual violence. They are at similar risk for physical abuse as women when this intimate partner violence occurs.

Scientific Session IV-A

Paper #24
January 12, 2018
10:15 am

DECONSTRUCTING DOGMA: NON-OPERATIVE MANAGEMENT OF SMALL BOWEL OBSTRUCTION IN THE VIRGIN ABDOMEN

Morgan L. Collom, DO, Mackenzie Campbell-Furdick, Billy Moore, Nadeem N. Haddad, MD, Martin D. Zielinski, MD, FACS*, Therese M. Duane, MD, FACS*, Mohamed D Ray-Zack, MBBS
JPS Health Network

Presenter: Morgan L. Collom, DO

Discussant: April E. Mendoza, MD, Massachusetts General Hospital

Objectives: Management of SBO has become more conservative, especially in those patients with previous abdominal surgery (PAS). However, surgical dogma continues to promote operative exploration for patients with SBO with no previous abdominal surgery (NAS). With the increase in use of CT resulting in more SBO diagnoses, it is important to reevaluate the role of mandatory exploration. Gastrografin (GG) decreases the need for operative exploration and may be an option for patients without previous surgery. We hypothesize that the use of GG in the SBO population without previous surgery will be equally effective in reducing operative exploration rate compared to the SBO population with previous surgery.

Methods: This prospective, multi-institutional, observational study was performed by comparing adjusted operative exploration rates between NAS and PAS. Rate adjustment was accomplished through multivariate logistic regression.

Results: Overall, 601 patients were included in the study; 500 with and 101 patients without prior abdominal surgery. The groups were similar except for age, gender, prior abdominal surgery including colon surgery, prior SBO admission and history of cancer as shown in Table 1. Multivariate analysis showed that PAS (OR = 0.47, $p=0.03$) and the use of GG (OR = 0.11, $p<0.01$) were independent predictors of not needing surgery, while ICU admission (OR = 16.0, $p<0.01$) was associated with a higher likelihood of need for operation. Figure 1 demonstrates that the use of GG significantly decreased the need for operation not only in the PAS group but also, and even more substantially, in the group of patients with NAS.

Conclusions: Patients receiving GG in both the NAS and the PAS group had lower rates of operative exploration for SBO compared to those that did not receive GG. Based on these results, patients with a diagnosis of SBO with NAS should be considered for GG and not automatic operative exploration.

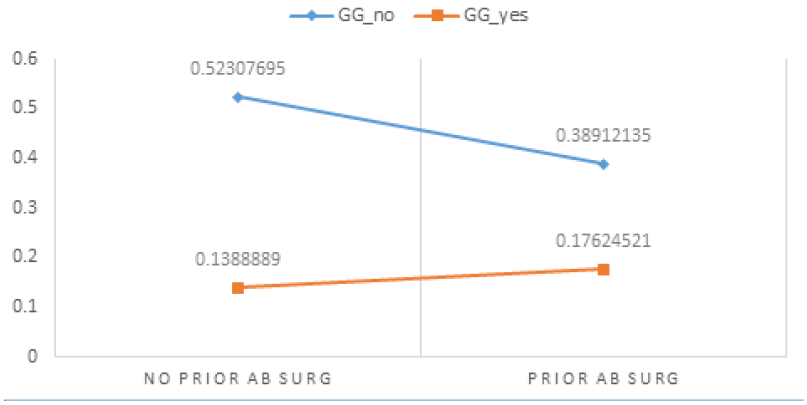


Figure 1.0. Comparing surgery rates for patients with and without history of abdominal surgery, N = 601.

Characteristic	Non-Gastrografin group N=304 (%)	Gastrografin group N=297 (%)	P-value
Operative exploration	127 (41.8)	51 (17.2)	< 0.01
Age >= 65 years	126 (41.5)	150 (50.5)	0.03
Female	140 (46.1)	135 (45.5)	0.88
Prior SBO admission, yes	95 (31.3)	120 (40.4)	0.02
Prior SBO surgery, yes	42 (13.8)	67 (22.6)	0.01
Prior abdominal surgery, yes	239 (78.6)	261 (87.9)	< 0.01
Readmission within 30 days	51 (16.8)	32 (10.8)	0.03
Surgical admission, yes	212 (69.7)	241 (81.1)	< 0.01
SBP, mean (SD)	136.1 (23.0)	136.3 (22.2)	0.92
BMI, mean (SD)	26.7 (7.3)	28.1 (6.9)	0.02
Heart rate, mean (SD)	87.4 918.1)	83.5 (16.5)	0.01
WBC, mean (SD)	10.4 (5.0)	10.3 (4.0)	0.82
Hx Crohn's disease	12 (4.0)	5 (1.7)	0.09
Prior total abdominal colectomy	16 (5.3)	20 (6.7)	0.45
Duration of obstipation, days, mean(SD)	1.7 (2.5)	1.3 (1.7)	0.04

Table 1. Selected characteristics of SBO patients by Gastrografin challenge status, N = 601.

Scientific Session IV-A

Paper #25
January 12, 2018
10:35 am

CAN ACUTE CARE SURGEONS PERFORM WHILE FATIGUED? AN EAST MULTICENTER PROSPECTIVE STUDY

Kevin M. Schuster, MD, MPH*, Joshua P. Hazelton, DO, FACS*, Deviney Rattigan, Linh Nguyen, J. Martin Perez, MD*, Melissa Blatt, Lara Spence, MD
Yale School of Medicine

Presenter: Kevin M. Schuster, MD, MPH

Discussant: Lawrence Lottenberg, MD, Charles E. Schmidt College of Medicine, Florida Atlantic University

Objectives: Fatigued surgeon performance has only been assessed in simulated sessions or retrospectively after a night on call. Our goal was to determine if self-reported fatigue of acute care surgeons affects patient outcome.

Methods: Four acute care surgery services prospectively collected emergency case outcomes over 18 months. Surgeons defined emergency cases by identifying the patient as needing an immediate operation upon consultation or admission. Surgeons reported, the following day, sleep time accumulated prior to operation, if non-clinical delays to operation occurred and patient volume during the shift. To maximize differences, fatigued surgeons were defined as performing a case after midnight without having slept in the prior eighteen hours. Rested surgeons performed cases before 9 PM or after at least 3 hours of sleep prior to operation. A four-level ordinal scale was used to assign case complexity. Hierarchical logistic regression models were constructed to assess the impact of fatigue on morbidity and mortality while controlling for center and patient level factors.

Results: Of 720 cases collected 567 met criteria for fatigue or rested. Of these cases 158 (27.9%) were performed at night and 154 by a fatigued surgeon. Rested surgeons were more likely to be operating on an older or female patient, other characteristics were similar. Outcomes including mortality, major morbidity, blood loss, incidence of abdominal closure and ostomy creation were similar (Table 1). After controlling for center and patient factors, surgeon fatigue did not impact mortality or major morbidity (Table 2). Mortality variance was 8.3% and morbidity variance was 7.8% at the center level.

Conclusions: Surgeons have similar outcomes in a fatigued or rested state and have equal rates of ostomy creation and fascial closure. Work schedules for acute care surgeons should not be adjusted for the sole purpose of improving patient outcomes.

	Rested surgeon n(%)	Fatigued surgeon n (%)	p
Total patients	413 (72.8)	154 (27.2)	
Age: mean (SD)	52.6 (19.7)	48.5 (20.1)	0.034
Gender female	185 (44.8)	52 (33.8)	0.018
Race			
White	243 (60.8)	81 (54.0)	0.344
Black or African American	102 (25.5)	45 (30.0)	
Asian	10 (2.5)	7 (4.7)	
Other	45 (11.3)	17 (11.3)	
Admitted from			
Home	328 (81.8)	119 (79.9)	0.851
Other acute care hospital	69 (17.2)	28 (18.8)	
ECF	4 (1.0)	2 (1.3)	
Presented with severe sepsis/septic shock	86 (20.8)	33 (21.6)	0.861
Presented with hemorrhagic shock	77 (18.6)	29 (18.8)	0.960
Fascia left open	103 (25.4)	45 (29.6)	0.321
Ostomy created	47 (57.3)	12 (38.7)	0.077
Death	39 (9.82)	12 (8.28)	0.585
Major Morbidity	188 (47.36)	71 (48.97)	0.740

Table 1: SD - Standard deviation, ECF - extended care facility

	Odds ratio for mortality (95% CI)	p	Odds ratio for major morbidity (95% CI)	p
Age	1.06 (1.03 – 1.09)	<0.001		
Admit From				
Home	Reference		Reference	
Other acute care hospital	1.49 (0.55 – 4.11)	0.042	0.87 (0.47 – 1.63)	0.763
ECF	31.73 (1.76 – 571.39)	0.019	1.49 (0.11 – 19.9)	0.686
Functional Status				
Independent			Reference	
Partially dependent			451.96 (<0.01 - >999)	0.756
Totally dependent			0.98 (0.13 – 15.97)	0.386
Hypertension	1.40 (0.55 – 3.55)	0.476		
CHF	5.01 (1.36 – 18.40)	0.011		
Dyspnea	2.77 (0.60 – 12.83)	0.329		
Ventilator dependent	5.86 (1.99 – 17.28)	0.001	2.34 (0.88 – 6.25)	0.088
Ascites	1.15 (0.28 – 4.70)	0.845		
Weight loss	2.44 (0.52 – 11.41)	0.257		
Bleeding disorder	0.93 (0.33 – 2.63)	0.896	1.87 (0.86 – 4.07)	0.116
Sepsis				
None	Reference		Reference	
SIRS	3.86 (1.20 – 12.46)	0.277	1.68 (0.94 – 3.00)	0.082
Sepsis	5.38 (1.43 – 20.28)	0.148	1.97 (0.95 – 4.09)	0.069
Septic shock	10.88 (3.04 – 38.90)	<0.001	16.76 (4.63 – 60.66)	<0.001
Hemorrhagic shock	4.84 (1.31 – 17.85)	0.018		
Hemoglobin	0.84 (0.69 – 1.01)	0.067	0.91 (0.99 – 1.01)	0.057
Case complexity				
Level I	Reference		Reference	
Level II	213.08 (0.09 - > 999)	0.193	3.79 (1.08 – 13.35)	0.038
Level III	242.04 (0.11 - >999)	0.153	6.16 (1.76 – 21.61)	0.005
Level IV	835.71 (0.31 - >999)	0.095	21.71 (3.83 – 123.08)	<0.001
Surgeon Fatigue	1.47 (0.54 – 3.96)	0.448	1.38 (0.82- 2.30)	0.224
Model area under ROC curve	0.921		0.862	

Table 2: ECF - extended care facility, CHF - congestive heart failure, SIRS - systemic inflammatory response syndrome, ROC - receiver operating characteristic

Scientific Session IV-A

Paper #26
January 12, 2018
10:55 am

RAPID RECOVERY OF PROTEIN DEBT IS ASSOCIATED WITH FEWER COMPLICATIONS IN CRITICALLY INJURED ADULTS

Jennifer L. Hartwell, MD, FACS*, Jenalee Cooksey, Ann Cotton, Chelsea Wenos,
Ben L. Zarzaur, MD, MPH*, Grace S. Rozycki, MD, MBA, FACS*
Indiana University

Presenter: Jennifer L. Hartwell, MD, FACS

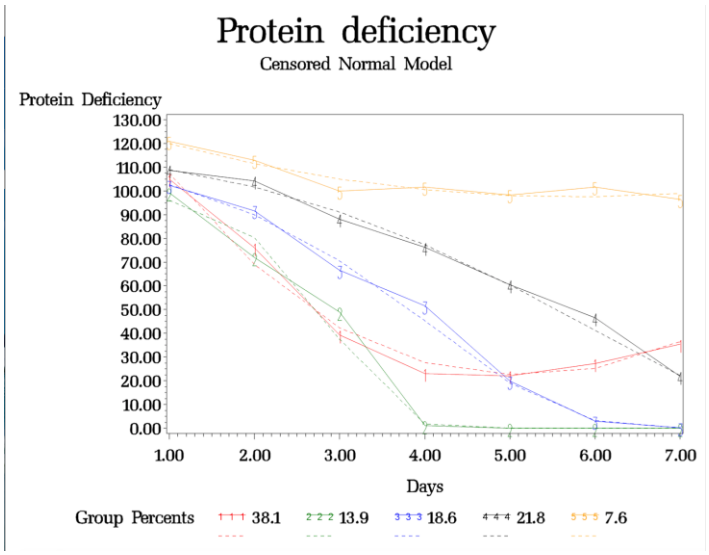
Discussant: Mack D. Drake, DO, Grady Memorial Hospital

Objectives: Injured patients are at risk of accumulating protein and caloric debt due to interrupted feeding. We hypothesized that differing injury patterns would result in variability in correcting the protein debt and that failure to meet protein goals during the first week of ICU admission would be associated with increased complications.

Methods: Injured adults who were unable to be volitionally fed were included. Data collected included demographics, injury characteristics, major surgical procedures, total prescribed and delivered protein and calories during the first seven days of admission, and complications. Group-based trajectory modeling (GBTM) was used to identify subgroup feeding trajectories.

Results: The included 274 patients (71.2% male) had a mean age 50.56 years ±19.76, mean ISS 26 ±14, time to first nutrition 39.6 hours ±24.3, mean caloric debt/7 days 5717.9 calories ±2290.65, mean protein debt/7 days 383 grams ±SD 160.8. C norm modeling reveals five quintiles of patients with varying trajectories of protein deficits over the first week of admission (graph). Group 5 never closes the protein gap, includes more patients with digestive tract injuries (33%, p=0.0002), higher mean number of surgeries (1.71, p=0.001), longer time to first nutrition (61.9 hours, p=0.001) and the highest mean number of complications (1.52, p=0.0086). Group 2, who close their protein debt within 4 days, have the lowest mean number of complications (0.62, p=0.0086). (table)

Conclusions: There is heterogeneity in the trajectory of protein debt recovery among injury pattern groups. Patients with digestive tract injuries are at increased risk for failure to close their protein debt with a significantly increased risk of complications. There is a decline in complication rates if the protein debt is closed within four days, calling into question the application of current guidelines that NPO status may be acceptable for up to seven days.



Protein Deficiency Trajectory Over First Week of Critical Care Admission

Group	% Blunt	% Penetrating	% Ortho Injury	%Digestive Tract Injury	Mean Complications	Mean # Surgeries	Mean Time 1st nutrition
1	94.29	3.81	20.95	6.67	1.34	0.93	32.18
2	90.48	9.52	16.67	0	0.62	0.74	23.57
3	90	8	22	12	1.02	0.9	42.6
4	89.29	7.14	44.64	19.64	1.23	1.7	54.43
5	85.71	14.29	42.86	33.33	1.52	1.71	61.9
p-value	0.5542	0.3165	**0.0026**	**0.0002**	**0.0086**	**0.001**	**0.001**

Protein Debt Trajectory Group Characteristics

Scientific Session IV-A

Paper #27
January 12, 2018
11:15 am

COMPARISON OF TWO WATER-SOLUBLE CONTRAST PROTOCOLS FOR SMALL BOWEL OBSTRUCTION

Priscilla Ding, BS, Christopher Dodgion, MD, MSPH, MBA*, Tracy VandeWater,
Mohamed D. Ray-Zack, MBBS, MD, Nadeem N. Haddad, MD, Jacob Peschman, Travis Webb,
Martin D. Zielinski, MD, FACS*, Colleen Trevino
Medical College of Wisconsin

Presenter: Priscilla Ding, BS

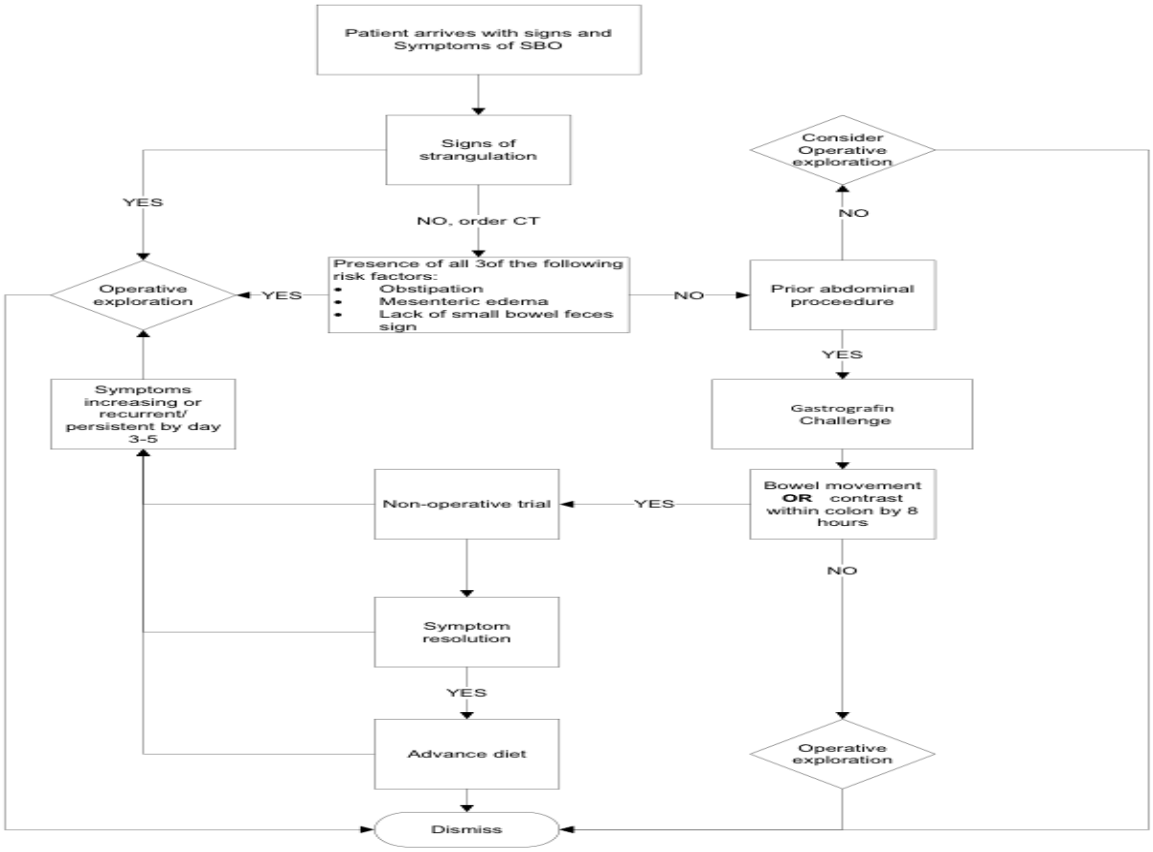
Discussant: Melissa M. Boltz, DO, MBA, Penn State Milton S. Hershey Medical Center

Objectives: Small bowel obstruction (SBO) accounts for 15% of acute surgical admissions, 300,000 operations and up to $2.3 billion in expenditures annually. Recent guidelines advocate a water-soluble contrast challenge (WSCC) protocol as a cornerstone to treatment but whether high osmolar (Gastrografin, GG) or isosmolar (Omnipaque, OP) contrast agents should be used is unknown. We aim to evaluate the adoption and compare the efficacy of two SBO WSCC protocols which utilize differing osmolar WSCC agents.

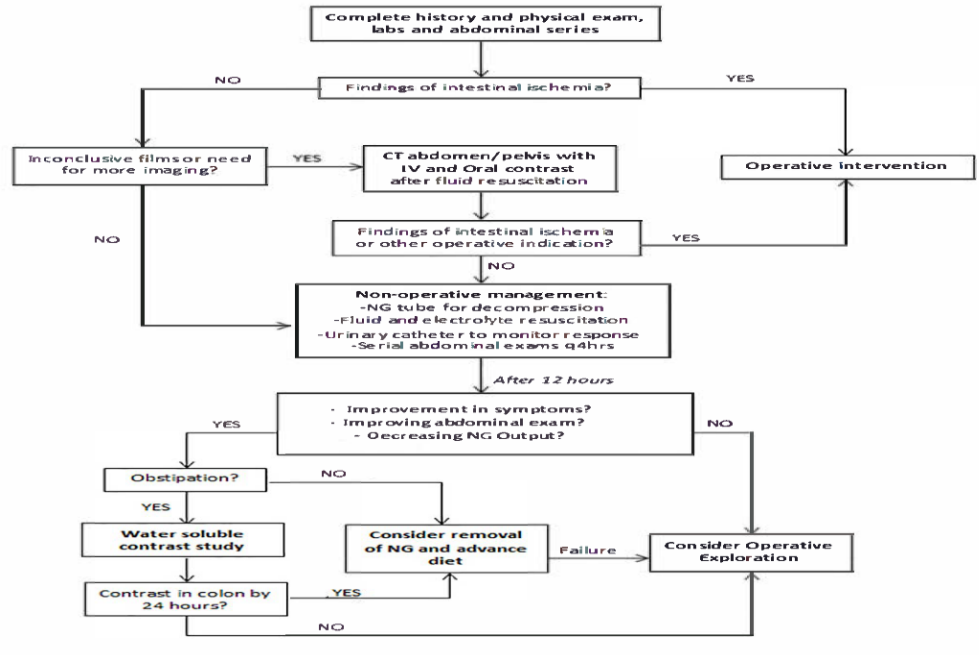
Methods: A multicenter, prospective observational study was conducted from July 2015-January 2017. Logistic and linear regression were used to investigate the influence of WSCC administration on length of stay (LOS), operative rate (OR), and time to operation both within and between each institution's protocol.

Results: 287 patients were treated for SBO at two institutions (150 at Int1, 137 at Int2; median age 65 ± 16; 57% female). 61% (Int1 75 pts, Int2 95 pts) received a WSCC and 39% (Int1 70 pts, Int2 35 pts) underwent an operation. Both contrast agents decreased LOS (GG 6d vs 16d, p=.001; OP 4.5d vs 6d p=.69) and OR (GG 26% vs 74%, Odds Ratio 0.13 p<.0001; OP 16% vs 47%, Odds Ratio 0.21 p=.0002) as compared to those patients who did not get contrast. The time to operation was increased with use of either agent (GG 92hrs vs 22hrs p<.0001; OP 72hrs vs 40hrs p=.0004) but without an increase in small bowel resection rate. When comparing the WSCC agents there was not a significant difference between LOS, OR, or time to operation. There were significant differences between protocols in OR (Int1 50% vs Int2 26% p<.0001) and time to operation (Int1 46hrs vs Int2 41hrs p=.033).

Conclusions: Utilization of either contrast agent reduced length of stay and operative rates. We found significant differences in outcomes between protocols, but additional investigations are needed to determine the exact etiology of these results and optimize these protocols.



Institution 1: SBO Protocol Using Gastrografin (High Osmolar)



Institution 2: SBO protocol Using Omnipaque (Isosmolar)

Scientific Session IV-A

Paper #28
January 12, 2018
11:35 am

THE OPIOID EPIDEMIC IN ACUTE CARE SURGERY—CHARACTERISTICS OF OVERPRESCRIBING FOLLOWING LAPAROSCOPIC CHOLECYSTECTOMY

Kristine T. Hanson, MPH, Stephanie F. Polites, MD, Cornelius Thiels,
Martin D. Zielinski, MD, FACS*, Elizabeth B. Habermann, PhD
Mayo Clinic

Presenter: Kristine T. Hanson, MPH

Discussant: Jeffrey D. Kerby, MD, PhD, University of Alabama at Birmingham

Objectives: Postoperative prescribing must be optimized in emergency surgery patients to address the opioid epidemic as misuse is commonly preceded by a prescription for acute pain. The purpose of this study was to identify characteristics associated with higher opioid prescribing following laparoscopic cholecystectomy (LC).

Methods: Patients age ≥18 who underwent LC at a single institution 2014-2016 were identified. Opioids prescribed at discharge were converted to oral morphine equivalents (OME) and compared to CDC guidelines (200 OME). Preoperative opioid use was defined as any opioid prescription ≤90 days before LC. Univariate and multivariable methods determined characteristics associated with a top tertile opioid prescription.

Results: Of 1309 patients, 34% had an emergent LC and 66% were elective. Nearly all (96%) received opioids at discharge. Median OME was 225 (IQR 150-300), and 59% were prescribed above CDC guidelines. Top tertile prescriptions (≥300 OME) were more likely in patients age <50 (37% vs 31%, p=.04) but did not vary by sex (p=.41). Prescribing did not differ for patients with acute cholecystitis, biliary colic, and gallstone pancreatitis (p=.12). While median OME did not differ between emergent and elective LC (225, IQR 150-300 for both, p=.13) (Figure), emergent had more top tertile prescriptions (37% vs 31%, p=.04). However, preoperative opioid use was more likely in elective patients (15% vs 9%, p=.002). On multivariable analysis adjusting for diagnosis, age, and preoperative use, emergent status was not associated with top tertile prescription (Table). Refill rate was 7%.

Conclusions: Over half of patients undergoing LC were prescribed opioids in excess of CDC guidelines. Variation in prescribing patterns was not fully explained by patient factors. Acute care surgeons have an opportunity to optimize prescribing practices with the ultimate goal of reducing opioid misuse.

Figure. Opioid oral morphine equivalents (OME) prescribed at discharge following emergent vs elective laparoscopic cholecystectomy.

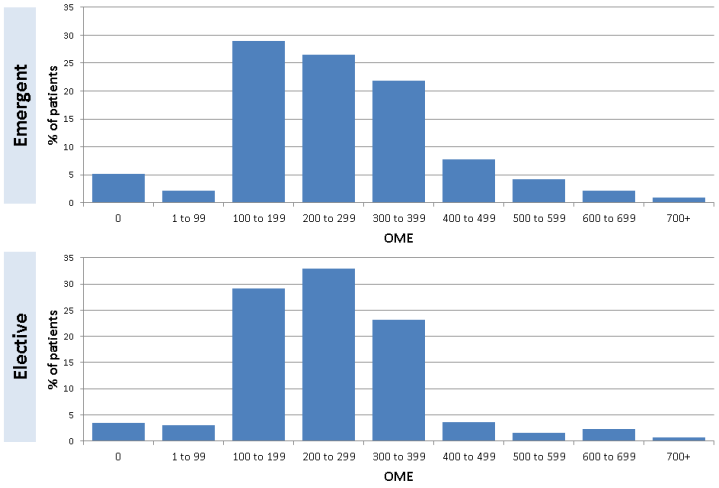


Figure. Opioid oral morphine equivalents (OME) prescribed at discharge following emergent vs elective laparoscopic cholecystectomy.

Table. Odds of a top tertile opioid prescription at discharge.

	OR	95% CI	p-value
Emergency Department Admission (Ref: no)			
Yes	1.24	0.93-1.64	0.15
Diagnosis (Ref: Acute Cholecystitis)			
Pancreatitis	1.35	0.91-2.03	0.14
Biliary colic/Other Biliary	0.94	0.70-1.26	0.67
Age (Ref: 50+ years)			
<50 years	1.26	0.98-1.60	0.05
Pre-operative Opioid Use (Ref: Naive)			
Pre-operative Use	1.38	0.99-1.93	0.06

Abbreviations: CI, Confidence Interval; OR, Odds Ratio.

Table. Odds of a top tertile opioid prescription at discharge.

Scientific Session IV-A

Paper #29
January 12, 2018
11:55 am

EAST MULTICENTER TRIAL ON TARGETED TEMPERATURE MANAGEMENT FOR HANGING-INDUCED CARDIAC ARREST

Cindy H. Hsu, MD, PhD*, Bryce E. Haac, MD, Roumen Vesselinov, PhD, Joseph A Kufera, MA, Mack D Drake, DO*, Andrew C. Bernard, MD*, Alberto Aiolfi, MD, Kenji Inaba, MD, Holly E Hinson, MD, MCR, Chinar Agarwal, MD, Joseph Galante, MD, Emily M Tibbits, M.D., Nicholas J. Johnson, MD, David Calbom, MD, Mina F. Mirhoseini, MD, Mayur B. Patel, MD, MPH, FACS*, Karen R. O'Bosky, MD, Christian Chan, MD, Pascal O. Udekwu, MD, MBA, MHA*, Megan Farrell, PhD, Jeffrey Wild, MD*, Katelyn Young, BS, Daniel C. Cullinane, MD*, Deborah J. Gojmerac, RN, Alexandra Weissman, MD, Clifton Callaway, MD, PhD, Imoigele P. Aisiku, MD, Raghu R. Seethala, MD, Ivan N. Co, MD, Debbie Y. Madhok, MD, Bryan Darger, MD, Dennis Y. Kim, MD, FRCSC, FACS, FCCP*, Lara Spence, MD, Thomas M. Scalea, MD, FACS, FCCM*, Deborah M. Stein, MD, MPH, FACS, FCCM*
R Adams Cowley Shock Trauma Center, University of Maryland School of Medicine

Presenter: Cindy H. Hsu, MD, PhD

Discussant: David T. Efron, MD, Johns Hopkins Hospital

Objectives: We sought to determine the outcome of suicidal hanging and the impact of targeted temperature management (TTM) on hanging-induced cardiac arrest (CA) through a multicenter retrospective study sponsored by Eastern Association for the Surgery of Trauma (EAST).

Methods: We collected patient demographics, CA variables, diagnostics studies, TTM metrics, and discharge outcome from January 1989 to December 2015. Cerebral performance category (CPC) score of 1 or 2 was considered good neurologic outcome, while CPC of 3 or 4 was considered poor outcome. Chi-square and ANOVA tests were performed for categorical and continuous variables, respectively.

Results: Total of 670 hanging patients from 16 centers were analyzed for this study. Their mean age was 34.6; 80.9% were male, and 70% were Caucasian. 192 patients (28.7%) including 20 dead on arrival suffered from CA. The CA patients had significantly higher Injury Severity Score (ISS), lower admission systolic blood pressure, more cerebral anoxia, and worse admission Glasgow Coma Score (GCS), survival, and neurologic outcome (Table 1). Of the 172 CA patients who survived to hospital admission, 80 (46.5%) received post-arrest TTM. Their unadjusted survival (23.8% vs 38%, p=0.04) and neurologic outcome (18.8% vs 35.9%, p=0.01) were worse than non-TTM CA patients (Table 2). However, after adjusting for admission GCS score of 3 to 8, differences between TTM vs non-TTM survival (23.8% vs 30.0%, p=0.37) and neurologic outcome (18.8% vs 28.8%, p=0.14) were not significant.

Conclusions: Hanging patients who suffered from CA had worse outcome than non-CA patients. CA patients who received post-arrest TTM had worse unadjusted survival and neurologic outcome than non-TTM patients, but these differences were not significant after adjusting for admission GCS score. Further analysis is necessary to determine TTM's role for the care of more severely injured hanging CA patients.

	CA (n=192)	Non-CA (n=478)	p-value
Age (Mean ± SD)	34.7 ± 13.4	34.6 ± 12.6	.90
Male, n (%)	156 (81.3)	386 (80.8)	.88
Caucasian, n (%)	140 (76.1)	329 (72.0)	.29
ISS (Mean ± SD)	16.6 ± 13.8	5.7 ± 6.5	<.001
Adm SBP (Mean ± SD)	125.3 ± 36.1	135.4 ± 23.7	<.001
Adm GCS, n (%)			<.001
3-8	180 (94.2)	209 (45.9)	
9-12	3 (1.6)	33 (7.3)	
13-15	8 (4.2)	213 (46.8)	
Cerebral anoxia, n (%)	108 (63.2)	56 (12.2)	<.001
Overall Survival, n (%)	54 (28.1)	461 (96.4)	<.001
Good neuro outcome, n (%)	48 (25.0)	450 (94.1)	<.001

Table 1: Characteristics of Cardiac Arrest and Non-Cardiac Arrest Hanging Patients

	TTM CA (n=80)	Non-TTM CA (n=92)	p-value
Age (Mean ± SD)	35.4 ± 12.7	34.9 ± 13.7	.81
Male, n (%)	65 (81.3)	75 (81.5)	.96
Caucasian, n (%)	63 (82.9)	66 (74.2)	.18
ISS (Mean ± SD)	17.6 ± 9.2	15.4 ± 13.4	.33
Adm SBP (Mean ± SD)	132.2 ± 35.9	118.8 ± 35.3	.02
Lowest SBP (Mean ± SD)	100.3 ± 24.7	96.2 ± 24.1	.30
Prehospital GCS, n (%)			.02
3-8	80 (100)	79 (92.9)	
13-15	0 (0)	6 (7.1)	
Adm GCS, n (%)			.006
3-8	80 (100)	80 (87.9)	
9-12	0 (0)	3 (3.3)	
13-15	0 (0)	8 (8.8)	
Admission laboratories (Mean ± SD)			
pH	7.2 ± 0.2	7.2 ± 0.2	.44
Base excess	-9.4 ± 5.7	-8.2 ± 6.3	.21
Lactate	7.6 ± 7.2	6.2 ± 4.2	.17
Cerebral anoxia, n (%)	52 (65.8)	55 (62.5)	.66
Overall Survival, n (%)	19 (23.8)	35 (38.0)	.04
Good neuro outcome, n (%)	15 (18.8)	33 (35.9)	.01

Table 2: TTM Versus Non-TTM Patient Characteristics and Outcome

Scientific Session IV-B

Paper #30
January 12, 2018
10:15 am

CONTEMPORARY UTILIZATION OF ZONE III REBOA FOR TEMPORARY CONTROL OF PELVIC AND LOWER JUNCTIONAL HEMORRHAGE RELIABLY ACHIEVES HEMODYNAMIC STABILITY IN SEVERELY INJURED PATIENTS

Jason Pasley, DO*, Megan Brenner, MD*, Amelia Pasley, DO*, Laura J. Moore, MD*, John B. Holcomb, MD*, Jeremy W. Cannon, MD, SM, FACS*, Mark J. Seamon, MD*, David J. Skarupa, MD, FACS*, Kenji Inaba, MD, Joseph Ibrahim, MD*, Nathaniel Poulin, MD*, Todd Rasmussen, MD, Thomas M. Scalea, MD, FACS, FCCM*, Joseph J. DuBose, MD*
R Adams Cowley Shock Trauma Center

Presenter: Joseph J. DuBose, MD

Discussant: Alistair Kent, MD, MPH, Johns Hopkins Hospital

Objectives: We utilized the AAST AORTA database to examine the contemporary utilization of distal (Zone 3) REBOA for management of traumatic pelvic and lower extremity junctional hemorrhage.

Methods: AORTA registry patients requiring Zone 3 REBOA from eight ACS Level 1 centers were examined. After excluding patients in arrest at time of AO, demographics, elements of treatment and outcomes were identified.

Results: From Nov 2013 – Dec 2016, 30 patients had Zone 3 REBOA (83.3% male; 96.7% injured by blunt mechanisms). Median age was 41.0 (IQR 38); median ISS 41.0 (IQR 12). Hypotension on admission (SBP < 90 mm Hg) was present in 30.0% and 53.3% had admission heart rate > 120 bpm. Median initial pH was 7.14 (IQR 0.22), and median admission lactate 9.9 mg/dL (IQR 5). Pelvic binders were utilized in 40%. Occlusion balloon devices included Coda™ (70%), ER-REBOA™ (13.3%), Reliant™ (10%); placed using plain film (50%); external landmarks (30%), fluoroscopy (16.7%), and ultrasound (3.3%). After REBOA, hemodynamics improved in 96.7% and stability (BP consistently > 90 mm Hg) was achieved in 86.7%. Median duration of REBOA was 53.0 mins (IQR 112). Median PRBC and FFP requirements were 19.0 units (IQR (17) and 17.0 units (IQR 14), respectively. One amputation unrelated to REBOA utilization was required. Systemic complications included AKI (23.3%) and MODS (10%). REBOA specific complications included groin hematoma (3.3%) and distal thromboembolization (16.7%). Survival to discharge was 56.7%, with in-hospital deaths occurring in the ED 7.7%, OR 23.1%, ICU 69.2%.

Conclusions: Zone III REBOA for early control of pelvic or junctional hemorrhage in patients in extremis provides hemodynamic stability sufficient to achieve definitive control in environments beyond the ED. Additional study is required determine optimal patient selection.

Scientific Session IV-B

Paper #31
January 12, 2018
10:35 am

OCCUPATIONAL EXPOSURE DURING EMERGENCY DEPARTMENT THORACOTOMY: A PROSPECTIVE, MULTI-INSTITUTION STUDY

Andrew Nunn, MD*, Priya Prakash, MD*, Kenji Inaba, MD, Alvarez Escalante, Zoë Maher, MD*, Seiji Yamaguchi, Dennis Y. Kim, MD, FRCSC, FACS, FCCP*, James Maciel, William C. Chiu, MD, FACS, FCCM*, Byron Drumheller, Joshua P. Hazelton, DO, FACS*, Kaushik Mukherjee, MD MSCI*, Xian Luo-Owen, Rachel M. Nygaard, PhD, Bryan C. Morse, MS, MD*, Caitlin A Fitzgerald, MD, Patrick L. Bosarge, MD*, Randeep S. Jawa, MD*, Susan E. Rowell, MD*, Louis J. Magnotti, MD*, Adrian W. Ong, MD*, Tejal S. Brahmbhatt, MD*, Michael D. Grossman, MD*, Mark J. Seamon, MD*
University of Pennsylvania

Presenter: Andrew Nunn, MD

Discussant: Jacques Mather, MD, MPH, University of Maryland Medical Center

Objectives: Occupational exposure (OE) is an important consideration during emergency department thoracotomy (EDT). While HIV/hepatitis prevalence in trauma patients (0-16.8%) and OE rates during operative trauma procedures (1.9-18.0%) have been reported, OE risk during EDT is unknown. We hypothesized that EDT OE risk would be greater than other operative trauma procedures.

Methods: A prospective, observational study at 16 US trauma centers was performed (2015-2016). All bedside EDT resuscitation providers were surveyed with a standardized data collection tool and risk factors analyzed with respect to the primary endpoint, EDT OE (percutaneous injury, mucous membrane, open wound, or eye splash). Provider, patient variables and outcomes were evaluated with single and multivariable logistic regression analyses.

Results: 1360 participants (23% attending, 59% trainee, 11% nurse, 7% other) were surveyed after 305 EDT (GSW 68%, prehospital CPR 57%, ED signs of life 37%) of which 15 patients survived (13 neurologically intact) their hospitalization. Overall, 22 OE were documented, resulting in an OE rate of 7.2% (95%CI; 4.7-10.5) per EDT and 1.6% (95%CI; 1.0-2.4) per participant. No differences in trauma center level, number of participants or hours worked were identified. Providers with OE were primarily trainees (68%) with percutaneous injuries (86%) during the thoracotomy (73%). Full precautions were utilized in only 46% of exposed providers (Figure). Multivariable logistic regression determined that each PPE item utilized correlated with 32% decreased OE risk (OR 0.68; 95%CI 0.52-0.88; p=0.004).

Conclusions: With 13 neurologically intact survivors and EDT OE rates that are *not* more common than previously reported operative trauma procedure OE rates, our results suggest that 1) OE should not deter providers from performing EDT and 2) improved universal precaution compliance would further minimize OE risk.

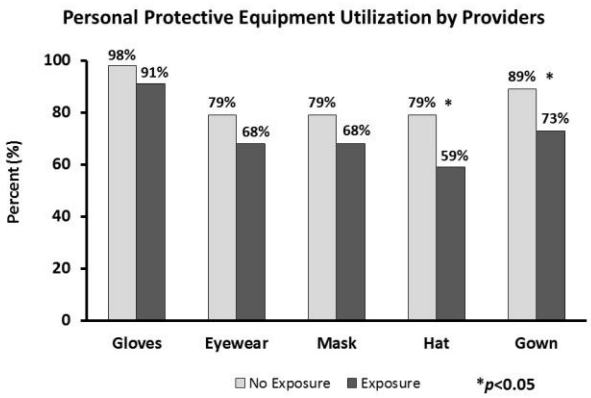


Figure: An itemized comparison of personal protective equipment utilized with respect to provider occupational exposure during EDT.

Scientific Session IV-B

Paper #32
January 12, 2018
10:55 am

FIT-TO-FLY? PREDICTING ADVERSE EVENTS IN SEVERE TRAUMATIC BRAIN INJURY

Christine L. Ramirez, MD*, Shiming Yang, PhD, Joseph Nehu Parimi, Peter Hu, PhD, Yao Li, Thomas M. Scalea, MD, FACS, FCCM*, Deborah M. Stein, MD, MPH, FACS, FCCM*
R Adams Cowley Shock Trauma Center, University of Maryland School of Medicine

Presenter: Christine L. Ramirez, MD

Discussant: Stephanie Streit, MD, United States Air Force

Objectives: In the battlefield, automated prediction of impending intracranial insults could assist with decision making regarding air evacuation to neurosurgical-capable facilities. This study aimed to test models of various data sources such as continuous vital sign (VS) monitoring and biomarkers to predict adverse intracranial pressure (ICP) changes in severe traumatic brain injury (TBI) prior to occurrence.

Methods: Patients with severe TBI were prospectively enrolled. Continuously measured VS and cytokine levels (CYT) were obtained on admission and every 6 hours for 72 hours. Systemic vital signs (SVS), such as blood pressure and heart rate, and intracerebral monitoring (ICM), such as ICP and cerebral perfusion pressure (CPP), were recorded. Boosting decision trees were used to rank the importance of SVS, ICM and CYT to predict four outcomes in the following 6 hours: (1)ICP>20 mmHg for >30 minutes, (2)ICP>30 mmHg for >15 minutes, (3)mean ICP>15 mmHg and (4)mean ICP>20 mmHg.

Results: 61 patients were prospectively enrolled. The mean age was 40±18.9 years and 78.7% were male. Median admission motor Glasgow Coma Score was 3, median Marshall Classification score was 3, and in-hospital mortality rate was 22.9%. The use of SVS alone had the lowest predictive ability (AUROC 72-84%, $p<0.01$). The use of CYT alone had a slightly higher AUROC of 83-84% ($p<0.01$). The use of SVS+ICM and SVS+ICM+CYT showed the prediction ability with an AUROC range of 86-92% and 87-90%, respectively (Fig.1). 10-fold cross-validation demonstrated that SVS+ICM models also had AUROCs of 79%-83% in unseen future data (Fig.2).

Conclusions: Prediction of impending adverse ICP events is possible and has the potential to inform expeditionary decision-making before emergency aircraft evacuation. SVS and/or cytokines carry some predictive value, but ICM appears to be the most direct predictor of the development of intracranial events.

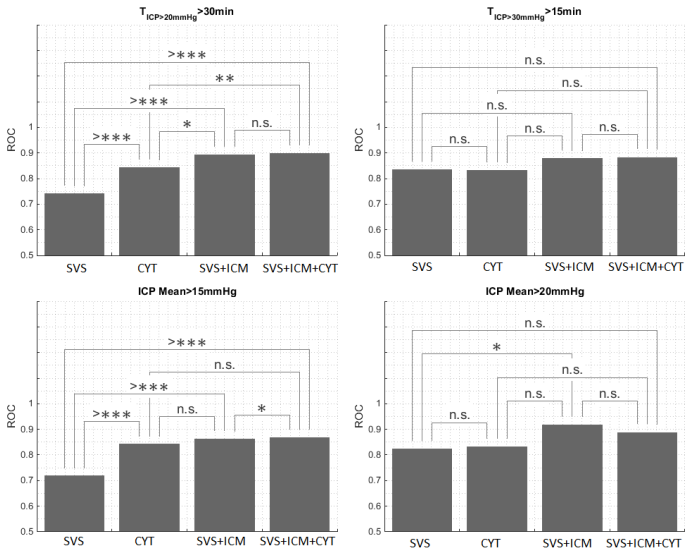


Fig. 1 AUROC values and comparison among different experiments. Models with ICM outperform other models in predicting adverse ICP changes.

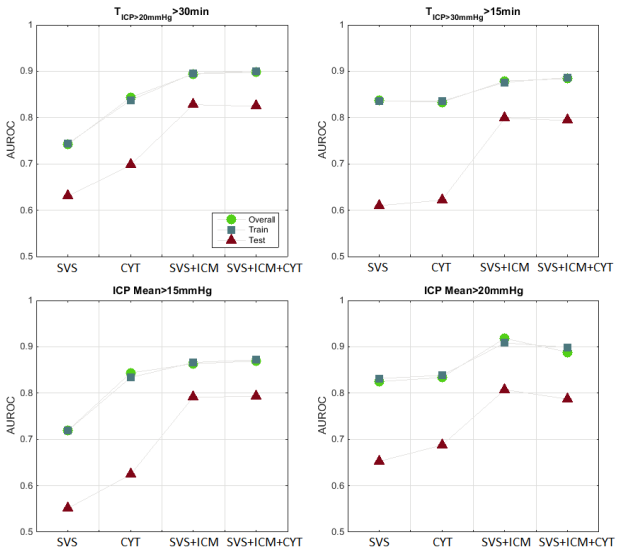


Fig. 2 Model performance evaluation with 10-fold cross-validation. overall (green), training (blue), and testing (red) show that models with ICM have higher AUROC and are more stable in predicting unseen new data.

Scientific Session IV-B

Paper #33
January 12, 2018
11:15 am

SUBSEQUENT LEARNING AND MEMORY RECOVERY IS DELAYED IF TBI IS ACCOMPANIED BY A CONCOMITANT BONE FRACTURE

Yujin Suto, MD, PhD, Katsuhiro Nagata, MD, Syed Ahmed, Kevin Browne, John Cognetti, Victoria Johnson, Ryan Leone, Lewis J. Kaplan, MD, FACS, FCCM, FCCP*, Douglas Smith, Jose L. Pascual, MD, PhD, FRCS(C), FACS, FCCM*
University of Pennsylvania

Presenter: Yujin Suto, MD, PhD

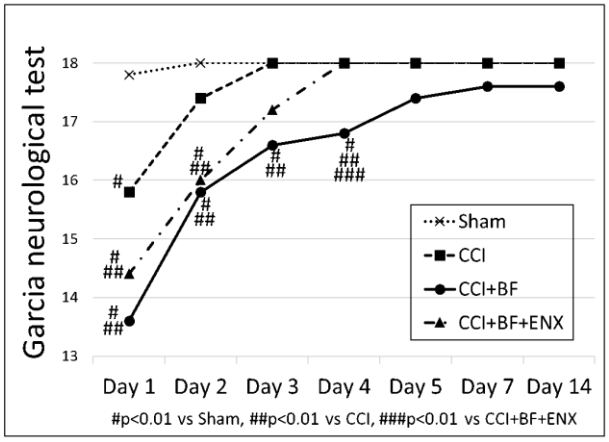
Discussant: Deborah M. Stein, MD, MPH, R Adams Cowley Shock Trauma Center

Objectives: Cognitive recovery from severe TBI is primarily affected by the severity of the initial cerebral injury but it is unknown if a concomitant bone fracture (BF) affects this recovery. Enoxaparin (ENX) after TBI decreases cerebral penumbral neutrophil mobilization and may slow progression of secondary brain injury. We hypothesized that: 1) a concomitant BF worsens learning/memory recovery after TBI and, 2) ENX improves recovery.

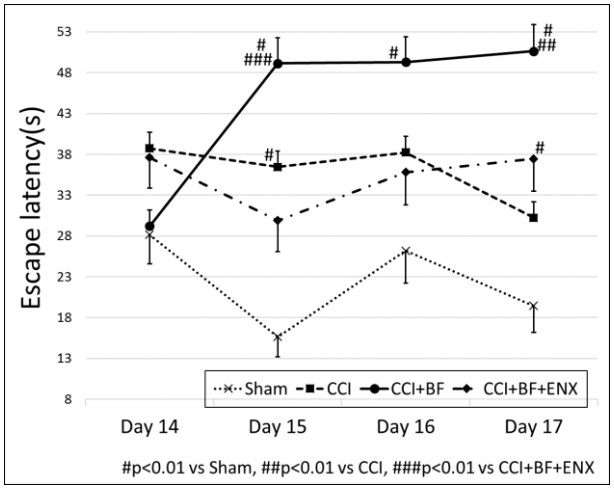
Methods: CD1 male mice underwent TBI (controlled cortical impact - CCI: velocity=6m/sec, depth=1.0mm) or sham craniotomy +/- tibial fracture, receiving either ENX (0.8mg/kg, 1time/day) or saline for 14 days after injury. Randomization defined 4 groups (Sham, CCI, CCI+BF, CCI+BF+ENX, n=5/each). Body weight loss ratio and neurological recovery (Garcia Neurological Test [GNT], max score=18) were assessed each day. Mouse learning (swimming time [s] to reach the platform day 14-17 after TBI) and memory (swimming time [s] in platform quadrant after platform removed [probe]) was assessed by the Morris Water Maze. ANOVA & Tukey's post-hoc test determined significance ($p<0.05$).

Results: Compared to CCI alone, a BF worsened GNT scores on days 2-4 after TBI, and ENX corrected this worsening on day 4 (Fig.1). Learning the position of the submerged platform was significantly slower in CCI+BF (50.7+3.3s) than CCI alone (30.2+3.8, $p=0.001$) (Fig2). This was despite similar swimming velocities (23.7+1.3m/s vs. 24.2+1.8, $p>0.05$) in both groups, indicating intact extremity motor function. Memory (probe trial, d 17) was greatest in Sham (22.7+4.1s), similar to CCI alone (19.4+1.6) but significantly better than CCI+BF (8.6+2.2, $p=0.047$). Body weight loss ratio was significantly greater in CCI+BF than Sham (d 2-5) ($p<0.01$).

Conclusions: A long bone fracture accompanying TBI worsens early neurological recovery and subsequent learning/memory ability. ENX may improve neurological recovery.



As compared to CCI alone, as measured by the Garcia Neurological Test, neurological recovery on days 1 through 4 was significantly worse if CCI was accompanied by a bone fracture.



Morris Water Maze Escape Latency (swimming time taken by mice to reach the submerged platform, i.e.: learning) was greatest in CCI+BF animals and significantly worse than CCI alone animals on day 17. (Mean +/- SEM).

Scientific Session IV-B

Paper #34
January 12, 2018
11:35 am

THE RUSH TO PRE-HOSPITAL CERVICAL SPINE CLEARANCE: ARE WE AT BREAKNECK SPEED?

Robert Laskowski, MD, PhD*, Randeep S. Jawa, MD*, Jane E. McCormack, RN, BSN*, Emily Huang, MS, James A. Vosswinkel, MD*, Neeta D Chaudhary, MD, PhD*
Stony Brook University Medical Center

Presenter: Robert Laskowski, MD, PhD

Discussant: Alicia R. Privette, MD, Medical University of South Carolina

Objectives: To review clinical outcomes of pre-hospital cervical collar clearance protocols 6 years after implementation at a suburban Level 1 Trauma Center.

Methods: The institutional trauma registry was queried retrospectively for pre-hospital spine immobilization and presence of cervical spine injury in adult patients admitted after sustaining blunt trauma from 2011-2016. Univariate and multivariate logistic regression analyses were performed.

Results: A total of 5,127 patients were included for analysis. The incidence of cervical spine injury remained steady (range: 8.3-9.2%) over the study period. The rate of pre-hospital cervical immobilization decreased from 53.5% in 2011 to 35.0% in 2016. The incidence of cervical spine injuries among patients presenting without cervical immobilization increased from 3.8% (2011) to 5.7% (2016); this represents a decrease in sensitivity of the pre-hospital cervical clearance protocols from 80.3% to 58.2% over this period. 14.5% of patients with cervical spine injury presenting without immobilization had a Cervical Spine AIS >/=3; 18.5% had multi-system injuries (i.e. AIS >/=3). Risk factors for inappropriate pre-hospital cervical clearance in the presence of cervical spine injury included fall mechanism (OR=2.80, $p<0.001$), increased age (mean age of 60.7 years vs 51.3 years, $p<0.001$), lower ISS (mean ISS 14.7 vs 19.6, $p>0.001$), functional dependence (OR= 7.00, $p<0.001$), dementia (OR 3.68, $p=0.001$), and co-morbidities >/=2 (OR 2.46, $p<0.001$).

Conclusions: The increased rate of inappropriate pre-hospital cervical spine clearance in frail, elderly patients calls into question the applicability of current pre-hospital cervical immobilization protocols to this patient population. Even in the settings of low ISS and low energy mechanisms of injury, missed cervical spine injuries may be catastrophic.

Scientific Session IV-B

Paper #35
January 12, 2018
11:55 am

IMPLEMENTING A CALL BACK PROGRAM IN THE TRAUMA POPULATION

Jennifer Bath, MSN, RN, AGCNS-BC, CEN, TCRN*, Daniel Freeman, Mariana Salamoun, Andrea Wright, Mark E. Hamill, MD FACS FCCM*, Katie M. Love, MD*, Daniel I Lollar, MD*, Bryan R. Collier, DO FACS*
Carilion Roanoke Memorial Hospital

Presenter: Jennifer Bath, MSN, RN, AGCNS-BC, CEN, TCRN

Discussant: Lisa Gray, BSN, MHA, RN, CPN, St. Vincent Evansville

Objectives: After hospital discharge, trauma care is fragmented potentially leading to unplanned readmissions. We hypothesize a post-discharge call back protocol would be associated with lower unplanned readmission rates.

Methods: A trauma registry retrospective analysis was performed from 10/12 to 09/16. A post discharge call back protocol was created in 10/14. Attempts to reach the patient were initially made ~72 hours post discharge. Call time and patient comments were recorded. Pre and post intervention group comparisons were analyzed for age, ISS, HLOS, and unplanned readmission. Chi-Square Test and Independent T-Test were used to assess categorical and continuous variables.

Results: 9117 admissions were analyzed; 4470 in the pre-intervention group and 4647 in the post-intervention group. The two groups did not differ by age or HLOS. The pre-intervention group had a higher ISS (11.7 v 10.3; $p<0.001$). 17.7% of the patients in the post intervention group were reached, with an average of 5.8+2.9 minutes per phone call, equating to approximately a 0.2 FTE. 97.4% of unsolicited patient feedback regarding the quality of care was deemed excellent. Comparing 2013 (pre-intervention) with 2016 (mature intervention) groups, there was a decrease in the readmission rate (1.42% vs. 0.81%; $p=0.04$). Those patients who suffered a readmission had a higher ISS (14.9 v 10.4; $p<0.01$), a longer HLOS (9.3d v 4.7d; $p<0.01$), and were more likely to have been discharged to a facility with medical oversight (37.4% v 26.7%; $p=0.03$).

Conclusions: A post trauma discharge call back program of approximately 2500 admissions/year requires a 0.2 FTE position. A decreased unplanned readmission rate is associated with a mature call back system despite a low rate of contact. Feedback regarding quality of care can be readily available. A call back program can be made more efficient if driven by ISS, HLOS, and discharge disposition.

Quick Shots Parallel Session I

Quick Shot Paper #1
January 10, 2018
4:30 pm

EXCESS SODIUM IS DELETERIOUS TO ENDOTHELIAL AND GLYCOCALYX BARRIER FUNCTION: A MICROFLUIDIC STUDY

Jonathan Martin, MD, David Liberati, MS, Lawrence N. Diebel, MD*
Wayne State University

Presenter: Jonathan Martin, MD

Objectives: Preclinical studies suggest a role for the administration of hypertonic saline solutions (HSS) after traumatic injury with shock. However clinical trials of HSS have failed to demonstrate significant benefits of HSS for shock resuscitation; further it may result in hypocoagulopathy and hyperfibrinolysis. The mechanism is uncertain. Excess sodium has been found to be detrimental in other clinical entities, which may be due to enhanced inflammatory signaling and damage to the endothelial cell (EC) glycocalyx. The endotheliopathy of trauma (EOT) is an important component of the acute coagulopathy of trauma. Principal drivers include tissue hypoperfusion, sympathoadrenal activation, inflammation, and hyperfibrinolysis. The effect of hypernatremia on the EOT is uncertain. Microfluidic technology has been used to study coagulation and endothelial cell biology *in vitro* and was used to compare the effects of hypernatremia on the endothelium under flow conditions.

Methods: Microfluidic channels lined with human umbilical vein endothelial cells (HUVEC) were exposed to hypoxia/reoxygenation (H/R) and epinephrine (EPI) for 60 minutes. HUVEC were then treated with a perfusate with sodium concentration to simulate post HSS infusion values. Microfluidic perfusate was sampled for hyaluronic acid (HA) and syndecan-1 (glycocalyx degradation), soluble thrombomodulin (TM) (EC activation/injury); tPA (tissue-plasminogen activator) and PAI-1 (plasminogen activator inhibitor-1) (coagulation phenotype).

Results: See table

Conclusions: Sodium at concentrations consistent with post HSS resuscitation result in glycocalyx degradation, endothelial injury/activation and a profibrinolytic phenotype. This was apparent in control and HUVEC cells under "shock" conditions. However the resultant effects were more profound in the "shock" HUVEC group and suggest HSS may have deleterious effects in traumatic shock resuscitation.

Mean ± SD, N = 5

	HA (ng/ml)	Syndecan-1 (ng/ml)	TM (pg/ml)	tPA (pg/ml)	PAI-1 (pg/ml)
HUVEC control (Na^+ 134 mEq)	11.6 ± 1.5	26.1 ± 4.8	26.1 ± 2.5	1596 ± 45.4	5948 ± 103.8
150 mEq Na^+	37.8 ± 3.8*	58.3 ± 3.9*	64.4 ± 3.4*	2740 ± 56.1*	5456 ± 47.9*
160 mEq Na^+	56.0 ± 3.4*	67.4 ± 2.9*	73.4 ± 2.4*	2922 ± 56.6*	5090 ± 63.6*
HUVEC+HR+EPI	74.1 ± 2.9*	94.6 ± 7.1*	105.2 ± 5.1*	3686 ± 33.7*	4887 ± 202.7*
HR+EPI+150 mEq Na^+	96.6 ± 2.9*#	105.6 ± 4.0*	168.7 ± 1.7*#	3963 ± 52.4*#	4620 ± 90.6*
HR+EPI+160 mEq Na^+	120.9 ± 2.7#	114.4 ± 5.8*#	196.7 ± 5.4*#	4418 ± 184.4*#	4568 ± 196.2*

*$p < 0.01$ vs. HUVEC control, #$p < 0.01$ vs. HUVEC + HR + EPI

Quick Shots Parallel Session I

Quick Shot Paper #2
January 10, 2018
4:36 pm

HYPOBARIA DURING LONG RANGE FLIGHT RESULTED IN SIGNIFICANTLY INCREASED HISTOPATHOLOGICAL EVIDENCE OF LUNG AND BRAIN DAMAGE IN A SWINE MODEL

Debra L. Malone, MD*, Ashraful Haque, Michelle Jefferson, Lam Thuy Vi Tran Ho, Saha Biswajit, Steve Chun, MD, Kirk Blackmoore, Neda Ilieva, Charles Auker, Richard McCarron, Anke H Scultetus, MD
Naval Medical Research Center

Presenter: Debra L. Malone, MD

Objectives: Precipitous aeromedical evacuation (AE) of combat casualties to definitive care is current practice. However, there is a dearth of knowledge about the effects of hypobaria during flight on injured patients. We investigated possible effects of hypobaria during AE on organ damage in a swine model. Data of a subgroup analysis of uninjured animals is presented here.

Methods: Anesthetized swine were instrumented for invasive neurological and physiological monitoring. A 4 hour AE flight was simulated in a hypobaric chamber with atmospheric pressure equivalent to an altitude of 8,000 ft. (HYPO, n=6). Control animals were kept at normobaric conditions (NORMO, n=6). Animals were then euthanized and histopathological analysis of lung, kidney and brain tissues stained with H&E was performed.

Results: There were no significant differences in physiological and neurological parameters between the groups over time. Organ damage was assessed by combined scores for hemorrhage, inflammation, edema, necrosis and microatelectasis (lungs only), and was significantly worse in HYPO animals compared to NORMO in lungs ($p< 0.0001$) and brain ($p=0.0439$). There were no differences between groups in the kidneys.

Conclusions: This swine model of 4 hour simulated AE resulted in significant increase in histopathological damage to lungs and brain compared to normobaric controls. This suggests that hypobaria has an adverse effect on tissues specifically lung and brain, and therefore may complicate transport of combat casualties. The findings also indicate that healthy passengers may be affected by prolonged hypobaria. Further studies are indicated to elucidate theses effects, simulate other AE scenarios and assess the effects of hypobaria on injured animals.

Quick Shots Parallel Session I

Quick Shot Paper #3
January 10, 2018
4:42 pm

LOCATION IS EVERYTHING: THE HEMODYNAMIC EFFECTS OF REBOA IN ZONE 1 VERSUS ZONE 3 OF THE AORTA

Emily M. Tibbits, MD, Guillaume Hoareau, Meryl Simon, Anders J. Davidson, MD, Erik DeSoucy, Robert Faulconer, MBChB MRCS, Joseph J. DuBose, MD*, J. Kevin Grayson, Timothy Williams, M. Austin Johnson, MD
David Grant Medical Center

Presenter: Emily M. Tibbits, MD

Objectives: Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) assists in augmenting proximal blood pressure during resuscitation of patients with non-compressible torso hemorrhage. The choice of aortic placement, zone 1 versus zone 3, depends upon injury patterns, but remains highly debated. We sought to compare proximal hemodynamic support provided by Zone 1 versus Zone 3 REBOA placement, and degree of hemodynamic instability upon reperfusion following it.

Methods: Eighteen anesthetized swine underwent controlled hemorrhage of 25% blood volume, followed by 45 minutes of Zone 1 REBOA, Zone 3 REBOA, or no intervention (control). They were then resuscitated with shed blood, balloons were deflated, and 5 hours of critical care ensued prior to euthanasia. Physiologic parameters were recorded continuously, and blood was drawn for analysis at specified intervals. Significance was defined as $p<0.05$.

Results: There were no differences in physiologic data at baseline or during the initial 30 minutes of hemorrhage. During the intervention, average proximal MAP was significantly higher in Zone 1 animals when compared to Zone 3 animals (127.9?1.3mmHg versus 53.4±1.1mmHg), and both were higher than control animals (42.9±0.9mmHg). In the hour after reperfusion, average pMAP was lower in Zone 1 animals than Zone 3 animals (57.3±1.9mmHg vs. 69.1±0.3mmHg). Both were lower than control (72.1±0.4mmHg). Peak lactate was higher in Zone 1 animals (9.6±0.4mmol/L) when compared to Zone 3 animals (5.1±0.3mmol/L) and control animals (4.2 ±0.8mmol/L).

Conclusions: In our model of hemorrhagic shock, Zone 3 REBOA provided hemodynamic support, but to a lesser degree than Zone 1, with less ischemic burden and instability on reperfusion. In cases of impending hemodynamic collapse, Zone 1 REBOA may be more efficacious regardless of injury pattern, while Zone 3 should be reserved for relatively stable patients with distal hemorrhage.

Quick Shots Parallel Session I

Quick Shot Paper #4
January 10, 2018
4:48 pm

INCREASE IN NEUTROPHIL/LYMPHOCYTE RATIO IS ASSOCIATED WITH EVOLUTION OF HEMORRHAGE AFTER TBI

Margo N. Carlin, DO, Alireza Daneshpajouh, DO, Joseph D. Catino, MD*,
Charles DiMaggio, Spiros Frangos, MD, Marko Bukur, MD*
Delray Medical Center, Delray Beach, Florida

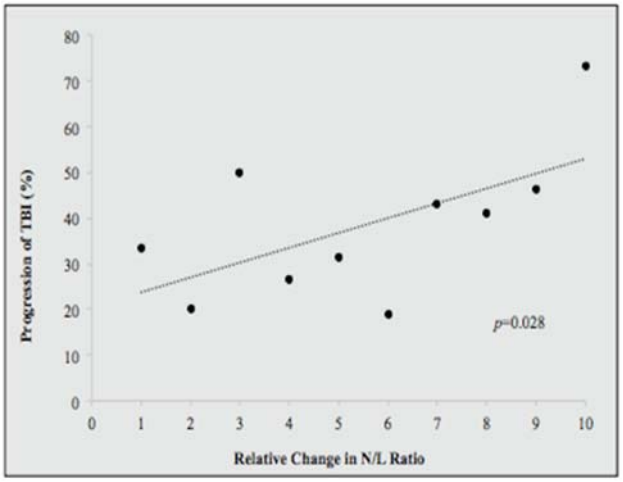
Presenter: Margo N. Carlin, DO

Objectives: The Neutrophil/Lymphocyte Ratio (NLR) is a marker of inflammation associated with adverse outcomes in the critically ill. Its impact in Traumatic Brain Injury (TBI) is unknown. We hypothesized increased NLR would predict progression of TBI on serial imaging. Secondary outcomes were effect of NLR on need for craniotomy and in-hospital mortality.

Methods: A retrospective study included isolated TBI patients admitted to a Level I Trauma Center from 2014-16 with sequential CT Head (CTH) imaging and blood work upon admission and day 1. Those with Head AIS of 6 or withdrawal of care within 24 hours were excluded. Worsening of TBI was determined by official radiology report. Patients were dichotomized by change in NLR; demographic, physiologic, intervention, and outcomes abstracted from the registry. Logistic regression determined effect of NLR on outcomes.

Results: 154 patients met inclusion criteria. 65.6% were Caucasian males over 65 injured by ground level falls. 53.9 % had increased NLR with mean N/L increase of 6.5 (SD 7.9) compared to patients exhibiting decreased or no change (Mean -4.9, SD 6.1; $p < 0.001$) in NLR. Patients with increased NLR had a higher ISS (Median 18 IQR [9,25] vs. 16 IQR [9,25], $p = 0.027$) and more subdural hematomas (80.7% vs. 66.2%, $p = 0.04$). Progression on CTH was noted in 44.6% with increased NLR (vs. 31.4% without positive change, $p = 0.09$), and decreased GCS in 48.2%. Adjusting for ISS, TBI, and GCS change, NLR was associated with a 5% increased risk for TBI progression per point increase in NLR (30% overall increased risk, $p = 0.028$). Craniotomy (42.2% vs. 29.6%, $p = 0.105$) and in-hospital mortality (26.5% vs. 16.9%, $p = 0.152$) were not different regardless of change in NLR.

Conclusions: Increased NLR is associated with TBI progression on sequential imaging. This ratio derived from routine labs may permit risk stratification of TBI patients and should be examined prospectively.



Relative Change in N/L Ratio vs Percent Progression of TBI

Quick Shots Parallel Session I

Quick Shot Paper #5
January 10, 2018
4:54 pm

FRAILTY SCREENING AND A FRAILTY PATHWAY DECREASE LENGTH OF STAY, LOSS OF INDEPENDENCE, AND 30-DAY READMISSION RATES IN FRAIL TRAUMA AND EMERGENCY GENERAL SURGERY PATIENTS

Kathryn E. Engelhardt, MD, Quentin Reuter, Jonathan Frederick Bean, M.D.*, Joliette Barnum, Michael B. Shapiro, MD*, Allison Ambre, Amanda Dunbar, Mara Markzon, Tara Reddy, Christing Schilling, Joseph Posluszny
Northwestern University

Presenter: Kathryn E. Engelhardt, MD

Objectives: Frail geriatric trauma and emergency general surgery (TEGS) patients have higher rates of complications, longer lengths of stay (LOS) and less frequent discharges to home when compared to non-frail geriatric patients. Despite this, there have been no studies reported that improve outcomes for frail TEGS patients. The objective of this quality improvement (QI) project was to develop a screening program, using the TEGS-Specific Frailty Index and implement a novel frailty pathway to reduce LOS, LOI and 30-day readmission rates.

Methods: This was a before-after study of a prospective cohort of all geriatric patients admitted to the TEGS service from 10/2016-5/2017. After 3 months of screening to obtain baseline outcome measures (pre-intervention), both frailty screening and implementation of the frailty pathway were implemented (*Fig 1*). Non-parametric statistical tests were used to assess significant differences in continuous variables; chi-squared and Fisher's exact were used for categorical variables, where appropriate.

Results: Of 153 geriatric TEGS patients screened, 47 (31%) were frail. All TEGS geriatric patients were screened within 24 hours of admission. Following frailty pathway implementation, median length of stay decreased from 8.5 to 6 days (p=0.67), readmissions decreased from 36.4% to 14.7% (p=0.19), and loss of independence decreased by 37%, (100% vs 63.6%; p=0.02; *Fig 2*). Outcomes for non-frail geriatric patients did not differ between cohorts.

Conclusions: Screening for frailty and a frailty pathway decreased LOS, LOI and 30 day readmission rates for frail TEGS patients. This pathway shifted available resources toward frail patients, without negatively affecting outcomes in other geriatric TEGS patients. Implementation of this pathway with larger patient cohorts and in varied settings is needed to confirm our findings.

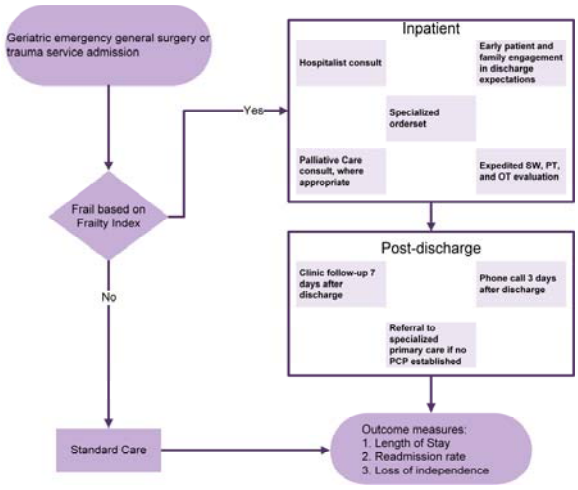


Figure 1: Novel, multidisciplinary clinical pathway for frail patients admitted to the emergency general surgery and trauma service

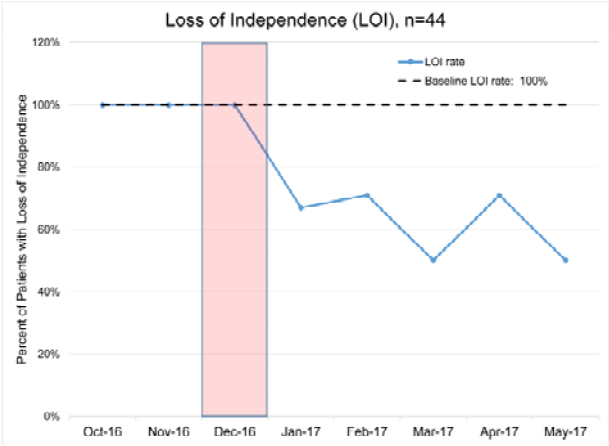


Figure 2: Run chart showing trend in loss of independence by month.
The intervention was implemented mid-December, 2016

Quick Shots Parallel Session I

Quick Shot Paper #6
January 10, 2018
5:00 pm

PIC SCORE: AN EFFECTIVE TOOL TO GUIDE MANAGEMENT OF BLUNT CHEST WALL INJURY (ANALYSIS OF THE FIRST TWO YEARS OF APPLICATION AT A LEVEL I TRAUMA CENTER)

Shawn M. Terry, MD, FACS*, Kimberly A. Shoff, BSN, RN, CCRN
WellSpan -- York Hospital

Presenter: Shawn M. Terry, MD, FACS

Objectives: Blunt chest wall injury patient outcomes were identified to be unsatisfactory based on trauma program process improvement review. A novel, comprehensive treatment plan involving a power plan protocol (PIC Protocol) and rating scale (PIC Score) was developed and deployed as a strategic intervention. We hypothesize that application of this protocol will improve outcomes from blunt chest wall injury at our institution.

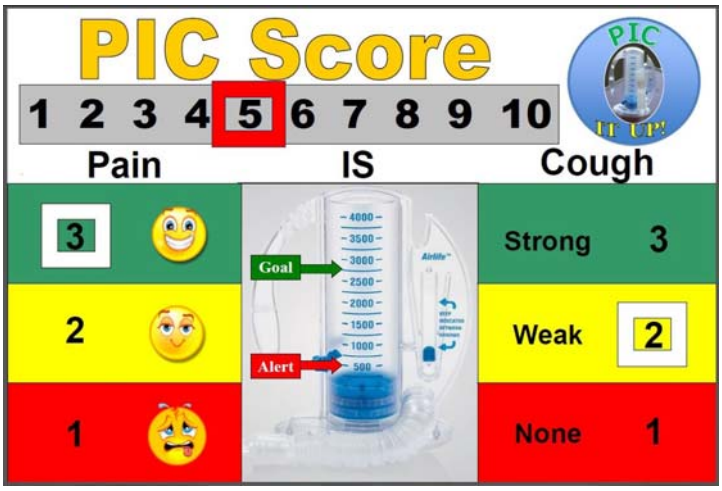
Methods: Retrospective trauma registry and electronic medical record queries at a Level I Trauma Center for 2 years following protocol initiation (2014-2015) for non-intubated chest wall injury patients were conducted and compared to outcomes recorded from 2 years prior to protocol development (2012-2013). Independent-sample t tests were performed to assess differences between groups for measurement variables. Chi Squares tests were performed to assess relationships between categorical variables of interest.

Results: Compliance with protocol was 100% (533/533 pts). Unanticipated transfer to higher level of care for respiratory decline was significantly reduced from 4% to 0.37% (p=0.0022). Patients requiring transfer to higher level of care were successfully predicted by an acute fall in PIC score of 2 points. No unpredicted patient care escalations related to declining pulmonary function occurred post PIC protocol (0/533) compared to prior study period (24/501). No significant increase in ICU or hospital length of stay was incurred.

Conclusions: Application of institution-developed PIC Protocol Chest Wall Injury Initiative improved patient outcomes for non-intubated chest wall injury patients without increasing time in the ICU or the hospital. The PIC Protocol Assessment Tool Score was demonstrated to have predictive value in assessment of declining respiratory function and need for patient transfer to higher level of care.

	PIC		
	No PIC Control Group	PIC Group	
	Mean	Mean	P value
Age	58.5	58	0.709
ISS	12.8	13.2	0.491
Time in ED	171.4	169.2	0.819
ICU LOS	1.2	1.4	0.365
Vent Days	0.8	0.8	0.958
LOS	5.2	5.2	0.803

Comparison data derived from pre- and post- PIC Protocol initiation for blunt chest wall injury patients.



Magnetized patient scoring, education, and communication tool board created for bedside use. Composite **PIC** score (range 3-10) derived from total for each column score:
Pain, **I**ncentive Spirometer Volume achieved, **C**ough.

Quick Shots Parallel Session I

Quick Shot Paper #7
January 10, 2018
5:06 pm

HEALTH LITERACY AND QUALITY OF PHYSICIAN-TRAUMA PATIENT COMMUNICATION: OPPORTUNITY FOR IMPROVEMENT

Jonathan Dameworth, MD, Jordan V Jacobs, MD, Pamela Goslar, Terrell Thompson,
Dana Stout, Thomas Gillespie, Scott Petersen,
St. Joseph's Hospital and Medical Center

Presenter: Jonathan Dameworth, MD

Objectives: Although physician-patient communication and health literacy (HL) have been studied in diverse patient groups, little research has focused on trauma patients. The purpose of this study was to evaluate trauma patient ratings of the quality of physician-patient communication during hospitalization and how this varies by HL.

Methods: Level 1 trauma center patients were interviewed during hospitalization (Aug 2016-Jan2017). Short Assessment of Health Literacy (SAHL) tool was used to stratify subjects by deficient vs. adequate HL. Interpersonal Processes of Care (IPC) survey was administered to assess perception of physician-patient communication. This survey allowed patients to rate physician-patient interaction across 6 domains: "clarity," "elicited concerns," "explained results," "worked together (on decision making)," "compassion and respect," and "lack of discrimination by race/ethnicity." Each is scored on a 5-point scale. Frequencies of "top-box" (5/5) scores were compared for significance ($p<0.05$) between HL-deficient and HL-adequate patients.

Results: 199 patients participated. Average age was 42, 33% female, and median ISS 10. 49 patients (25%) had deficient HL. Comparison of patients with deficient vs. adequate HL with respect to IPC top-box scores is demonstrated in Figure 1. The majority of patients in both groups rated communication below 5/5 across most domains. HL-deficient patients were consistently less likely to give physicians top-box scores, most notably in the "elicited concerns" domain.

Conclusions: HL-deficient patients appear relatively less satisfied with physician communication, particularly with respect to perceiving that their concerns are being heard. Overall, however, the majority of patients in both groups were unlikely to score physician communication in the "top box." Efforts to improve physician-trauma patient communication are warranted, with attention directed toward meeting the needs of HL-deficient patients.

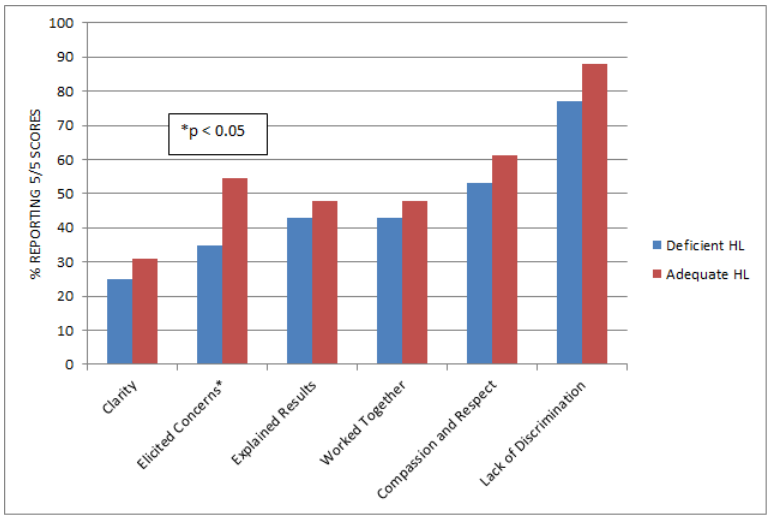


Figure 1. Proportion of "top box" scores across IPC survey domains, stratified by HL group.

Quick Shots Parallel Session I

Quick Shot Paper #8
January 10, 2018
5:12 pm

INCREASED TRAUMA ACTIVATION IS NOT EQUALLY BENEFICIAL FOR ALL ELDERLY TRAUMA PATIENTS

Bryan Carr, MD, Peter M Hammer, MD*, Grace S. Rozycki, MD, MBA, FACS*,
David V. Feliciano, MD, FACS*, Jamie J. Coleman, MD, FACS*
Indiana University

Presenter: Bryan Carr, MD

Objectives: Physiologic changes in the elderly lead to higher morbidity and mortality after injury. Increasing the level of trauma activation for has been proposed to improve geriatric outcomes; but, the increased cost to the patient and stress to the hospital system are significant downsides. The purpose of this study was to identify the age at which an increase in activation status is beneficial.

Methods: A retrospective review of trauma patients = 70 years old from October 1, 2011, to October 1, 2016 was performed. On October 1, 2013, a policy change increased the activation criteria to the highest level for patients = 70 years of age with a significant mechanism of injury. Patients who presented prior to (PRE) were compared to those after the change (POST). Data collected included age, injury severity score (ISS), length of stay (LOS), complications and mortality. Primary outcome was mortality and secondary outcome was LOS. Multivariable regressions controlled for age, ISS, injury mechanism, and number of complications.

Results: 4363 patients were included in the study, 1921 in PRE (mean age 80.4, mean ISS 11.6) and 2442 in POST (mean age 81, mean ISS 12.5). After adjusting for injury mechanism, LOS and number of complications, there was no significant difference in age ($p=0.053$) or ISS ($p=0.820$) between PRE and POST. POST had more level 1 activations (712 vs. 221, $p<0.001$). After multivariable logistic regression analysis, a significant reduction in mortality occurred in the POST group = 77 of age (OR 0.53, 95% CI: 0.3-0.87), figure 1. LOS started to decrease significantly in the POST group at age 78 (regression coefficient -0.55, 95% CI: -1.09-0.01), figure 2.

Conclusions: This study suggests that geriatric trauma patients = 77 years benefit from the highest level of trauma activation with a shorter LOS and lower mortality. A focused approach to increasing activation level for elderly patients may decrease patient cost.

Figure 1:

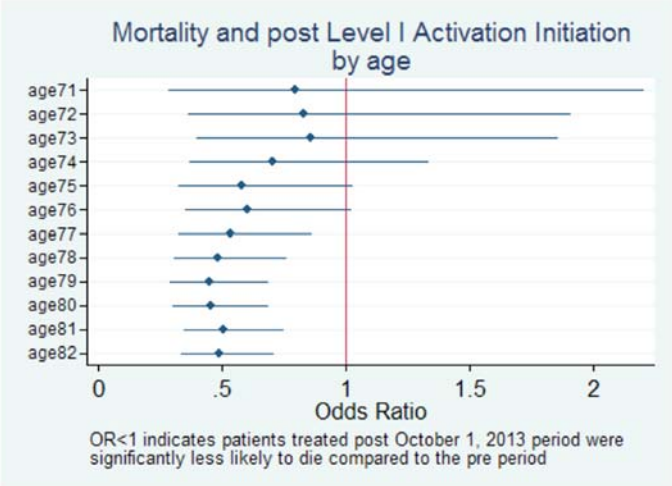
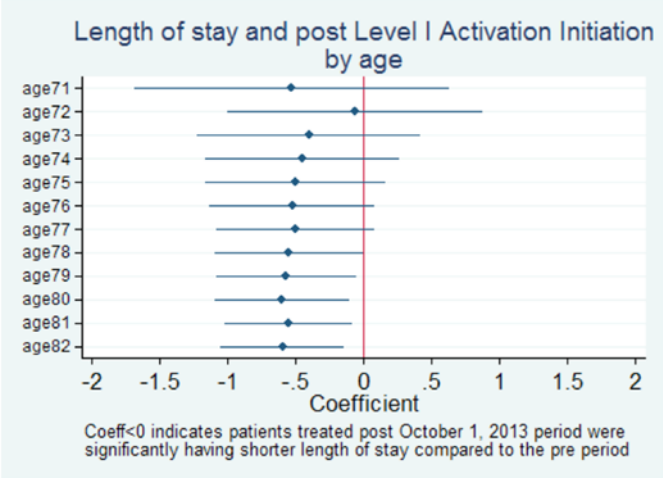


Figure 2:



Quick Shots Parallel Session I

Quick Shot Paper #9
January 10, 2018
5:18 pm

THE UTILITY OF ADDITIONAL IMAGING IN TRAUMA CONSULTS WITH MILD TO MODERATE INJURY AFTER INITIAL ED WORKUP

Andrew L. Plaster, BS, Bryan R. Collier, DO FACS*, Daniel Freeman, Daniel I. Lollar, MD*, Katie M. Love, MD*, Andrew Benson, Michael S Nussbaum, Mark E. Hamill, MD FACS FCCM*
Virginia Tech Carilion School of Medicine

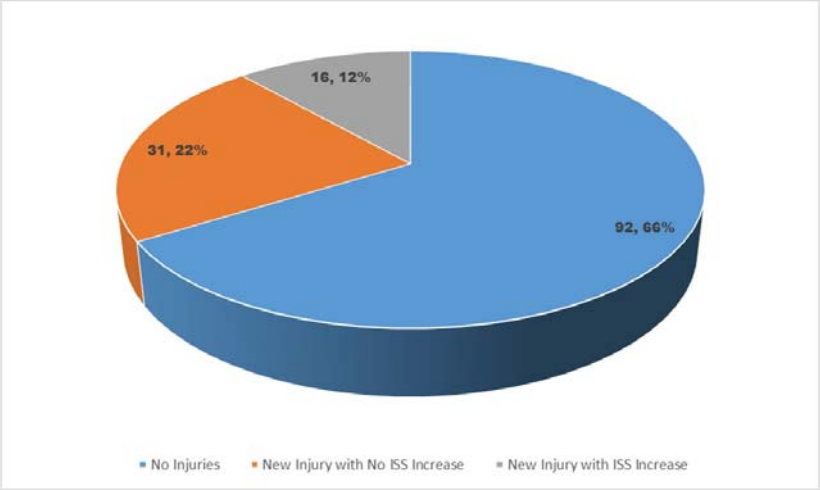
Presenter: Andrew L. Plaster, BS

Objectives: Limiting CT imaging in the ED has gained interest recently. However, following trauma consultation in the ED, additional CT imaging is frequently ordered. We sought to determine the benefits of additional imaging after initial workup by the ED. Hypothesis: Additional imaging in trauma patients results in the diagnosis of new significant injuries that will change the treatment plan and raise the Injury Severity Score (ISS).

Methods: The trauma registry at our level 1 trauma center was queried from November 2015 to November 2016 for trauma consults initially evaluated by ED physicians. Patients with mild to moderate injuries were included. Injury findings before and after additional imaging were determined by chart review and a pre and post imaging ISS was calculated for patients with new injuries. Blinded trauma surgeons reviewed the findings to assess for clinical significance and changes in treatment.

Results: 421 patients were evaluated, with 140 (33%) undergoing additional CT imaging. 47 (34%) had additional injuries found, with 16 (12%) increasing their ISS with a mean change of 0.536 (SD 1.658) - significant by Wilcoxon test (N'16, W=136.0). After physician review, 93% of cases resulted in at least one physician finding the new injuries clinically significant; however, agreement between the reviewers was low (κ =0.0948). For 70%, at least one physician felt the findings resulted in a change in treatment plan (κ =0.4047).

Conclusions: Attempts to minimize imaging for trauma consultations resulted in additional imaging for one third of our patient sample resulting in identification of a considerable number of new injuries. This suggests that current efforts to limit the use of CT imaging in trauma patients may result in significant injuries going undiscovered and under-treated. Further research is needed to determine the risk versus benefit of attempts to limit imaging in this population.



Frequency of new injuries and ISS increase after additional imaging

Quick Shots Parallel Session I

Quick Shot Paper #10
January 10, 2018
5:24 pm

BENCHMARKING EMERGENCY DEPARTMENT THORACOTOMY: USING TRAUMA VIDEO REVIEW TO GENERATE PROCEDURAL NORMS

Ryan P. Dumas, MD Kristen Chreiman, BSN, Matthew Goldshore, Mark J. Seamon, MD*,
Jeremy W. Cannon, MD, SM, FACS*, Patrick M. Reilly, MD*, Jason Christie, Daniel N. Holena, MD MSCE*
University of Pennsylvania

Presenter: Ryan P. Dumas, MD

Objectives: Emergency department thoracotomy (EDT) must be rapid and well-executed. Currently there are no defined benchmarks for EDT procedural milestones. We hypothesized that trauma video review (TVR) can be used to define the "normative EDT" and generate procedural benchmarks. As a secondary aim, we used these benchmarks to classify EDTs performed at our center.

Methods: We used high-definition, continuously recording video to review all EDTs from 4/2016-2/2017. Using skin incision as procedure start time, we defined four procedural milestones for EDT: 1.) time to chest entry (defined as completion of retractor deployment) 2.) time to right chest decompression 3.) time to pericardiotomy and 4.) time to aortic cross-clamp. A benchmark was defined as the 75th percentile of time from skin incision to each milestone. EDTs with any milestone time exceeding the 75th percentile were identified as outliers.

Results: 30 EDTs were performed during the study period. Patients had a median age of 31(IQR 29-49) and were predominantly African-American (96%) males (93%) with penetrating trauma (93%). From skin incision median times in seconds to milestones were as follows: left chest entry 66.5(IQR 58-105), right chest decompression 129(IQR 38-170), pericardiotomy 142.5(IQR 113-204.5), aortic cross-clamp 242.5(IQR 170-340). Procedural milestones can be seen in Figure 1. In total, 19/30 (63%) of EDTs were high outliers for one or more benchmarks.

Conclusions: Video review can be used to define normative times for the procedural milestones of EDT. Steps exceeding the 75th percentile of time were common, with over half of EDTs having at least one milestone as an outlier. Future work should seek to determine if minimizing procedural technical outliers improves patient outcomes.

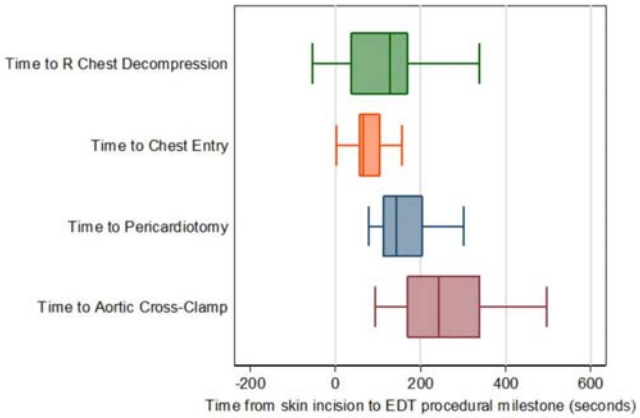


Figure 1

Quick Shots Parallel Session II
Quick Shot Paper #11
January 10, 2018
4:30 pm

EXPANDING TRAUMA FRAILTY STRATIFICATION: THE ARE-FIT SCORE

Margaret H. Lauerman, MD*, Maxwell Raithel, Joseph A. Kufera, MA,
Kathirkamanthan Shanmuganathan, Brandon Bruns, MD, FACS*,
Thomas M. Scalea, MD, FACS, FCCM*, Deborah M. Stein, MD, MPH, FACS, FCCM*,
R Adams Cowley Shock Trauma Center, University of Maryland School of Medicine

Presenter: Margaret H. Lauerman, MD

Objectives: Multiple clinical and computerized tomography (CT) frailty markers exist with unclear utility. Limitations include younger patients, who are often excluded from evaluation of frailty markers, and critically ill patients, who cannot participate in questionnaires or physical testing often required. Our objective was to develop a more singularly applicable marker of frailty than is currently available.

Methods: We reviewed restrained drivers with airbag deployment aged 40 years and greater over a 6 year period. Eight CT markers of frailty were measured, including variables novel to trauma patients. Outlying quartiles or terciles (depending on normality and breakpoints) were used to indicate “frail” status. A value of 1 was assigned for “frail” and 0 for “non-frail” for CT markers, with these 8 values summed to calculate the Advanced Radiographic Evaluation of Frailty in Trauma (ARE-FIT) score. The primary outcome was a composite variable of disposition, with “good” disposition to acute rehabilitation or home, and “poor” to all other locations.

Results: Overall 489 patients were included, with 49 having poor disposition (10.0%). Cerebral atrophy, cervical spine calcification, renal volume, sarcopenia, osteopenia, and sarcopenic obesity were normally distributed, and emphysema and vascular calcifications non-normal. Receiver operating characteristic (ROC) curve analysis had a Youden’s Index of 0.26 and $p<0.001$ at an ARE-FIT of 3. In multivariate logistic regression, ARE-FIT of 3 or greater ($p=0.03$) was statistically associated with disposition following adjustment for GCS ($p=0.003$), ISS ($p<0.001$), sex ($p=0.02$), and blood pressure ($p=0.002$). Age 60 years and greater was not associated with disposition.

Conclusions: The ARE-FIT score can be used in critically ill and younger frail patients, and is a more universally applicable assessment of frailty in injured patients than currently used measures.

Quick Shots Parallel Session II

Quick Shot Paper #12
January 10, 2018
4:36 pm

OVERTRIAGE FROM PROXIMAL PENETRATING EXTREMITY INJURIES

Grace E. Martin, MD, Heng He, Amy Makley, MD*, Timothy A. Pritts, MD, PhD*, Joel B. Elterman, MD*, Jay A. Johannigman, MD*, Michael Goodman, MD*
University of Cincinnati

Presenter: Grace E. Martin, MD

Objectives: Penetrating injuries to the extremity proximal to the elbow or knee are anatomic criteria for full trauma team activation by ACS COT standards. This criterion lacks evidence-based support. Overtriage of trauma team activation may result in excessive costs and resource burden at trauma centers. We hypothesized that full trauma team activation for penetrating injuries to the proximal extremities by anatomic criteria alone may lead to significant overtriage.

Methods: We completed a 3-year retrospective review (2013-2015) of all patients evaluated at a Level I trauma center with isolated penetrating extremity injuries. Data included the number and criteria of trauma team activations, ISS, injury characteristics, and disposition. Overtriage was defined as full trauma team activation for an ISS = 15, with a goal rate <50%.

Results: We identified 6335 total trauma team activations with 809 isolated penetrating extremity injuries. Of the highest level activations, 388/488 (79.5%) were for injuries proximal to the joint. Within this subgroup, 81% of patients were discharged from the ED with a median ISS = 1 and no additional intervention. Only 6.7% underwent immediate and 10% underwent delayed operative intervention. Disposition to the OR was more common for upper extremity (14.4%) compared to lower extremity (7.7%, $p < 0.05$) full trauma activations. By comparison, 21% of all full and 5.8% of all limited trauma activations underwent immediate operative intervention during the 3 year period. Of the 388 full trauma activations, only one had an ISS 15, resulting in a 99.7% overtriage rate.

Conclusions: Penetrating injuries to the extremities are common in urban trauma centers. Highest level trauma team activation based on anatomic, rather than physiologic, criteria may lead to a significant overtriage rate. Further distinction in level of trauma team activation may be made based on upper vs. lower extremity injury or hard signs of neurovascular injury.

Quick Shots Parallel Session II

Quick Shot Paper #13
January 10, 2018
4:42 pm

THE MAGIC NUMBER: ARE IMPROVED OUTCOMES OBSERVED AT TRAUMA CENTERS WITH UNDERTRIAGE RATES BELOW 5 PERCENT?

Eric H. Bradburn, DO, MS, FACS*, Brian Gross, Alan D Cook, MD*, Madison Morgan, Danielle Von Nieda, Kameron Durante, John Paul Ellis, Frederick Rogers, MD, MS, FACS*
Lancaster General Health/Penn Medicine

Presenter: Eric H. Bradburn, DO, MS, FACS

Objectives: The American College of Surgeons Committee on Trauma (ACSCOT) advises trauma centers maintain less than 5 percent undertriage, however provides limited rationale for this guideline. We sought to determine whether patients managed at trauma centers with <5% undertriage had improved outcomes compared to centers with >5% undertraige. We hypothesized that similar adjusted mortality would be observed at centers in Pennsylvania regardless of their compliance with ACSCOT undertriage recommendation.

Methods: The Pennsylvania Trauma Outcome Study database was retrospectively queried for all patients managed at accredited trauma centers with a minimum of 350 admissions per year from 2003-2015. Patients missing Injury Severity Score (ISS) and/or Trauma Activation status data were excluded from analysis. Institutional undertriage rates were calculated for all trauma centers based on ACSCOT criteria (ISS≥15; no Trauma Activation) and were categorized into <5% or >5% subgroups. A multilevel mixed-effects logistic regression model assessed the adjusted impact of management at centers with <5% undertriage. Statistical significance was set at $p<0.05$.

Results: A total of 437,452 patients from 30 centers met inclusion criteria. Institutional undertriage rates ranged from 0.28% to 15.5%, with 15 centers exhibiting undertriage rates <5% and 15 centers >5%. No significant difference in unadjusted mortality rate was observed between subgroups (<5% undertriage: 4.67%; >5% undertriage: 3.85%; p=0.246). In adjusted analysis, no difference in mortality was found for patients managed at centers with <5% undertriage compared to those with >5% undertriage (AOR: 1.22; 95% CI: 0.99-1.50; p=0.060).

Conclusions: Achieving the <5% undertriage standard may have limited impact on overall institutional trauma patient outcome. Further research should seek to identify new triage criteria by which to hold trauma centers accountable.

		Mortality
Variable	AOR (95% CI)	*p*
Undertriage <5%	1.22 (0.99-1.50)	0.060
Age	1.04 (1.04-1.04)	<0.001
Systolic Blood Pressure	0.97 (0.97-0.97)	<0.001
Injury Severity Score	1.10 (1.10-1.11)	<0.001
Injury Year	0.99 (0.99-1.00)	0.001
		AUROC: 0.89

Table 1. Adjusted odds ratios for mortality for centers with an undertriage rate <5% versus >5%

Quick Shots Parallel Session II

Quick Shot Paper #14
January 10, 2018
4:48 pm

THE COMBINED UTILITY OF EFAST AND CXR IN BLUNT THORACIC TRAUMA

Morgan Schellenberg, MD MPH, Kenji Inaba, MD, James M. Bardes, MD*, Nicholas Orozco,
Jessica Chen, Caroline Park, Demetrios Demetriades
LAC+USC Medical Center

Presenter: Morgan Schellenberg, MD MPH

Objectives: Portable chest xray (CXR) and Extended FAST (EFAST) screen patients for thoracic injury in the trauma bay. It is unclear if one test alone is sufficient or if the two investigations are complementary. The study objective was to define the diagnostic yield of EFAST and CXR among stable blunt thoracic trauma patients.

Methods: In this retrospective study, all blunt trauma patients =15 years admitted to our Level I trauma center in 2016 were screened. Only patients who underwent CT Thorax were included. Patients were excluded if they presented >24h after injury or were transferred. Demographics, physical exam (PEx) of the thorax, injury data, investigations, procedures, and outcomes were abstracted. EFAST, CXR, and PEx findings were compared to the gold standard of CT Thorax to calculate the diagnostic yield of each investigation and combinations thereof in the assessment for clinically significant thoracic injury (requiring chest tube, operative intervention, or endovascular procedure).

Results: 1724 patients were enrolled. Mean age was 44 years (range 15-100). Most common mechanisms of injury were motor vehicle collision (n=517,30%), auto vs pedestrian (n=484,28%), and fall (n=393,23%). Mean ISS was 11 (1-75), with mean AIS Chest 1.6 (1-6). 1355 (79%) underwent EFAST and 1344 (78%) underwent CXR. The diagnostic yields are shown in Table 1. Injuries missed using a combination of EFAST+CXR were pneumothoraces (n=37, 12% of all pneumothoraces), hemothoraces (n=20,20%), and aortic injuries (n=3,30%).

Conclusions: EFAST+CXR together have a sensitivity of only 58% and miss clinically significant pneumothoraces, hemothoraces, and aortic injuries. Even in conjunction with the physical exam, the sensitivity of EFAST+CXR is low. Therefore, the majority of blunt trauma patients who are admitted to hospital require CT scan for further evaluation of potential injury as EFAST,CXR, and PEx are insufficient to rule out clinically significant injuries.

	Sensitivity	Specificity	PPV	NPV
EFAST alone	0.42	0.99	0.74	0.97
CXR alone	0.88	0.81	0.24	0.99
EFAST+CXR	0.58	0.80	0.25	0.94
EFAST+CXR+PEx	0.76	0.67	0.17	0.97

Table 1. Diagnostic Yield of Tests for Thoracic Injury.
CXR*, chest* xray. EFAST*, Extended Focused* Sonography *for the Assessment of Trauma.* PEx*, physical exam of the thorax.* PPV*, positive predictive value.* NPV*, negative predictive value.*

Quick Shots Parallel Session II

Quick Shot Paper #15
January 10, 2018
4:54 pm

CAN TRAUMA SURGEONS KEEP UP? A COMPARISON OF OUTCOMES BETWEEN PATIENTS CARED FOR IN A TRAUMA-ICU VERSUS A DEDICATED NEURO-ICU

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University of Texas Health Science Center at Houston

Presenter: Derek Roberts, MD, PhD

Objectives: To compare outcomes between severe TBI patients managed in a Trauma-ICU and those managed in a Neuro-ICU.

Methods: A prospective study was conducted on patients admitted directly to an ICU between 05/2015 and 12/2016. Blunt trauma patients with CT-evidence of brain injury who were 18 years of age and older were included. Patients were dichotomized by ICU to which they were admitted; Trauma-ICU or Neuro-ICU. The Trauma-ICU is staffed primarily by Trauma Surgeons also involved in ICU care, whereas Neuro-intensivist trained physicians staff the Neuro-ICU. Continuous values are expressed as median (IQR) and comparisons were performed using the Wilcoxon rank-sum test. Categorical values are expressed as proportions and were tested using chi-squared or Fisher's exact tests. Finally, a purposeful logistic regression model was developed to evaluate predictors of mortality.

Results: 548 patients were included (207 Trauma-ICU, 341 Neuro-ICU). While Trauma-ICU patients were younger (median age 44 vs. 57) and less likely to have comorbidities (13 vs. 22%), they were more likely to have high-speed mechanism (71 vs. 34%) and higher ISS (median 25 vs. 16) when compared to Neuro-ICU admissions; all $p<0.05$. On admission, Trauma-ICU patients were more likely have fixed or unequal pupils, and lower GCS-motor exam (median 3 vs. 6); $p<0.05$. While the rate of pneumonia was higher in Trauma-ICU patients (17 vs. 11%; $p=0.03$), there were no differences in urinary tract infections, venous thromboembolic complications, or sepsis. Univariate analysis also noted that 30-day mortality was higher in the Trauma-ICU (22% vs 12%; $p<0.001$). However, multivariate regression demonstrated that Trauma-ICU admission was associated with a 70% reduction in mortality (TABLE).

Conclusions: Despite higher ISS and poorer initial neurologic exam, Trauma-ICU admission is associated with a 70% reduction in 30-day mortality.

	Odds ratio	95% C.I.	p-value
Admitted to Trauma-ICU	0.30	0.11-0.82	0.019
Age in years	1.01	0.98-1.03	0.268
Injury severity score (ISS)	1.12	1.07-1.18	<0.001
High-speed mechanism of injury	0.96	0.35-2.69	0.942
Field intubation	4.99	1.91-12.99	0.001
Fixed or unequal admission pupils	2.87	1.10-7.49	0.031

Multivariate regression model predicting 30-day mortality

Quick Shots Parallel Session II

Quick Shot Paper #16
January 10, 2018
5:00 pm

NATIONWIDE COMPARISON OF INFECTIOUS COMPLICATIONS AFTER BLUNT SPLENIC INJURY

Rishi Rattan, MD*, Joshua Parreco, MD*, Olubode A Olufajo, MD, MPH,
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University of Miami Miller School of Medicine

Presenter: Rishi Rattan, MD

Objectives: As non-operative management (NOM) of blunt splenic injury (BSI) increases, understanding risks, especially infectious complications, becomes more important. Our previous work found that over 1 in 4 post-trauma readmissions in the US occur at a different hospital with infection the most common reason. No national BSI infectious outcomes studies tracking readmissions across hospitals exist. We sought to compare nationwide BSI outcomes by also capturing readmissions to different hospitals.

Methods: The Nationwide Readmissions Database for 2013-2014 was queried for patients 18-64 years old admitted non-electively with a primary diagnosis of BSI. Surgical site infections, pneumonia, urinary tract infections, and sepsis were identified in 3 groups: NOM, splenic artery embolization (SAE), and operative management (OM). Infection rates were quantified during admission, and 30-day and 1-year readmissions. Multivariable logistic regression was performed. Results were weighted for national estimates.

Results: Of the 15,140 patients admitted for BSI, 54% underwent NOM, 12% SAE, and 34% OM. SAE had higher rates of infectious complications compared to NOM, with 20% incidence at 1 year. OM had higher rates of infectious complications compared to NOM and SAE (Table 1). Predictors of infectious complications at 1 year included: hospital stay >4 days, not being discharged home, SAE, and Charlson Comorbidity Index >1. Protective factors included private insurance (OR 0.69 [0.61-0.79], $p<0.01$) (Table 2).

Conclusions: In the first national study of BSI outcomes capturing different hospital readmission, BSI treated with SAE is at increased risk of infectious complications. Despite splenic preservation, surgeons should be aware that SAE has a significant infectious complication rate when making treatment decisions. Post-splenectomy infections also remain a significant cause of morbidity after trauma and require aggressive preventive management.

Table 1. Incidence of infectious complications after blunt splenic injury, comparing splenic artery embolization (SAE) to nonoperative management (NOM) and operative management (OM) to both NOM and SAE.

Outcome (%)*	NOM	SAE	OM
Infection during index admission	5.3	15.0	18.9
Splenic abscess during index admission	0.7	1.4	1.7**
Sepsis during index admission	0.6	2.4	5.0
30-day readmission for infection	6.4	18.3	22.5
30-day readmission for splenic abscess	1.3	3.5	2.1
30-day readmission for sepsis	0.9	3.2	6.4
1-year infection	7.8	20.4	23.7
1-year readmission for splenic abscess	1.6	5.3	2.2
1-year readmission for sepsis	1.5	3.6	6.9

* - $p < 0.01$ except where noted

** - not significantly different from SAE incidence (p=0.03)

Table 1. Incidence of infectious complications after blunt splenic injury, comparing splenic artery embolization (SAE) to nonoperative management (NOM) and operative management (OM) to both NOM and SAE.

Table 2. Risk factors for infectious complications after blunt splenic injury.

		Within 30 d after injury				Within 1 y after injury			
Characteristic		OR	95% CI		p	OR	95% CI		p
NOM									
SAE		1.65	1.38	1.96	<0.01	1.63	1.38	1.93	<0.01
OM		1.46	1.27	1.69	<0.01	1.37	1.20	1.57	<0.01
Age group	45-64	0.98	0.88	1.10	0.76	1.00	0.90	1.12	0.99
Female		1.37	1.22	1.54	<0.01	1.39	1.25	1.55	<0.01
Median household income national quartile for patient ZIP Code	$1 - $37,999								
	$38,000 - $47,999	0.79	0.68	0.91	<0.01	0.82	0.72	0.94	0.01
	$48,000 - $63,999	0.92	0.80	1.07	0.29	0.93	0.81	1.07	0.33
	$64,000 or more	0.83	0.70	0.98	0.03	0.81	0.69	0.95	0.01
Insurance type	Public								
	Private	0.72	0.63	0.82	<0.01	0.69	0.61	0.79	<0.01
	Self-pay	1.04	0.87	1.24	0.68	1.00	0.85	1.18	0.99
	Other	0.87	0.73	1.05	0.16	0.82	0.68	0.98	0.03
Injury severity score	<9								
	9-15	0.61	0.50	0.74	<0.01	0.58	0.48	0.70	<0.01
	16-24	0.66	0.55	0.79	<0.01	0.65	0.55	0.77	<0.01
	>25	0.66	0.55	0.79	<0.01	0.69	0.58	0.83	<0.01
Injury grade	I/II								
	III/IV	0.97	0.83	1.13	0.69	0.80	0.70	0.92	<0.01
	V	1.08	0.87	1.34	0.49	0.85	0.69	1.04	0.11
Length of stay (days)	<4								
	4-7	2.79	2.32	3.36	<0.01	2.33	1.97	2.74	<0.01
	>7	12.88	10.66	15.56	<0.01	10.53	8.88	12.50	<0.01
Charlson comorbidity index >1		1.53	1.28	1.83	<0.01	1.81	1.53	2.15	<0.01
Discharge disposition	Home								
	SNF, ICF, Others	2.74	2.36	3.19	<0.01	2.58	2.23	2.99	<0.01
	Home Health	1.58	1.32	1.89	<0.01	1.53	1.29	1.82	<0.01
	AMA	2.17	1.41	3.33	<0.01	2.19	1.47	3.25	<0.01

Table 2. Risk factors for infectious complications after blunt splenic injury. NOM: non-operative management. SAE: splenic artery embolization. OM: operative management.

Quick Shots Parallel Session II

Quick Shot Paper #17
January 10, 2018
5:06 pm

ARE TEG ASSAYS INTERCHANGEABLE? A COMPARISON OF RAPID AND KAOLIN THROMBELASTOGRAPHY IN MASSIVE TRANSFUSION PATIENTS

James Turbett, MBBS, BSc, John R. Taylor, III, MD, Jessica Cardenas,
Charles E. Wade, PhD, William Beck, MD*, Bryan A. Cotton, MD, MPH
South Thames Hospital/University College London

Presenter: James Turbett, MBBS, BSc

Objectives: To compare the correlation of RapidTEG® (rTEG) and standard kaolin TEG (kTEG) values in injured patients receiving massive transfusion (MT). In addition, we set out to identify kTEG transfusion thresholds by cut-point analysis against published rTEG thresholds.

Methods: A prospective study was conducted on consecutive trauma patients predicted to receive MT. Both rTEG and kTEG were obtained on arrival. Pearson and Spearman's rank correlation coefficients, along with Bland-Altman plots, were determined for matching TEG parameters (rTEG ACT was compared to kTEG R-value). Area under the receiver operating characteristics curve (AUROC) of each kTEG parameter was assessed at published rTEG thresholds. Optimal kTEG cut-offs were determined by maximum Youden's index and minimum distance to the upper left of ROC space.

Results: 113 patients were included with median age 36, 58% white, 65% blunt, and 82% male. The median ISS was 29, with median ABC score of 2, and 24-hour and 30-day mortalities of 14% and 25%, respectively. There were strong linear correlations for MA (0.70) and LY30 (0.86), and moderate correlations for ACT/kTEG R-value (0.31), K-time (0.49) and alpha-angle (0.52); all $p<0.001$. kTEG AUROC ranged from 0.67 for R-value (at ACT ≥128s) to 0.86 for LY30 (at rTEG LY30 ≥5%). Optimal kTEG cut-points were: R ≥4.5min, K ≥2.1min, alpha ≤66.7°, MA ≤59.8mm and LY30 ≥5.2%.

Conclusions: Assessment of the discriminative performance of kTEG at published rTEG thresholds provides a more clinically relevant measure of assay interoperability than correlation strength. We have identified kTEG thresholds to accompany existing, evidence-based rTEG thresholds for goal-directed resuscitation of injured patients. Our results indicate that substitution of rTEG with kTEG is possible but undesirable, due to suboptimal agreement between the assays.

	Established rTEG cut-points	Proposed kTEG cut-points	Sensitivity	Specificity	AUROC
ACT/R-value	≥ 128 s	≥ 4.5 min	0.52	0.81	0.67
K-time	≥ 2.5 min	≥ 2.1 min	0.70	0.85	0.83
α-angle	≤ 60°	≤ 61.2°	0.73	0.83	0.82
	≤ 65°	≤ 66.7°	0.96	0.67	0.83
MA	≤ 55 mm	≤ 59.8 mm	0.86	0.73	0.83
LY-30	≥ 3 %	≥ 1.1 %	0.69	0.79	0.76
	≥ 5 %	≥ 5.2 %	0.71	0.93	0.86

Comparison of rTEG and kTEG cut-points

Quick Shots Parallel Session II

Quick Shot Paper #18
January 10, 2018
5:12 pm

CERVICAL SPINE FRACTURES IN GERIATRIC BLUNT TRAUMA: IS NEXUS ENOUGH?

Katelyn Young, BS, Christie Buonpane, James T. Dove, BA, Marie Hunsinger, Mohsen Shabahang, Joseph Blansfield, Denise Torres, James S. Gregory, MD*, Jeffrey Wild, MD*
Geisinger Medical Center

Presenter: Katelyn Young, BS

Objectives: The NEXUS criteria are the prevailing standard to identify potential cervical spine fracture (CF) in need of imaging in alert trauma patients. This guideline, however, relies exclusively on physical exam, lacking any consideration of patient age. This study characterizes NEXUS sensitivity for clinically significant CF in young (<65 years) and old patients (≥65 years).

Methods: This was a retrospective review of alert, stable blunt trauma patients (≥18 years, GCS 15) who presented to one Level I trauma center (1/1/2011 - 12/31/2016) with an acute CF. Significant CF was limited to injury requiring surgery or cervicothoracic orthosis, excluding bracing for comfort.

Results: In total, 999 patients had spine fracture with 413 sustaining CF. The studied population consisted of CF patients with complete NEXUS documentation (388 patients). From this population, 353 patients had significant CF, and 101 of those with significant injury (28.6%) presented without neck pain and denied tenderness to palpation (TTP).

Among the 353 patients with significant CF, 191 patients were young (<65 years). While 63 of these patients (33.0%) denied neck pain and TTP, only six failed to meet any of the remaining NEXUS criteria, revealing a sensitivity of 96.8% (95%CI: 94.4-99.5; Table 1).

The remaining 162 patients were old (≥65 years), and 38 (23.4%) were asymptomatic. Seventeen of these patients failed to meet any of the remaining NEXUS criteria, revealing a sensitivity of 89.5% (95%CI: 84.8–94.2). Thus, NEXUS sensitivity was significantly reduced in older compared to younger patients (89.5 vs 96.8%, $p<0.01$).

Conclusions: Alarmingly, 28.6% of patients with significant CF had no subjective pain or tenderness on exam. NEXUS criteria had an appropriately high sensitivity with younger patients. In geriatric trauma, however, NEXUS sensitivity was significantly reduced and liberal imaging should therefore be utilized in this patient population.

	Young Patients (Age<65) N=6		Older Patients (Age≥65) N=17	
	n	%	n	%
Mechanism				
MVC	2	33.3%	2	11.8%
MVC with Ejection	1	16.7%	0	-
Unenclosed Vehicle	1	16.7%	1	5.9%
Fall, Height	1	16.7%	1	5.9%
Fall, Ground Level	0	-	13	76.5%
Crushed Torso	1	16.7%	0	-
Level[1]				
C1	1	16.7%	6	35.3%
C2	0	-	2	11.8%
Odontoid Process	0	-	3	17.6%
C3	1	16.7%	1	5.9%
C4	2	33.3%	1	5.9%
C5	0	-	6	35.3%
C6	1	16.7%	3	17.6%
C7	3	50.0%	1	5.9%
Fracture[1]				
Burst, Jefferson	0	-	2	11.8%
Odontoid, Type II	0	-	3	17.6%
Vertebral Body	3	50.0%	5	29.4%
Teardrop	0	-	4	23.5%
Facet	2	33.3%	3	17.6%
Lamina	0	-	1	5.9%
Transverse Process	0	-	1	5.9%
Spinous Process	3	50.0%	3	17.6%

[1] Many patients had more than one fracture, sum of percentages exceeds 100%.

Table 1. Characteristics of NEXUS Negative Patients

Quick Shots Parallel Session II

Quick Shot Paper #19
January 10, 2018
5:18 pm

COMPENSATORY RESERVE INDEX AND PULSE CHARACTER: ENHANCED POTENTIAL TO PREDICT CASUALTY URGENCY AFTER INJURY

Michael C. Johnson, MD, Kevin Chung, Victor Convertino, Donald H. Jenkins, MD, FACS*,
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Presenter: Michael C. Johnson, MD

Objectives: Field triage of trauma patients requires timely assessment of physiologic status to determine resuscitative needs. First responders assess hemodynamics by vital signs and rudimentary clinical assessments such as pulse character to guide decision making. The Compensatory Reserve Index (CRI) has demonstrated utility as an easily interpretable method of analyzing physiologic reserve. We hypothesized the combination of CRI and pulse character would enhance the identification of injured patients requiring life-saving intervention (LSI).

Methods: We performed a prospective observational study of 300 injured patients admitted to a level I trauma center. CRI was recorded continuously after device placement on arrival. Patient demographics, field and trauma resuscitation unit vitals signs, therapeutic interventions and outcomes were collected. A field SBP<100 mmHg was utilized as a surrogate for abnormal pulse character (PC) as previously validated. A CRI threshold value of <0.63 was considered abnormal. Data were analyzed to assess the capacity of CRI and pulse character to predict LSI defined as need for transfusion, intubation, tube thoracostomy, or operative/angiographic hemorrhage control.

Results: The study cohort consisted of 195 patients. Mean age of the population was 46 years and 64% were male. The majority (88%) of injuries were blunt with an average ISS of 9 (1-75). Logistic regression analyses were performed using the abnormal CRI and pulse character thresholds (Table 1). An incremental improvement in predictive capability for LSI was demonstrated over abnormal PC for abnormal CRI and more prominently for abnormal PC plus abnormal CRI.

Conclusions: Combining pulse character assessment with CRI has the potential to significantly enhance the recognition of injured patients requiring life-saving intervention thus providing valuable decision support information to prehospital providers.

	Odds Ratio	P-value
LSI		
Abnormal PC	3.8	0.01
Abnormal CRI	9.4	0.01
Abnormal CRI & PC	37.4	0.003
Need for Transfusion		
Abnormal PC	1.9	0.31
Abnormal CRI	12.3	0.004
Abnormal CRI & PC	48.7	0.002
Composite		
Abnormal PC	2.3	0.07
Abnormal CRI	10.1	0.01
Abnormal CRI & PC	22.8	0.01

Table 1. Logistic regression analyses with subsequent odds ratios. Threshold values: Abnormal Pulse Character (SBP <100 mm Hg) and Abnormal CRI (CRI < 0.63). LSI- life-saving intervention; PC- pulse character; SBP- systolic blood pressure; CRI- compensatory reserve index

Quick Shots Parallel Session II

Quick Shot Paper #20
January 10, 2018
5:24 pm

F.R.I.E.N.D. OR F.O.E.: A PROSPECTIVE EVALUATION OF RISK FACTORS FOR REINTUBATION IN SURGICAL AND TRAUMA PATIENTS

Christopher P. Michetti, MD*, Margaret M. Griffen, MD*, Erik Teicher, Jennifer Rodriguez, Hani M. Seoudi, MD*
Inova Fairfax Hospital

Presenter: Christopher P. Michetti, MD

Objectives: To investigate risk of unplanned reintubation (*Failure of Extubation*, FOE) using a *Form for Re-Intubation Evaluation by Nurses and Doctors* (FRIEND) that was completed prior to all ICU extubations after passing a breathing trial.

Methods: FRIENDs were prospectively collected from 1/1/16-05/31/17 on intubated adult trauma & nontrauma surgery patients (pts). Factors on the form were analyzed with multivariate logistic regression to determine odds ratios (OR) for FOE. Terminal extubations and tracheostomy pts were excluded.

Results: 437 pts with median age 51 years had 461 extubations. 46 (10%) had FOE (37/271 [14%] trauma, 9/190 [5%] surgery). Mean ICU days prior to 1st extubation were 3.4 for those without, and 6.4 for those with FOE. See Table.

Conclusions: Significant lung secretions, delirium, and use of enteral opioid medications at the time of extubation increased the odds of reintubation. Trauma patients had nearly triple the reintubation rate of nontrauma surgical patients. FOE risk can be assessed using a structured data form.

Variable	OR	95% CI	p-value
Age	1.015	(0.994, 1.037)	0.152
Male (vs. female)	0.92	(0.375, 2.257)	0.856
Trauma (vs. surgery) pts	***2.636***	***(1.08, 6.435)***	***0.033***
Admission weight	0.961	(0.912, 1.013)	0.14
Extubation weight	1.051	(0.998, 1.106)	0.06
(+) total fluid balance	0.976	(0.229, 4.167)	0.974
(+) 24hr fluid balance	0.581	(0.22, 1.536)	0.274
ICU days before extubation	0.997	(0.847, 1.175)	0.974
Ventilator days	1.004	(0.847, 1.19)	0.964
RASS >0 vs. <0	0.796	(0.222, 2.848)	0.726
(+) Delirium (CAM-ICU)	***3.061***	***(0.977, 9.586)***	***0.055***
GCS <11T	1.344	(0.406, 4.442)	0.628
Cough not strong vs. strong	0.788	(0.311, 1.998)	0.616
Moderate or high secretions	***2.981***	***(1.188, 7.479)***	***0.02***
Sedative drip at extubation	1.276	(0.39, 4.173)	0.686
Opioid drip at extubation	0.558	(0.228, 1.365)	0.201
Enteral opioids at extubation	***3.948***	***(1.555, 10.024)***	***0.004***
Trauma pts w/ vs. w/o rib fxs	1.219	(0.457, 3.250)	0.693

Quick Shots Parallel Session III

Quick Shot Paper #21
January 11, 2018
4:15 pm

LOGISTICS OF AIR MEDICAL TRANSPORT: WHEN & WHERE DOES HELICOPTER TRANSPORT REDUCE PREHOSPITAL TIME?

Joshua B. Brown, MD, MSc*, Mark L. Gestring, MD, FACS*, Matthew R. Rosengart, MD, MPH, FACS*, Xilin Chen, Andrew B. Peitzman, MD*, Timothy Billiar, MD, Jason L. Sperry, MD, MPH*
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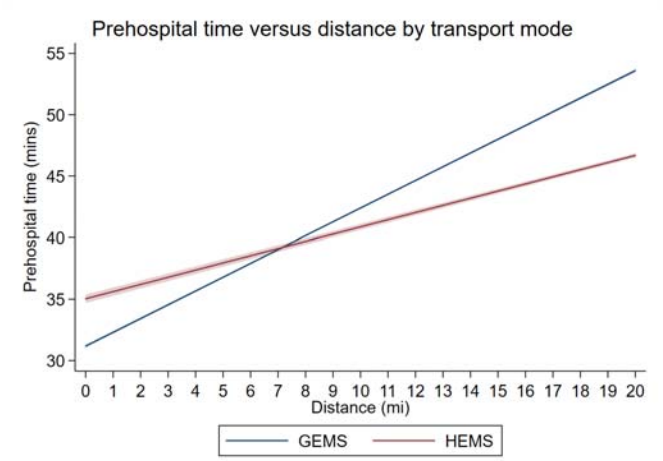
Presenter: Joshua B. Brown, MD, MSc

Objectives: Trauma is a time sensitive disease. Helicopter emergency medical services (HEMS) have shown benefits over ground EMS (GEMS), and may be partly due to reducing prehospital time. The distance at which this time benefit emerges depends on many factors that can vary across regions. Our objective was to determine the threshold distance at which HEMS has shorter prehospital time than GEMS under different conditions.

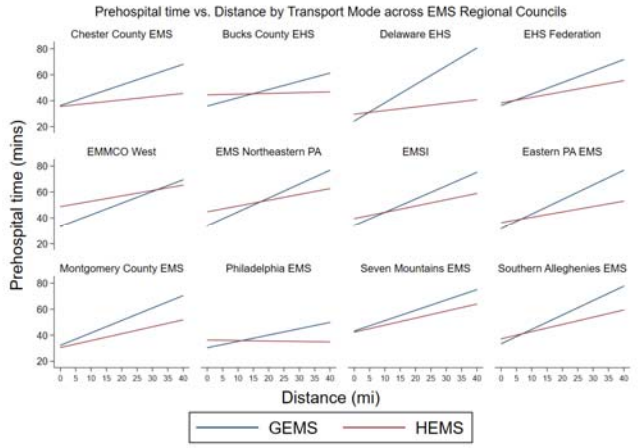
Methods: Patients in the PA trauma registry 2000-13 were included. Distance between zip centroid and trauma center was calculated using straight-line distance for HEMS and driving distance from GIS network analysis for GEMS. Contrast margins from linear regression identified the threshold distance at which HEMS had a significantly lower prehospital time than GEMS indicated by non-overlapping 95%confidence intervals. The effect of peak traffic times and adverse weather on the threshold distance was evaluated. Geographic effects across EMS regions were also evaluated.

Results: 144,741 patients were included with 19% transported by HEMS. Overall, HEMS became faster than GEMS at 7.7miles from the trauma center ($p<0.05$, FIG1). When evaluating traffic times, HEMS became faster at 6.5miles during peak traffic compared to 7.9miles during off-peak traffic ($p<0.05$). Adverse weather increased the distance at which HEMS was faster to 17.1miles from 7.3miles in clear weather ($p<0.05$). Significant variation occurred across EMS regions, with distances ranging from 4.4miles to 31.6miles (FIG2).

Conclusions: This is the first study to demonstrate that traffic, weather, and geographic region can significantly impact the threshold distance at which HEMS is faster than GEMS. HEMS was faster at shorter distances during peak traffic while adverse weather increased this distance. The threshold distance varied widely across geographic region. These factors must be considered to guide appropriate HEMS triage protocols.



Total prehospital time versus distance by transport mode from linear regression. Shaded areas represent 95% confidence intervals.



Total prehospital time versus distance by transport mode from linear regression across Pennsylvania state EMS regional councils.

Quick Shots Parallel Session III

Quick Shot Paper #22
January 11, 2018
4:21 pm

COMPARISON OF UNCROSSMATCHED WHOLE BLOOD AND BLOOD COMPONENT THERAPY DURING TRAUMA RESUSCITATIONS IN A LEVEL 1 TRAUMA CENTER: A CASE MATCH CONTROLLED STUDY

Catherine M. Zatorski, BA, Justin Slotman, Charlene Bierl, John Porter, Joshua P. Hazelton, DO, FACS*
Cooper University Hospital

Presenter: Catherine M. Zatorski, BA

Objectives: The objective of this analysis is to compare outcomes after trauma resuscitation, using either uncrossmatched whole blood (UWB) or blood component therapy (BCT).

Methods: This is a retrospective, case-match study of patients who received UWB or BCT between September 2016 and February 2017. Criteria to receive UWB included age=18, male gender, any SBP<90 mm Hg, and identifiable source of hemorrhage. Patients undergoing prehospital CPR, CPR in the trauma bay, age<18 years, and female patients were excluded. Participants were matched by mechanism of injury, injury severity score (ISS), and age against any patient who received=1u of PRBCs in the trauma bay between 2013-2016. Exact or best match was used for analysis. Variables on demographics, blood product usage, mortality, and length of stay were collected. Comparisons were made using the independent t and Fisher exact test for significance. SPSS 24.0 (IBM Analytics) was used for all analyses. A $p<0.05$ was significant.

Results: 15 patients received UWB in the first 6 months of product availability with 1 retrospectively deemed inappropriate for UWB transfusion as he did not meet inclusion criteria. Of the 14 study patients, 3 died within 24-h of admission in contrast to the 6 who received BCT (p=0.225). UWB patients required fewer PRBC transfusions during the initial resuscitation when compared to BCT patients (9.43?11vs.24.21±22.2, p=0.03). Mean ICU length of stay for those who received UWB was less than half when matched to BCT (2.82±3 days in the ICUvs.7±6.4, p=0.121). Mean ISS was nearly identical (34.36±24vs.34.29±24, p=0.99).

Conclusions: Our data suggest that UWB decreases the need for additional blood product during a trauma resuscitation. Major limitations include sample size as well as the need to include females in the BCT group to obtain optimize matching.

		Uncrossmatched Whole Blood	Blood Component Therapy
N		14	14
Gender	Male	14	9
	Female	**0**	**5***
Age		31.85±14.16	34.36±17.40
Race	Black	7	8
	White	3	5
	Hispanic	0	1
	Other	4	0
Injury severity score		34.36±24	34.29±24
Injury classification	Penetrating	10	10
	Blunt	4	4
Mechanism of injury	GSW	9	9
	KSW	1	1
	Fall	0	1
	MVC	2	3
	MCC	1	1

***significant (p<0.05)**

Table 1: Patient characteristics

		Uncrossmatched Whole Blood	Blood Component Therapy
Blood product given	**PRBCs**	**9.43±11***	**24.21±22.2***
	Plasma	7.36±13.8	16.79±18
	Platelet	1.21±3.22	3.5±3.82
Need for extra blood during stay?	Yes	7	7
	No	7	7
24-hour mortality	Yes	3	6
	No	11	8
30-day mortality**	Yes	2	1
	No	6	3
	Lost to follow up	3	4
ICU Length of Stay**		2.82±3	7±6.4
Total Length of Stay**		14.55±13.59	19.75±10.38

***significant (p<0.05)**

****excludes those that died within 24-hours of admission**

Table 2: Patient outcomes

Quick Shots Parallel Session III

Quick Shot Paper #23
January 11, 2018
4:27 pm

A NOVEL PREHOSPITAL TRAUMA SMARTPHONE APP FOR IMPROVED EMS TO HOSPITAL COMMUNICATION

William M. Hallinan, RN, MSBA, Mark L. Gestring, MD, FACS*, Jeremy Cushman, Francis Manzo
University of Rochester Medical Center

Presenter: William M. Hallinan, RN, MSBA

Objectives: Prehospital reports informing trauma team activation require clear communication of information with timely transmission of data across a system that avoids degradation. The most common method is cellular voice communication which can compromise accurate trauma team activation by lacking complete or objective information, is not convenient for providing updates, and is prone to misinterpretation by background environmental noise. The objective of this project was to improve completeness of vital sign and mechanism information and increase timeliness of prehospital trauma notifications through the development of a smartphone application.

Methods: The Trauma and Prehospital Medicine Programs of a large academic Level 1 Trauma Center in collaboration with a local emergency response software vendor developed and tested an application designed to improve prehospital communication. The application provides a seamless flow of information from the 911 center, updates from responders, patient vital signs, common injury descriptors, GPS tracking, and scene imaging that can be securely transmitted to the emergency department. Using a comparison group of conventional communication (CC) cases, those using the application (AC) were compared for completeness of information and time from alert to hospital arrival.

Results: 780 patient transports resulted in an alert over a 6 month period. Fifty random trauma team activations using CC were compared to fifty using AC. The mean time from notification to arrival for CC was 5:55 while for AC it was 12:37 representing a 44% mean increase in prehospital notification time 84.3% of patients notified using AC had complete vital sign information compared to 46% using CC.

Conclusions: A smartphone application provides enhanced transmittal of trauma patient data in a more timely fashion and offers an innovative solution to prehospital communication.

Quick Shots Parallel Session III

Quick Shot Paper #24
January 11, 2018
4:33 pm

GERIATRIC INJURY INSTITUTE: THE VALUE OF A MULTIDISCIPLINARY, COORDINATED CARE MODEL FOCUSED ON THE NEEDS OF INJURED ELDERS.

Shea C. Gregg, MD*, Andrew Francis, Andrew Stone, Walter Cholewczynski, MD*, Alisa Savetamal, MD*, Roselle Crombie, Kristen Glasgow, Paul P. Possenti, PA-C*, Ann Dyke, Vivian Argento, Roseanne Prunty, Sheikh Hoq, Rockman Ferrigno, Nabil A. Atweh, MD*
Bridgeport Hospital-YaleNHH

Presenter: Shea C. Gregg, MD

Objectives: To determine if our Geriatric Injury Institute (GII) model which, uses a multidisciplinary approach involving coordinated pre-hospital, in-hospital and case management resources would reduce length of stay (LOS) and total hospital costs.

Methods: A retrospective review of our Level II trauma registry & medical records was performed on all trauma activations >age 65. The Geriatric Injury Institute (GII) was established in early July 2015. Patients presenting from July 1, 2014 to June 30, 2015 were grouped as pre-GII, while those presenting from July 1, 2015 to June 30th, 2016 were grouped as post-GII. Primary outcomes were length of stay (LOS) and hospital costs.

Results: A total of 663 patients met activation criteria, with 319 in the pre-GII group and 344 in the post-GII (8% increase). Of admitted patients, there was an 8% increase in trauma service admissions (173 pre-GII vs. 186 post-GII). Overall Pre vs. Post GII mean ages (82 ± 8 vs. 81 ± 9) and median ISS with interquartile ranges (8 (4-13) vs. 8 (1-14)) were not statistically different. In regards to LOS, discharges were more efficient in the post-GII cohort with LOS ≤ 2 days occurring in 40% of admissions, whereas only 25% had a LOS ≤ 2 days in the pre-GII cohort. This was observed despite the mean age and median ISS not being statistically different ($p>0.05$). Although the overall median LOS did not reach significance ($p=0.07$), overall median per-patient hospital costs were significantly less ($1200) in the post-GII group (pre-GII: $8808, IQR: $5700-$17500 vs. post-GII: $7602, IQR: $4700-$13700; $p=0.04$).

Conclusions: Our philanthropy-supported, Geriatric Injury Institute has >50 care providers committed to maximizing care for our injured elders. This scalable model has contributed to increased patient volume and has demonstrated value through efficient discharge processes and significant reductions in hospital costs.

Quick Shots Parallel Session III

Quick Shot Paper #25
January 11, 2018
4:39 pm

DETERMINING SUICIDE RISK IN TRAUMA PATIENTS USING A UNIVERSAL SCREENING PROGRAM

Jonathan Imran, MD, Robyn Richmond, MD*, Tarik Madni, MD, Kimberly Roaten, Emily Huang, Audra Clark, Ali Mokdad, Michael W. Cripps, MD*, Kareem AbdelFattah, MD*, Alexander L. Eastman, MD, MPH, FACS*
University of Texas Southwestern Medical Center

Presenter: Jonathan Imran, MD

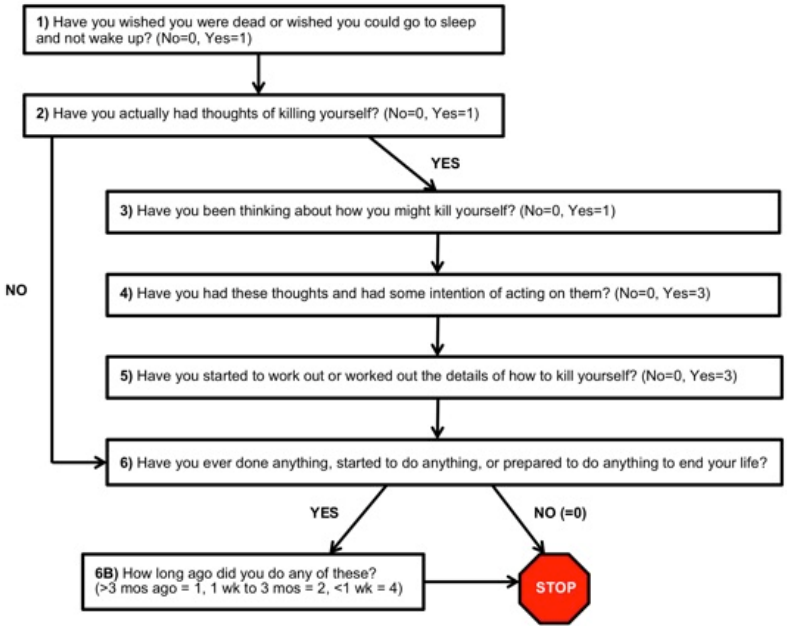
Objectives: Trauma patients may be at elevated risk for subsequent suicide; however, it is unclear whether patients at risk can be identified during their initial presentation following injury. The objective of this study was to evaluate the use of an easy-to-perform suicide risk assessment and the incidence of a positive suicide risk score in our trauma population.

Methods: A universal screening protocol was initiated at our level I trauma center and performed by our Trauma Nurse Clinicians on presentation to the hospital (Figure 1). Adult trauma patients who had a suicide risk assessment completed from February 2015 to November 2015 were evaluated retrospectively. Patients were divided into cohorts consisting of those with positive and negative screening assessments. Statistical analysis was performed using Student's *t* test, and a chi-squared test. Significance was set at a = 0.05.

Results: Overall, 3691 of 3780 patients (98%) had a suicide risk assessment screen completed during the study period. Those who went unscreened were not evaluated due to altered mental status/intubation (97%), death (1%), or an unwillingness to cooperate (2%). In 164 of 3691 patients (4%), the screening assessment score was =1, indicating a positive assessment. On univariate analysis, patients with a positive suicide risk assessment were more likely to be of non-Hispanic ethnicity (67% vs. 55%; $P < 0.01$), use English as their first language (91% vs. 73%; $P < 0.01$), have insurance coverage (47% vs. 29%; $P < 0.01$), and were more likely to be a low-level trauma activation (27% vs. 16%; $P < 0.01$) than those who had a negative screening assessment. There were no differences in mean age, race, gender, marital status, injury severity score, blunt vs. penetrating trauma, or hospital discharge disposition between the cohorts.

Conclusions: Universal suicide screening assessment identifies a previously missed at-risk subpopulation of trauma patients.

Figure 1. Parkland Algorithm for Suicide Screening using the C-SSRS, Screen Version, Recent



Parkland Hospital Algorithm for Suicide Screening

Quick Shots Parallel Session III

Quick Shot Paper #26
January 11, 2018
4:45 pm

A CALL TO FOLLOW UP; FOLLOW-UP PRACTICES OF THE MEMBERS OF THE EASTERN ASSOCIATION FOR THE SURGERY OF TRAUMA

James Cooros, MD, Samantha J. Chesney, Terri deRoon-Cassini, Colleen Trevino, David J. Milia, MD*
Medical College of Wisconsin

Presenter: James Cooros, MD

Objectives: To assess the current practice pattern regarding follow up of trauma patients among the members of the Eastern Association for the Surgery of Trauma (EAST).

Methods: Anonymous, online, multiple-choice survey of EAST members in 2016. Ten questions relating to the follow-up care of injured patients were presented to the Active, Senior and Associate members of EAST. Data were screened for quantitative anomalies and problematic response styles.

Results: Of the 1611 members surveyed, 289 participants responded. Approximately 52% of respondents stated that their institution has a dedicated trauma follow-up clinic where most injured patients are seen after discharge. Fewer than 20% reported that non-trauma, multidisciplinary providers are present in clinic. Most (89.5%) reported that follow-up is a single visit, unless a patient has longstanding issues. Only three respondents stated that patients are regularly seen greater than 3 months from injury, and a significant minority (17.7%) acknowledged no set follow-up timeline. Pain management was most commonly (43.3%) the responsibility of the trauma team exclusively. When asked about mental health treatment, most respondents indicated that psychiatry (26.6%) or a clinical psychologist separate from the trauma team (26.6%) were responsible. Only 3.6% of participants indicated that they have a psychologist embedded in the trauma team, and 11.5% reported that no system is currently in place to manage mental health.

Conclusions: Despite over 20 years of literature highlighting the long-term physical andmental health sequelae after trauma, and the improvement in outcomes with the identification and treatment of these sequelae; the results of our survey indicate there remains a lack of standardized and multidisciplinary follow up. Greater attention should be paid to functional recovery, social and psychological well-being and chronic pain.

Quick Shots Parallel Session III

Quick Shot Paper #27
January 11, 2018
4:51 pm

COMBAT NEUROSURGERY IN RECENT CONFLICTS: 2002-2016

Zsolt T. Stockinger, MD, FACS*, Caryn A Turner, MPH, Jennifer M. Gurney, MD*
DoD Joint Trauma System

Presenter: Zsolt T. Stockinger, MD, FACS

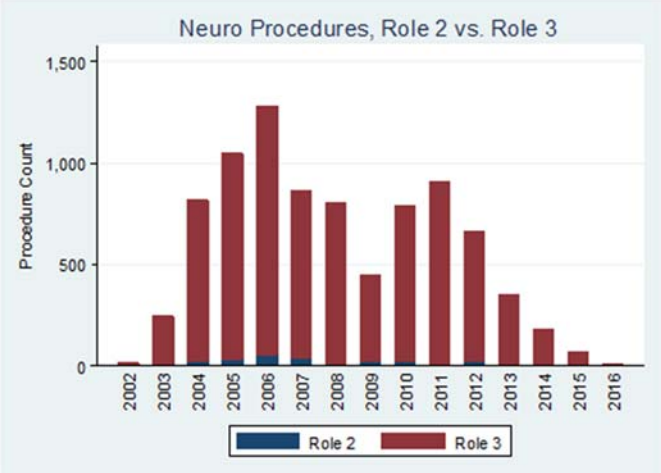
Objectives: Approximately 4.5% of surgical procedures performed at Role 2 and Role 3 MTFs are neurosurgical. These procedures are foreign to the routine daily practice of the military general surgeon. We examined the neurosurgical workload in Iraq and Afghanistan to identify surgical training gaps.

Methods: Retrospective analysis of the Department of Defense Trauma Registry (DoDTR) for all Role 2 (forward surgical) and Role 3 (theatre) military facilities, from January 2002 to May 2016. The 107 neurosurgical ICD-9-CM procedure codes identified were grouped by anatomic location. Select groups were further subdivided. Procedure grouping was determined by surgical subject matter experts. Data analysis used Stata Version 14 (College Station, Texas).

Results: A total of 8,488 neurosurgical procedures were identified. The majority (8,211, 97%) occurred at Role 3. Cranial was the most common procedure at both Role 2 (121, 43.7%) and Role 3 (4,484, 54.6%). Spine procedures were performed almost exclusively at Role 3, with 60% being fusions/stabilizations, and being spinal decompression alone. Neurosurgical caseload was variable over the 15 year study period, dropping to almost zero in 2016.

Conclusions: Neurosurgical procedures were performed primarily at larger Role 3 theatre hospitals where neurosurgeons are assigned if present in theatre; however, over 100 cranial procedures were performed at forward Role 2s where neurosurgeons are not deployed. Considering this, and that Role 3s arrive later in theatre or sometimes not at all, deploying surgeons should have familiarity with trauma neurosurgery.

	Role 2 N (%)	Role 3 N (%)	Total N (%)
Cranial	121 (43.7)	4,484 (54.6)	4,605 (54.3)
Craniotomy/-ectomy	90 (74.4)	2,332 (52)	2,422 (52.6)
Cranioplasty	3 (2.5)	292 (6.5)	295 (6.4)
Monitor	14 (11.6)	1,119 (25)	1,133 (24.6)
Ventriculoperitoneal Shunt	0 (0)	187 (4.2)	187 (4.06)
Lobectomy/ Resection	14 (11.6)	554 (12.36)	568 (12.3)
PNS	119 (43)	968 (11.8)	1,087 (12.8)
Spine	1 (0.4)	638 (7.8)	639 (7.5)
Decompression	0 (0)	170 (26.6)	170 (26.6)
Insertion of Prosthesis	0 (0)	2 (0.3)	2 (0.3)
Fusion	0 (0)	386 (60.5)	386 (60.4)
Cervical	0 (0)	41 (10.6)	41 (10.6)
Thoracolumbosacral	0 (0)	119 (30.8)	119 (30.8)
Unspecified	0 (0)	226 (58.5)	226 (58.5)
NOS	1 (100)	80 (12.5)	81 (12.7)
Other	36 (13)	2,121 (25.8)	2157 (25.4)
Total	**277 (100)**	**8,211 (100)**	**8,488 (100)**



Quick Shots Parallel Session III

Quick Shot Paper #28
January 11, 2018
4:57 pm

ASSOCIATION OF THE AFFORDABLE HEALTHCARE ACT WITH INSURANCE STATUS AT A LEVEL I TRAUMA CENTER IN A MEDICAID NON-EXPANSION STATE

Kyle Cunningham, MD, MPH*, Michael Nahouraii, Ronald F. Sing, DO*,
Kelly Sing, A. Britton Christmas, MD, FACS*
Carolinas Medical Center

Presenter: Kyle Cunningham, MD, MPH

Objectives: The intended purpose of the Patient Protection and Affordable Care Act (ACA) was to expand access to health care insurance for all Americans. Trauma centers, especially those in urban areas, historically faced the financial burden of uninsured and underinsured patients. In our study, we examine the association of the ACA with trauma patient insurance status at a Level I urban trauma center in a state that did not expand Medicaid coverage.

Methods: We retrospectively reviewed trauma patient admissions to our institution from 2008-2016, via the trauma registry (n=54,184). The patient population was compared for changes in selected variables and demographics following ACA implementation. Insurance assignments were consistent with 2016 National Trauma Data Bank nomenclature. Chi-square analysis was used to compare the association of the ACA, by three-year average (n=36,250), on payor mix. Students t-test and Mann-Whitney tests were used to compare secondary descriptive patient characteristics.

Results: The three-year mean uninsured patient rate increased following implementation of the ACA (25.4% vs 23.5%, p<0.001), as did the commercially insured patient rate (31.4% vs 21.0%, p<0.001). The rate of patients insured by Medicaid decreased (16.2% vs 24.0%, p<0.001). Patients were older (42.5yr vs 40.3yr, p<0.001), admitted longer (4.6d vs 4.2d, p<0.001), more injured (ISS 9.5 vs 8.8, p<0.001), and were charged more (median $32,656 vs $24,068, p<0.001).

Conclusions: Failure to adopt Medicaid expansion was associated with an increase in uninsured patient rates, however it was also associated with a greater increase in commercially insured patients. Moreover, patients were charged 36% more for care. Additional study of this relationship is warranted.

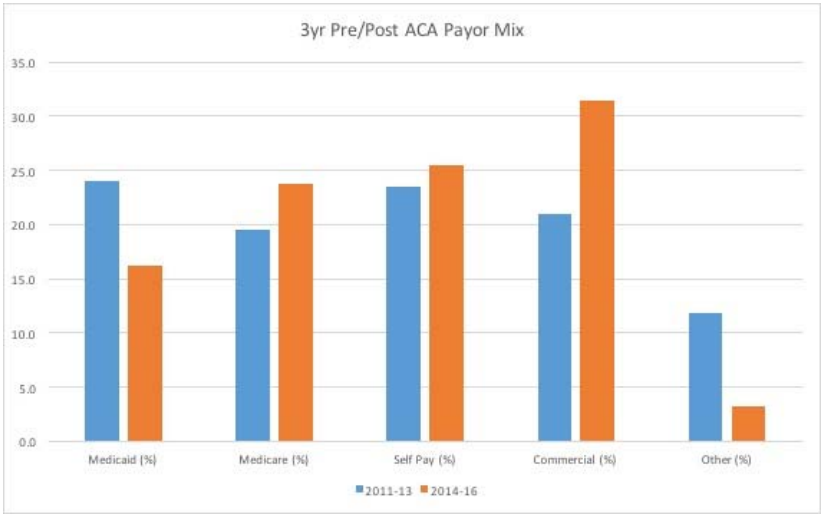


Figure 1. 3yr Mean Pre/Post ACA Payor Mix

Quick Shots Parallel Session III

Quick Shot Paper #29
January 11, 2018
5:03 pm

NATIONWIDE TRENDS IN MORTALITY FOLLOWING PENETRATING TRAUMA: ARE WE UP FOR THE CHALLENGE?

Joseph V. Sakran, MD, MPH, MPA, FACS*, Ambar Mehta, M.P.H., Avery B. Nathens, MD, PhD, MPH*, Bellal Joseph, MD*, Alistair Kent, MD, MPH*, Christian Jones, MD*, Elliott R. Haut, MD, PhD, FACS*, Raymond Fang, MD, FACS*, David T. Efron, MD*
Johns Hopkins School of Medicine

Presenter: Joseph V. Sakran, MD, MPH, MPA, FACS

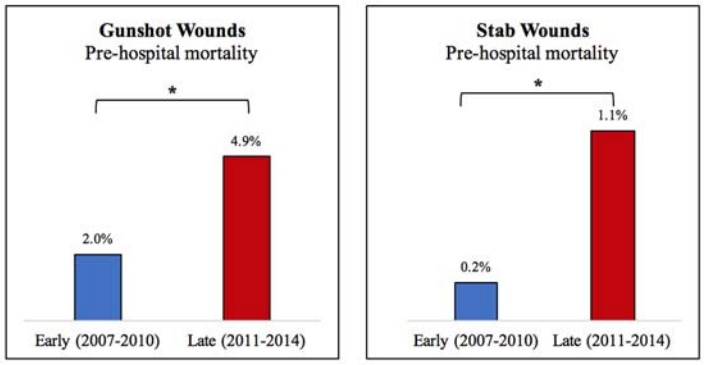
Objectives: Despite a focus on improved pre-hospital care, penetrating injuries contribute substantially to trauma mortality in the U.S. We analyzed trends in pre-hospital mortality from penetrating trauma in the past decade.

Methods: We identified patients suffering gunshot (GSW) and stab wounds (SW) in the NTDB database from 2007-2010 ("early period") and 2011-2014 ("late period") treated at hospitals recording dead-on-arrival statistics. Multivariable logistic regressions assessed differences in body locations of trauma, pre-hospital mortality, and in-hospital mortality between the early and late periods. Models accounted for hospital clusters and adjusted for age, pulse, hypotension, NISS, GCS, and number of injured body parts.

Results: There were 437,398 patients experiencing penetrating traumas from 2007-2014, with equal distributions of GSW and SW. The overall pre-hospital mortality rate was 2.1% (GSW: 3.5%, SW: 0.7%). After adjustment, patients in the late period relative to those in the early period were associated with significantly higher odds of pre-hospital death after both GSWs (aOR 4.41 [95%-CI 3.23-6.03]) and SWs (aOR 8.84 [5.26-14.86]) (Figure). Sensitivity analyses assessing GSWs and SWs by locations of body injury found similar results (Table). Additionally, patients in the late period were more likely to experience penetrating injuries to the spine (aOR 1.13 [1.08-1.18]) and face (aOR 1.06 [1.02-1.09]) but not neck (aOR 1.02 [0.98-1.06]). For patients arriving to the hospital alive, in-hospital mortality decreased from the early period to the late period (4.0% vs 3.6%, aOR 0.83 [0.78-0.88]).

Conclusions: In the U.S., the prevalence of penetrating traumas remains a nationwide burden and the odds of pre-hospital mortality in 2011-2014 relative to 2007-2010 has increased up to 9-fold. Examining violence intensity, improvements in hospital care, and data collection may explain these findings.

Figure: Increases in Pre-hospital Death After Penetrating Trauma During the Late Years (2011-2014) Relative to the Early Years (2007-2010).



After adjustment, there were significantly higher odds of pre-hospital death in the late period (2011-2014) relative to the early period (2007-2010, reference) for both gunshot wounds and stab wounds.**P<0.001 for both GSW and SW. Regressions accounted for correlations of outcomes within individual hospitals and adjusted for patient age, pulse, hypotension, the New Injury Severity Score, Glasgow Coma Scale, and number of injured body parts.*

Table: Increases in Pre-hospital Death for all Body Locations of Penetrating Trauma

	Gunshot Wounds	Stab Wounds
	*Adjusted Odds Ratio [95%-Confidence Interval]	
Face	4.27 [2.64-6.90]	10.24 [5.31-19.77]
Head	3.54 [2.38-5.26]	10.73 [4.72-24.39]
Neck	5.06 [2.87-8.93]	6.54 [4.01-10.68]
Thorax	5.13 [3.57-7.38]	7.40 [4.89-11.22]
Abdomen and Pelvis	6.10 [4.17-8.93]	12.75 [6.67-24.38]
Spine	5.34 [3.28-8.70]	28.34 [4.43-181.54]
Upper Extremities	5.48 [3.59-8.38]	9.15 [5.48-15.29]
Lower Extremities	5.71 [3.69-8.85]	10.98 [5.44-22.15]
Overall	4.41 [3.23-6.03]	8.84 [5.26-14.86]

For all body locations of penetrating trauma, there were greater adjusted odds of pre-hospital death in the late period (2011-2014) relative to the early period (2007-2010, reference).**P<0.001 for both GSWs and SWs. Regressions accounted for correlations of outcomes within individual hospitals and adjusted for patient age, pulse, hypotension, the New Injury Severity Score, Glasgow Coma Scale, and number of injured body parts.*

Quick Shots Parallel Session III

Quick Shot Paper #30
January 11, 2018
5:09 pm

HEALTHCARE UTILIZATION & COST OF POST-TRAUMATIC ARDS CARE

Anamaria J. Robles, MD, Lucy Z Kornblith, MD, Benjamin Howard, Amanda Conroy, Ryan Kunitake, Carolyn Hendrickson, Farzad Moazed, Carolyn Calfee, Mitchell J. Cohen, MD, FACS, Rachael Callcut, MD, MSPH, FACS*
University of California San Francisco

Presenter: Anamaria J. Robles, MD

Objectives: Acute respiratory distress syndrome (ARDS) after injury is associated with lengthy hospitalizations but the financial burden associated with increasing ARDS severity has not been studied. We examined cost differences of post-traumatic ARDS severity classified by Berlin criteria.

Methods: All adult highest level trauma activation patients enrolled in an ongoing prospective cohort study were included. For patients with PaO2:FiO2 ratio (P/F) <=300mgHg during the first 8 days of admission, two blinded physicians reviewed chest radiographs for ARDS adjudication by Berlin criteria. ARDS severity was classified according to degree of hypoxemia: mild (200<P/F<=300), moderate (100<P/F<=200), and severe (P/F<=100). Hospital charge data was used to perform standard costing analysis.

Results: Adjudicated ARDS was present in 13.1% (203/1552) of patients surviving >=6 hours. Those with ARDS were older (41 vs 35 years, p<0.01), had higher median ISS (30 vs 10, p<0.01), more likely to have chest injury (AIS>=3: 51% vs 21%, p<0.01), and blunt mechanism of injury (85% vs 53%, p<0.01). Of the ARDS patients, 33% had mild, 42% moderate and 25% had severe disease. A correlation between ARDS severity, higher ISS and mortality was observed. Compared to mild/moderate ARDS, patients with severe ARDS had increased multi-organ failure and mortality. Standardized total hospital charges were four-fold higher in those with ARDS ($434K vs. $96K, p<0.01), and highest charge per day was associated with severe ARDS (mild $20,451; moderate $23,994; severe $33,316, p<0.01).

Conclusions: The development of ARDS after injury is associated with higher healthcare costs. Among trauma patients who develop ARDS, total hospital charges per day increase with worsening disease severity. Protective strategies to prevent or mitigate ARDS after trauma are essential to controlling health care costs and should be prioritized.

Demographics/Outcomes by ARDS severity	Mild ARDS (n=67)	Moderate ARDS (n=86)	Severe ARDS (n=50)	*p*
Percent intubated on admission day	93%	98%	98%	<0.01
Percent transfused within 24h	64%	76%	84%	0.05
Ventilator free days	10 (0-21)	3 (0-15)	0 (0-10)	0.03
Multi-organ failure	23%	45%	58%	<0.01
ICU days	14 (7-24)	14 (8-24)	10 (4-22)	0.14
Hospital days	24 (11-51)	21 (11-42)	14 (5-25)	0.01
Total hospital charge ($)	462,417 (264,993-920,018)	489,330 (254,829-773,073)	311,017 (179,427-802,498)	0.35
Charge per day ($)	20,451 (13,398-28,133)	23,994 (14,989-32,768)	33,316 (17,175-120,735)	<0.01
Standardized total hospital charge ($)	579,528 (265,617-123,497)	495,013 (265,617-1,014,174)	338,058 (120,735-603,675)	0.01
Mortality at 28 days	21%	33%	50%	<0.01
Mortality at discharge	24%	36%	52%	<0.01

* Data are mean +/- SD, median (inter-quartile range), or n (%) as indicated. Data for skewed variables reported as median with inter-quartile ranges. Ventilator free days are counted for the first 28 days of hospitalization. Subjects who expired received 0 ventilator free days

Quick Shots Parallel Session III

Quick Shot Paper #31
January 11, 2018
5:15 pm

30-DAY TRAUMA READMISSIONS: A CLINICAL ANALYSIS

Sarah K. West, MS, RN, ACNP-BC, Michael Shay O'Mara, MD, MBA, FACS*, M. Chance Spalding, DO, PhD*
Grant Medical Center

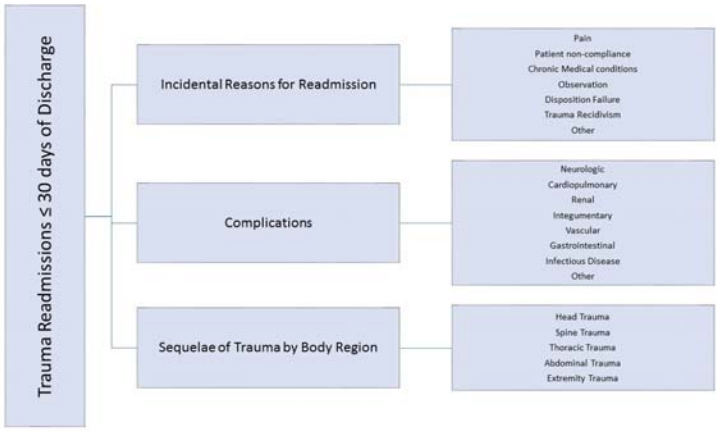
Presenter: Sarah K West, MS, RN, ACNP-BC

Objectives: We hypothesized that a structured methodology for abstraction of clinically meaningful variables describing 30-day trauma hospital readmissions will lead to identification of populations at risk and allow targeted process and quality improvement.

Methods: A three-year retrospective cohort study of 18,998 trauma patients at a level 1 trauma center. Excluded were initial hospitalization deaths, transfers, and isolated hip fractures. A systematic methodology was developed for conducting chart reviews. Identified were descriptive clinical variables associated with trauma readmission. The administrative data was also evaluated.

Results: Of 15,373 patients, 413 (2.7%) were readmitted. Readmissions were white males (71.2%), 16-44 years (56.7%), with ISS ≥ 10 (68.3%). Mechanism of injury (MOI) was falls (27%), motor vehicle collisions (26%), and gunshot wounds (16%). Readmission rate was highest for gunshot wounds (11.0%) and motorcycle crashes (4.3%). There was no difference in time to readmission by MOI (P= 0.39). 24.2% were compliant with outpatient follow-up, the strongest predictor being discharge to a skilled nursing facility (85%, P=0.002). Clinically abstracted readmissions were for complications (41.0%) and incidental (35.1%). Infection was the leading complication on readmission (63.7%). The incidental reasons were observation (25%) and pain (24.4%). The difference between clinically abstracted and administrative data was significant (P<0.0001).

Conclusions: We showed a significant difference between the reasons for 30-day trauma readmission when comparing clinically abstracted and administrative data. Data obtained from this study has assisted in the structuring of process improvement, clinical guidelines, and early proactive follow-up. Further research into the development of predictive models using clinically abstracted data for trauma patient readmission will allow preventative intervention and allocation of resources prior to hospital discharge.



Structured methodology for 30-day trauma readmission reviews.

Data Comparison

Readmission Category	Clinically Abstracted Variables	Administrative Data Codes	Significance (P<0.05)	Percent of Administrative variables that agreed with clinically abstracted variables
Complications	182 (41%)	181 (39%)	0.61	134 (74%)
Incidentals	156 (35%)	36 (8%)	<0.0001	27 (75%)
Head Trauma	54 (12%)	80 (17%)	0.027	46 (58%
Spine Trauma	3 (1%)	13 (3%)	0.014	3 (23%)
Thoracic Trauma	25 (6%)	39 (8%)	0.095	23 (60%)
Abdominal Trauma	12 (3%)	44 (10%)	<0.0001	8 (18%)
Extremity Trauma	12 (3%)	32 (7%)	0.003	7 (22%)
*Other	0 (0%)	35 (8%)	<0.0001	0 (0%)
*Other: Unable to categorize based upon the information provided				
P<0.0001 overall, chi-square test				

Comparison of clinically abstracted versus administrative readmission data.

Quick Shots Parallel Session III

Quick Shot Paper #32
January 11, 2018
5:21 pm

"THAT CAN'T BE!" PERCEPTIONS OF HIV AND HEPATITIS C SCREENING DURING ADMISSION TO AN ACS SERVICE

Alicia R. Privette, MD, FACS*, Pamela Ferguson, Jama Olsen, Sarah Gay, ACNP-BC*, Lauren Richey
Medical University of South Carolina

Presenter: Alicia R. Privette, MD, FACS

Objectives: A large number of patients live with undiagnosed HIV and/or Hepatitis C despite broadened national screening guidelines. European studies, however, suggest many patients falsely believe they have been screened during a prior hospitalization. This study aims to define current perceptions among trauma and emergency general surgery (EGS) patients regarding HIV and Hep C screening practices during current and prior admissions.

Methods: Prospective survey administered to adult (>18 yo) trauma and EGS patients at a Level 1 academic trauma center. Survey consisted of 13 multiple choice questions: demographics, whether admission tests included HIV and Hep C at index and prior hospital visits, whether receiving no result indicated a negative result, history of primary care screening. Response percentages calculated in standard fashion.

Results: 100 patients surveyed: 61 trauma, 39 EGS. Overall, 34% and 30% of patients believed they were screened for HIV and Hep C at admission with trauma patients more likely to believe they were screened. 69% of patients had a hospital visit within 10 yrs. Of these, 45% and 37% believed they had been screened for HIV and Hep C. More EGS patients believed they received Hep C screening while HIV was equivalent. Among patients who believed they had a prior screen and didn't receive any results, 73% (HIV) and 75% (Hep C) believed a lack of results meant they were negative. Only 26% and 21% of patients had ever been offered outpatient HIV and Hep C screening.

Conclusions: A large portion of patients believe they received admission or prior hospitalization HIV and/or Hep C screening and the majority interpreted a lack of results as a negative diagnosis. Due to these factors, routine screening of trauma/EGS patients should be considered to conform to patient expectations and national guidelines, increase diagnosis and referral for medical management, and decrease disease transmission.

Patients	Admit HIV screening test (n=100)	Admit Hep C screening test (n=100)	Prior HIV screening test (n= 56)	Prior Hep C screening test (n=56)
Trauma	39.3% (24)	32.8% (20)	53.1% (17)	39.4% (13)
ACS	25.6% (10)	25.6% (10)	50% (12)	47.8% (11)

Table. Percentage of patients by service who believe they received screening at index admission and prior admission.

Quick Shots Parallel Session IV

Quick Shot Paper #33
January 11, 2018
4:15 pm

EVALUATING SWALLOWING FUNCTION IN THE ELDERLY REQUIRING CERVICAL COLLARS: A NEW STANDARD OF CARE

Nicholas M. Sich, MD, Andrew Rogers, Andrew Shajari, Ryan Shadis, MD*
Abington-Jefferson Health

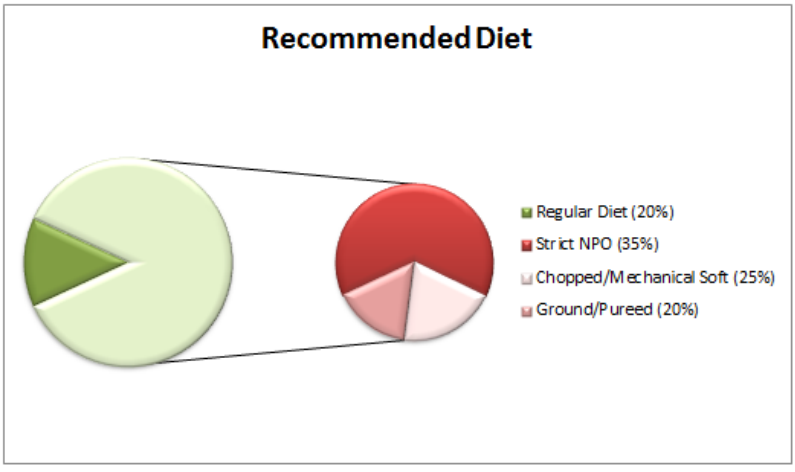
Presenter: Nicholas M. Sich, MD

Objectives: There is a high rate of aspiration events in the elderly with cervical collars. In 2008 our institution implemented a policy requiring speech and swallow evaluations (SSE) in any patient with age >65 requiring a hard cervical collar for their management. This study sought to determine if performing SSE in elderly patients requiring cervical collars for injury management should be a standard of care.

Methods: A retrospective chart review of all patients evaluated by the trauma service was performed starting in 2008. Inclusion criteria were patients with age >65, an image-confirmed cervical spine fracture, and treatment requiring hard cervical collar. Patients were further stratified into cohorts of those with documented SSE and those without. The SSE were then reviewed by investigators for diet recommendations.

Results: Three hundred eighty-eight patients were identified to have cervical spine fractures. Of these, 271 underwent documented SSE. Only 55 (20%) patients were cleared for a regular diet. For the remaining 238 (80%) patients: 69 (25%) were recommended chopped or mechanical soft diet, 52 (19%) ground/pureed diet, and 95 (35%) strict nil per os with either video-barium swallow for further evaluation or alternative feeding access (e.g. gastrostomy tube).

Conclusions: Due to a high rate of aspiration in our patients, our institution adopted a department policy requiring SSE in patients over 65 requiring hard cervical collar for management. Retrospective analysis of this management algorithm clearly demonstrates that the vast majority of patients (4 of 5) with cervical fractures requiring hard collar will have swallowing dysfunction. We recommend mandatory SSE for all patients over 65 requiring cervical collar as a standard of care.



Breakdown of diet recommendations following speech and swallow evaluation.

Quick Shots Parallel Session IV

Quick Shot Paper #34
January 11, 2018
4:21 pm

DOES IT WORK: A CRITICAL ASSESSMENT OF THE "STOP THE BLEED" EDUCATION PROGRAM

Brian L. Frank, MD*, Kathryn Bommer, Amanda Young, Patrick Wende, Charles Proctor, Claire LeGuen, Ryan Hessenius, Maddison Kane, Richard A. Lopez, DO*, John Mitchell
Geisinger - Community Medical Center

Presenter: Brian L. Frank, MD

Objectives: Since its inception, "Stop the Bleed" (STB) has trained participants to recognize and treat life-threatening hemorrhage. ACS members feel the course is appropriate to train the public, but its efficacy has not been assessed. We conducted a critical analysis of course effectiveness in improving comfort with, willingness to use, and knowledge about tourniquet use.

Methods: This is a prospective observational study utilizing pre- and post-course survey responses. Course participants over 18 years old were enrolled in classes through our trauma outreach office and informed about the study at the outset of the class. A pre-course survey was completed. Students then participated in the STB didactic and hands-on training followed by the post-course survey. Pre- and post-course comfort, willingness, and knowledge were compared using McNemar's test and paired t-tests. Analysis was limited to completed surveys.

Results: A total of 367 participants were accrued from January through May 2017. They had backgrounds in law-enforcement (55%), pre-hospital medical care (17.2%), fire-fighting (14.4%), medicine (CRNP, MD, RN; 12.3%). Prior bleeding control training was reported in 41.2%. Specific tourniquet training was noted in 58%. Prior to training, 52.8% were "uncomfortable" or "neutral" with tourniquet use, but 79% were willing to use a tourniquet. After STB training, 76.2% of participants improved comfort *(p<0.0001)*, 17.4% improved willingness *(p<0.0001),* and knowledge assessment scores improved in 83% *(p<0.0001).*

Conclusions: STB training is effective in training participants to recognize and treat life-threatening hemorrhage. The training improves comfort, willingness, and knowledge of tourniquet use. Efforts to support this outreach should continue with emphasis on interval follow-up to assess long-term knowledge retention.

	N	%	p-value
Currently comfortable with appropriate tourniquet use (n=357)			
Improved Comfort	272	76.2	<0.0001*
Same Comfort	77	21.6	
Still not Comfortable	8	2.2	
Missing	5		
Willingness to use a tourniquet (n=350)			
Improved Willingness	61	17.4	<0.0001**
Still Willing	284	81.2	
Not Willing/No Longer Willing	5	1.4	
Missing	12		
Knowledge assessment score (n=358)			
Improved Test Score	297	83.0	<0.0001*
Same Test Score	46	12.8	
Decreased Test Score	15	4.2	
Missing	4		

*Paired t-test
**McNemar's Test

Change in Pre-Course and Post-Course Results

Quick Shots Parallel Session IV

Quick Shot Paper #35
January 11, 2018
4:27 pm

HEALTH LITERACY AND ITS IMPACT ON OUTCOMES IN TRAUMA PATIENTS: A PROSPECTIVE COHORT STUDY

Tianyi Swartz, BS, Faisal S. Jehan, MD, Andrew L. Tang, MD*, ElRasheid Zakaria, Narong Kulvatunyou, MD*, Arpana Jain, Lynn Gries, Terence O'Keeffe, MD, MSPH*, Bellal Joseph, MD*
The University of Arizona

Presenter: Tianyi Swartz, BS

Objectives: Health literacy (HL) is emerging as a focus of interest and is evolving as an important component of national health policy. Aim of our study is to assess prevalence of low-health literacy in trauma patients and its impact on outcomes after trauma.

Methods: 1-year prospective cohort study on all trauma patients age>18. The Short Assessment of Health Literacy (SAHL) score in English or Spanish to assess HL of patients. SAHL and trauma specific questionnaire were administered at discharge. LHL was defined as SAHL score <14. At 30-days post discharge, patients were surveyed about clinic follow-up details and recovery. Outcomes measures were prevalence of LHL and factors associated with it, readmission, follow-up, and time to recovery.

Results: We prospectively enrolled 105 patients. Mean age was 45+20 years, 59% were male and median ISS was 14[9-18]. Most common mechanism of injury was blunt 84% and 56% patients were White while 38% were Hispanics. Overall, 24% patients had LHL. LHL patients were more likely to be Hispanics (63%vs27%, p=0.01), have lower-socioeconomic status (90%vs51%, p=0.02), un-insured (45%vs18%, p=0.01) and less likely to have completed college (0%vs49%, p=0.01), compared to the HL patients. At discharge, both groups were satisfied with the time spent by physician to explain the condition; however, the LHL patients could not recall their injuries and details about the surgery (**Table1**). On regression analysis, patients with LHL were less likely to follow-up (OR0.7), took longer time (>4 weeks) to recover (OR1.2), however, there was no difference in the readmission rates. **(Table2)**

Conclusions: One in 5 trauma patients has LHL. LHL is associated with poor understanding of injuries and treatment provided to them, lack of follow-up and longer time to recovery. Identifying LHL in high risk patients and improving techniques of discussion with patients before discharge may help to improve outcomes.

Table 1. Health Literacy related trauma specific questionnaire			
	LHL (n=25)	HL (n=80)	*P*
At discharge			
Satisfaction with time spent by physician	81.8%	80.9%	0.98
Recalled injuries	27.3%	56.3%	0.03
Knowledge about type of surgery performed or treatment	0%	43.8%	0.01
Understood the purpose of medications prescribed	18%	50.1%	0.03
Knowledge about when to follow-up	18%	60%	0.02

Table 1. Health Literacy related trauma specific questionnaire

Table 2. Survey at 30-days post-discharge. (Multivariate Regression analysis)			
Low health literacy (LHL)	**OR**	**95% confidence interval**	***P***
Follow-up	0.78	[0.66-0.89]	0.03
Time to recover > 4 weeks	1.23	[1.08-2.56]	0.04
Re-admission	0.97	[0.65-2.45]	0.64

Table 2. Survey at 30-days post-discharge. (Multivariate Regression analysis)

Quick Shots Parallel Session IV

Quick Shot Paper #36
January 11, 2018
4:33 pm

SEE ONE, DO ONE, BUT NEVER TEACH ONE? AN ACUTE CARE SURGERY MODEL WITH GRADUATED SUPERVISION SAFELY FACILITATES SENIOR RESIDENT AUTONOMY

Joshua P. Smith, DO, Donald Moe, John McClellan, Avery Walker, Vance Sohn,
Matthew J Eckert, MD*, Matthew J. Martin, MD*
Madigan Army Medical Center

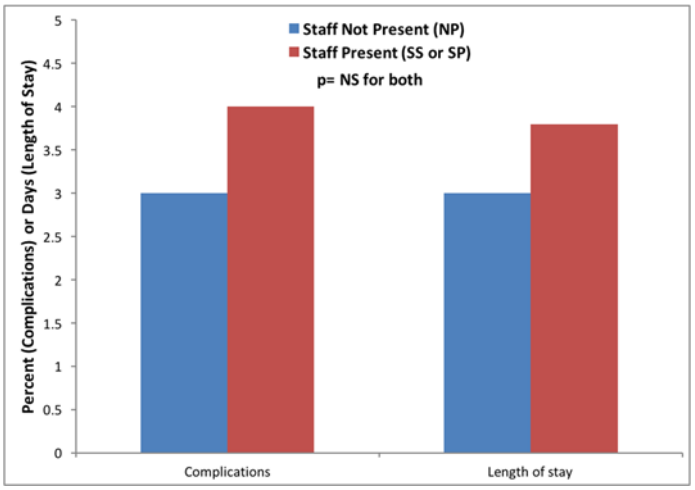
Presenter: Joshua P. Smith, DO

Objectives: Surgical training traditionally relied on gradually increasing levels of resident autonomy and independence, particularly on operative cases. However, this practice has become increasingly limited due to reimbursement, and patient safety concerns. We sought to analyze the outcomes of senior resident teaching assist (TA) cases performed under an acute care surgery model with a structured policy including varying levels of staff supervision.

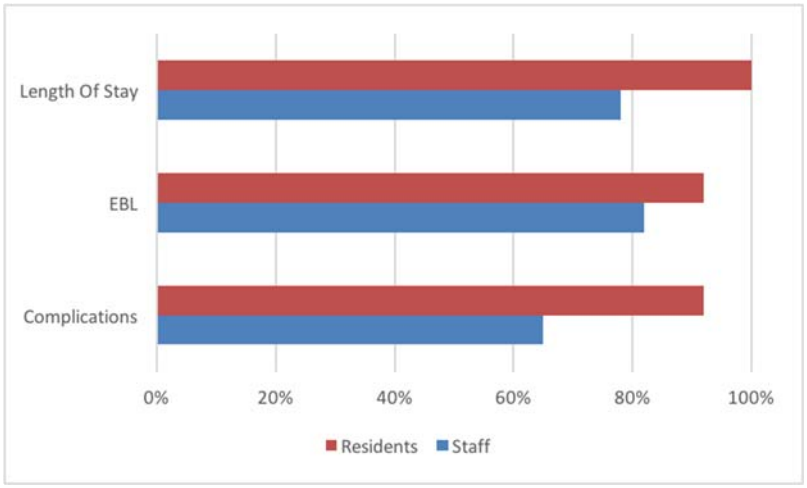
Methods: Retrospective review at a military academic medical center of senior resident TA cases from 2009-2014. Operative time, estimated blood loss, complications and length of stay were analyzed according to level of staff supervision (staff not present (NP), staff scrubbed (SS), and staff present but not scrubbed (SP). An anonymous survey of residents and staff at 6 military training programs regarding experience and opinions on TA cases was distributed.

Results: 389 TA cases were identified. The majority (52%) were performed as NP, while 48% were performed as SP or SS. Operative times were shorter for NP cases ($p < 0.05$). Overall complication rate and mean length of stay were not significantly different between groups ($p > 0.05$, Figure). Survey results demonstrated most staff (71%) and residents (91%) believed there was no increased risk of complications with the selective NP approach, with similar results for blood loss and length of stay (Figure 2). Staff and residents felt that allowing selective NP was critical for achieving resident competence.

Conclusions: In a structured program of allowing increasing senior resident autonomy on highly select TA cases, there was no identified adverse effects on major complications or patient outcomes. Staff and residents felt this practice was safe and is a critical component of graduating residents readiness for independent practice.



Comparison of overall complications and overall patient length of stay between NP and SP/SS. There is no statistical difference in either category between groups.



There is agreement amongst staff and residents on the impact of allowing teaching assist cases in terms of length of stay, estimated blood loss and overall complication rates.

Quick Shots Parallel Session IV

Quick Shot Paper #37
January 11, 2018
4:39 pm

EFFECT OF RELAXED LEGISLATION OF FIREWORKS-RELATED INJURIES IN DOUGLAS COUNTY, NEBRASKA

James Tiehen, MD, Jessica Summers, MD*, Brett Harden Waibel, MD*, Paul J. Schenarts, MD*
University of Nebraska Medical Center

Presenter: James Tiehen, MD

Objectives: In December 2010, Omaha, NE relaxed its fireworks ordinance to be more in line with the rest of the state by allowing a larger variety of fireworks to be legally used during the July 4th holiday. Prior to this change, fireworks were available in neighboring municipalities and injuries within Omaha were common despite the ban. Our purpose was to determine what effect the relaxation of a local fireworks ban had in an area surrounded by more liberal fireworks laws.

Methods: Discharge data from Douglas County hospitals was evaluated for a period before (2004-10) and after (2011-14) the ordinance change. The population of Omaha accounts for the vast majority of Douglas County, therefore, data collected in Douglas Co. was used as a surrogate for the trends in Omaha. The pre and post rates of firework-related injury (per 100,000 persons per year) were compared using the Wilcoxon-Mann-Whitey test.

Results: A total of 1,264 fireworks injuries were reported in Nebraska, 276 of those in Douglas County over a ten-year period from 2004 – 2014. Prior to the legislation in Douglas Co, there were 4.13 injuries per 100k population, with a 49.9% increase to 6.19 injuries per 100k after the ordinance change (p=0.023). In the state of Nebraska, the rates for the same time period were 5.96 and 6.96 per 100k respectively (p=0.131). Both of these rates are higher than the national average over the same time period of 3.09 per 100k (table).

Conclusions: This study demonstrates that despite the availability of fireworks just outside the city limits of Omaha prior to 2010, the rate of injuries increased by almost 50% after the sale of fireworks was allowed within the city limits. This data can be used to provide information to both state and city officials to advocate for stronger fireworks legislation in both the city of Omaha and the state of Nebraska.

	Rate	Stnd Dev	p	% Change Pre to Post	% Difference to National	% Difference to State
Douglas Co Pre	4.13	0.62	0.023	49.9%	35.9%	-30.8%
Douglas Co Post	6.19	1.56			94.4%	-11.1%
Douglas Co All Yrs	4.87	1.43			57.8%	-23.0%
Nebraska Pre	5.96	0.83	0.131	16.7%	96.5%	
Nebraska Post	6.96	0.87			118.7%	
Nebraska All Yrs	6.33	0.94			104.8%	
National Pre	3.03	0.43	0.706	4.9%		
National Post	3.18	0.35				
National All Yrs	3.09	0.39				

Quick Shots Parallel Session IV

Quick Shot Paper #38
January 11, 2018
4:45 pm

MISCONCEPTIONS - GUN VIOLENCE IN AMERICA

Matthew Benns, MD*, Keith Miller, MD*, Kimberly Denzik, Annabelle Pike,
Latasha White, Lindsey Kendrick, Shannon Cambron
University of Louisville

Presenter: Matthew Benns, MD

Objectives: The U.S. has the highest estimated number of gun owners per capita of any industrialized nation in the world. Firearm injuries are also common, with more than 100,000 occurring annually. Despite the prevalence of guns and gun violence in America, we hypothesized that there would be significant misconceptions related to gun violence among a surveyed population.

Methods: Students at an urban, liberal arts university were electronically surveyed regarding gun violence. Where applicable, responses were compared to the most recent 5-year annual average data from the Centers for Disease Control.

Results: 605 people were invited to participate; 168 completed the study (27.7%). Respondents were mostly female (79.76%) and diverse in terms of age (10.7% between 17-22 years, 19.6%: 23-29, 23.8%: 30-39, 18.4%: 40-49, 18.4%: 50-59, 8.9%: >60). 40% of respondents own a gun. 44% of respondents personally know someone who has been shot. All respondents believed suicide accounted for <50% of annual gun deaths (actual: 62%). 48% of respondents believed there were >75,000 annual gun deaths (actual: 33,880). 73% of respondents believed that >10% of gunshot deaths occurred as a result of accidents (actual: 1.6%). 46% of respondents believed that police shootings accounted for >10% of all firearm deaths (actual: 1.3%). 40.8% of respondents believed that mass shootings accounted for >6% gunshot deaths (actual: <0.5%). Only 35.5% of respondents considered suicide an act of gun violence.

Conclusions: Misconceptions related to gun violence were common amongst survey participants. Many respondents overestimated the total number of firearm injuries and the proportion of deaths related to mass shootings, police interventions, and accidents. The majority of respondents also indicated that they did not view suicide as an act of gun violence. Further characterization of misconceptions is essential to the development of successful injury prevention strategies.

Quick Shots Parallel Session IV

Quick Shot Paper #39
January 11, 2018
4:51 pm

THE USE OF ABC SCORE IN ACTIVATION OF MASSIVE TRANSFUSION: THE YIN AND THE YANG

Rebekah Hodge, BS, Amirreza Motameni, MD, Brian P. Strollo, MD*, Matthew Bozeman, MD*,
Matthew Benns, MD*, Keith Miller, MD*, Brian G. Harbrecht, MD*
University of Louisville

Presenter: Amirreza Motameni, MD

Objectives: Hemorrhage is the most common cause of death in trauma patients within the first hour of arrival to a trauma center. Delay in Massive Transfusion Protocol (MTP) activation has shown to result in increased mortality. Predicting the need for MT remains a challenge. The Assessment of Blood Consumption (ABC) score has become a widely accepted criteria for MTP activation. The purpose of this study is to compare the use of ABC criteria to clinical judgment in MTP activation.

Methods: Adult trauma patients treated at University of Louisville Trauma Center from January 2016 to December 2016 who either had MTP activation based on clinical judgment or had a Focused Assessment with Sonography for Trauma (FAST) scan performed during the initial trauma resuscitation were include. Activation of ABC score was assessed retrospectively. ABC score was calculated by assigning a value (0 or 1) to each of the following four criteria: penetrating mechanism, free fluid on FAST, arrival blood pressure <90 mm Hg and arrival pulse >120 bpm. A score of 2 or more was used as "positive" to activate MTP.

Results: 1,438 patients were included in this study. After retrospectively applying the ABC criteria, only 40% of the patients who had MTP activation based on the ABC criteria would have used more than 5 units of blood products during their entire hospital stay as compared to 77% of the patients in whom clinical judgment was used to activated MTP. 55% of all MT activations via clinical judgment were activated in the OR and 44% in the ED. 83% of activations that occurred in the OR by clinical judgment could have been activated earlier in the ED using the ABC criteria.

Conclusions: While the ABC criteria overestimates the need for MT, its use does lead to earlier activation of MT. Criteria to trigger MT activation should rely on multiple factors including both clinical acumen and well-studied prediction tools such as the ABC score.

Quick Shots Parallel Session IV

Quick Shot Paper #40
January 11, 2018
4:57pm

THE PRESENCE OF AN APPENDICOLITH ON PREOPERATIVE CT IS ASSOCIATED WITH A SEVERE CLINICAL COURSE AND FAILURE OF NON-OPERATIVE THERAPY IN PATIENTS WITH ACUTE APPENDICITIS

David Wang, BS, Mohamad H. Abouzeid, MD
NYU School of Medicine

Presenter: David Wang, BS

Objectives: As the non-operative therapy of acute appendicitis gains traction in the United States, we sought to examine the subset of patients who were found have an appendicolith on preoperative imaging; specifically, the severity of disease, complications rates, and the rate of failure of non-operative management.

Methods: This is a retrospective review of all adult patients admitted to an academic tertiary care center in 2016 with the primary diagnosis of acute appendicitis. Patient demographics and clinical characteristics including sex, age, perforation rate, sepsis rate, complications, and readmission rates were recorded. failure of non-operative therapy was also determined in those who did not undergo surgery as first line therapy. Patients with an appendicolith were compared to those without.

Results: A total of 458 cases of acute appendicitis were identified. 239 were female (52.2%) and the mean age was 36.5 years. Appendicoliths were present in 137 (29.9%). The rates of sepsis, perforation, and abscess were significantly higher at 21.2%, 35.8%, and 18.2% respectively in the appendicolith group compared to those without at 8.4% (P=0.0001), 21.5% (P=0.0014), and 10.9% (P=0.033). In the patients who underwent surgery, the complication rate tended to be higher in the appendicolith group at 9.5% vs 5.3%, although it was not statistically significant (P=0.097). Non-operative management was attempted in 76 patients, of whom 22 (16.1%) had an appendicolith. Their failure rate was 50% compared to 22.2% for the non-appendicolith group (P=0.017).

Conclusions: The presence of an appendicolith in patients with acute appendicitis is a predictor of a more severe disease course and failure on non-operative therapy. We thus recommend strong consideration for early appendectomy in these patients when feasible, rather than non-operative therapy.

Quick Shots Parallel Session IV

Quick Shot Paper #41
January 11, 2018
5:03 pm

TRAUMA SURGEON PERFORMANCE OF APPENDECTOMY IN 5-10 YEAR-OLD CHILDREN IS SAFE AND DECREASES LENGTH OF HOSPITAL STAY

Derek B. Wall, MD*, Carlos Ortega
NorthShore University HealthSystem

Presenter: Derek B. Wall, MD

Objectives: Even in metropolitan areas, on-call pediatric surgeons may not always be immediately available for surgical care of appendicitis, potentially leading to delays in care. Approximately six years ago, the in-house trauma group at a suburban Level 1 trauma center (none with formal pediatric fellowship training) assumed surgical care of 5-10 year-old children with appendicitis within a four hospital system. We propose to compare clinical outcomes before and after this change.

Methods: Retrospective chart review of 5-10 year-olds undergoing emergency appendectomy at a community Level 1 trauma center between January, 2007 and December, 2016 was performed. Patients were classified as having surgery performed by the trauma group or the pediatric surgery group. Patient characteristics, clinical course, and outcomes were compared using the Wilcoxon Rank-Sum Test and Fisher's Exact Test, with $p<0.05$ considered significant.

Results: A total of 220 patients were identified, 138 in the trauma group and 82 in the pediatric surgery group. Patients cared for by the trauma group were more likely to be female (47% vs. 31%; $p=0.03$), were less likely to be diagnosed without imaging (2% vs. 26%; $p<0.0001$), had a shorter time from diagnosis to surgery (214 vs. 318 minutes; $p=0.01$), were more likely to have laparoscopic surgery (70% vs. 55%; $p=0.04$), had a shorter operative time (40 vs. 49 minutes; $p<0.0001$), and had a shorter length of stay (32 vs. 41 hours; $p<0.0001$), despite more of them needing to be transferred from outside hospitals (60% vs. 37%; $p<0.001$). There were no significant differences in patient age, rate of perforated appendicitis, 30 day readmissions, surgical site infections, or unanticipated procedures.

Conclusions: Trauma surgeon performance of emergency appendectomy in 5-10 year-old children decreased length of hospitalization with similar complication rates as compared to pediatric surgeons.

Quick Shots Parallel Session IV

Quick Shot Paper #42
January 11, 2018
5:09 pm

NASOGASTRIC TUBE (NGT) OUTPUT AFTER TWO DAYS PREDICTS THE NEED FOR OPERATION IN SMALL BOWEL OBSTRUCTION (SBO)

D. Dante Yeh, MD*, Mohamed D Ray-Zack, MBBS, Matthew C. Hernandez, MD, Kenji Inaba, MD, Therese M. Duane, MD, FACS*, Salina M. Wydo, MD*, Daniel C. Cullinane, MD*, Andrea Pakula, MD, MPH, FACS*, Asad Choudhry, John Christopher Graybill, Carlos J. Rodriguez, DO, MBA, FACS*, Martin D. Zielinski, MD, FACS*
University of Miami Miller School of Medicine

Presenter: D. Dante Yeh, MD

Objectives: Patients presenting with SBO without signs warranting immediate exploration are often treated with NGT for a trial of non-operative management (non-op). It is difficult to predict patients who will fail non-op. We hypothesized that cumulative NGT output after two days predicts eventual operation.

Methods: A post-hoc analysis of an EAST-sponsored, multi-institutional database collected to study the Gastrografin (GG) challenge in SBO was performed. Only patients with complete data and NGT inserted on the day of admission were included. Exclusions included peritonitis, closed loop obstruction on CT, and operation within 48 h after NGT insertion. The cohort was divided into operative (Op) and non-operative (Non-Op) groups. Descriptive statistics were calculated with comparisons between groups performed using Fisher's exact, t test, and Wilcoxon-rank-sum test as appropriate. Multiple logistic regression analysis controlling for Service of Admission, GG Challenge, and Cumulative NGT output was performed to predict odds of operation.

Results: There were 212 subjects with 50 (24%) ultimately undergoing operation (Table-1). GG challenge was used in significantly more Non-Op patients (68% vs. 42%, p=0.001). Daily and cumulative NGT output by day 2 were significantly greater among Op patients. On regression analysis, odds for eventual operation was significantly greater among patients with surgical service of admission (OR 3.3, 95% CI 1.3-9.6, p=0.029) and cumulative day 2 NGT output >1500mL (OR 3.3, 95% CI 1.6-6.7, p=0.001). GG challenge was predictive of successful non-op (OR 0.3, 95% CI 0.1-0.5, p<0.001).

Conclusions: For patients with SBO treated initially with NGT decompression, cumulative NGT output after two days is predictive of eventual operation. Patients with high NGT output after this time should be strongly considered for exploration.

	All (n=212)	Op (n=50)	Non-Op (n=162)	p
Mean age (SD)	66.6 (15.8)	66.2 (14.3)	66.7 (16.2)	0.8378
Male sex	102 (48%)	23 (46%)	79 (49%)	0.749
Mean weight kg (SD)	79.2 (20.5)	78.5 (22.0)	79.4 (20.1)	0.7967
BMI mean (SD)	27.5 (6.6)	27.5 (1.2)	27.5 (0.5)	0.9830
Hospital LOS median [IQR]	4 [3 – 10]	13 [9 – 20]	3 [2 – 5]	<0.001
Surgical service admission	174 (82%)	45 (90%)	129 (80%)	0.138
History of any cancer	98 (46%)	71 (44%)	27 (54%)	0.256
Prior SBO Admission	99 (47%)	22 (44%)	77 (48%)	0.746
Prior SBO Operative Exploration	57 (27%)	13 (26%)	44 (27%)	1.00
Number of prior abdominal operations	2 [1-4]	2 [1 – 3]	2 [2 -4]	0.06
CT scan	205 (97%)	48 (96%)	157 (97%)	0.669
Transition point identified on CT scan	157 (74%)	37 (74%)	120 (74%)	0.914
Gastrografin challenge performed	131 (62%)	21 (42%)	110 (68%)	0.001
NGT output (mL)				
Day 1	400 [150 – 1000]	600 [270 – 1300]	350 [150 – 920]	0.043
Day 2	615 [250 – 1400]	925 [500 – 1500]	450 [200 – 1250]	<0.001
Cumulative on Day 2	940 [400 – 2100]	1522 [890 – 2950]	800 [350 – 1675]	<0.001
>500 mL	141 (67%)	43 (86%)	98 (60%)	0.001
>1000 mL	99 (47%)	34 (68%)	65 (40%)	0.001
>1500 mL	71 (33%)	25 (50%)	46 (28%)	0.006
Duration from admission to operation: median days [IQR]	4 [2 – 5]	4 [2 – 5]	-	-
Requiring operation	50 (24%)	50	-	

Demographics, Nasogastric Tube (NGT) output on Day 1 and 2, and operative outcomes. BMI = body mass index; CT = computed tomography; SBO = small bowel obstruction

Quick Shots Parallel Session IV

Quick Shot Paper #43
January 11, 2018
5:15 pm

NON-TRAUMA SERVICE ADMISSIONS: SHOULD WE CARE?

Brandon Joseph Fumanti, MD*, Lisa Szyzdiak, Michael D. Grossman, MD*
Northwell Health Southside Hospital

Presenter: Brandon Joseph Fumanti, MD

Objectives: ACS-COT requires trauma centers with greater than 10% injured patients admitted to non-trauma services (NTSA) have process to review these for appropriateness of care. We previously described an algorithm to determine the appropriateness of NTSA. Our objective was to determine potential effects of prospective implementation of the algorithm.

Methods: Three-year retrospective analysis of trauma registry in an ACS-COT verified level II trauma center. Patients defined as meeting NTDB submission criteria but **excluding** isolated hip fractures. NTSA appropriate patients by algorithm were included. Differences between patients admitted to a trauma service (TS) and NTSA were compared using x^2, Fisher's exact, or Wilcoxon tests with significance at p=0.05.

Results: 941of 2872 (33%) patients met algorithm criteria as appropriate NTSA; 694 (74%) were admitted to TS, 247 (26%) were NTSA. Most common association with admission to TS was trauma consult or activation. Compared to TS patients NTSA patients were older, had similar ISS, and a similar proportion had three or greater pre-existing comorbidities(Table 1). NTSA had similar risk for mortality and complications, but longer length of stay (LOS), and were less likely to have a desirable discharge disposition(Table 2).

Conclusions: Minimally injured elderly patients constitute the majority of NTSA and a large proportion of TS admission. ACS-COT requirement for evaluation of NTSA compared to TS admission allowed determination that care after NTSA was appropriate with respect to mortality and complications. Process of care between TS/NTSA may have accounted for longer LOS and differences in disposition. Prospective application of the algorithm would have resulted in a 36% rate of NTSA, well above the ACS-COT threshold and would not have resulted in improved patient care. Efforts to prospectively identify and manage this population are warranted given changing demographics in many trauma centers.

	Trauma	Non Trauma	p-value
Mean Age (Years)	72.2	77.6	<0.001
Mean ISS	5.9	5.4	0.06
3+ Comorbidities (%)	130 (50.8)	352 (52.6)	0.61

Table 1 - Population baseline characteristics

	Trauma	Non Trauma	p-value
Mean Length of Stay (Days)	4.7	6.1	<0.001
Complication (%)	26(3.8)	13 (5.3)	0.31
Mortality (%)	11 (1.6)	2 (0.8)	0.53
Desirable Discharge (%)*	465 (71.2)	105 (43.8)	<0.001

Table 2 - Outcomes.
* Desirable discharge to home or acute rehab setting.

Quick Shots Parallel Session IV

Quick Shot Paper #44
January 11, 2018
5:21 pm

TRENDS IN CIVILIAN PENETRATING BRAIN INJURY; A REVIEW OF 26,871 PATIENTS

David J. Skarupa, MD, FACS*, Muhammad Khan, MD, Dunbar Alcindor, David Ebler, MD*, Albert T Hsu, MD*, Firas G. Madbak, MD, FACS*, Gazanfar Rahmathulla, Brian K. Yorkgitis, DO*, Bellal Joseph, MD*
University of Florida College of Medicine - Jacksonville

Presenter: David J. Skarupa, MD, FACS

Objectives: Penetrating traumatic brain injuries (TBI) are generally associated with higher mortality rates. Principles of management and resuscitation protocols have evolved over the past few years; however, their impact on outcomes remains unclear. The aim of our study is to analyze the 5 years' trends, mortality rate, and factors that influence mortality after civilian penetrating TBI.

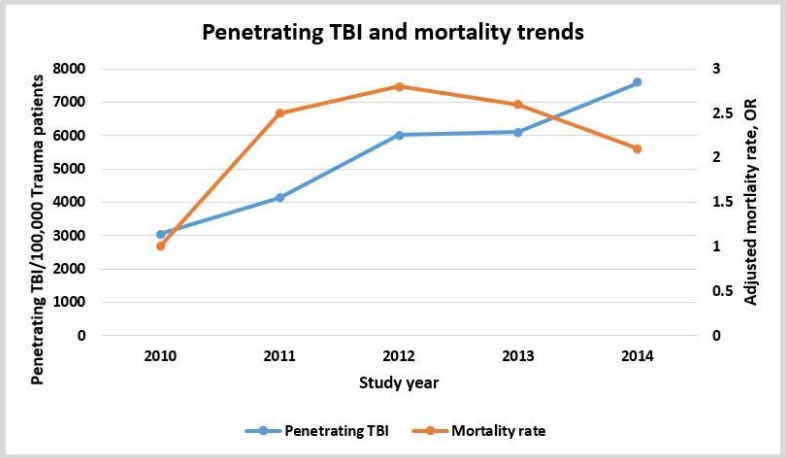
Methods: We performed a 5-year (2010-14) analysis of all trauma patients diagnosed with TBI in the Trauma Quality Improvement Program (TQIP). Patients who had penetrating mechanism of injury were included. Our outcome measures were trends of penetrating TBI and mortality rate over the 5-year period. Regression analysis was performed to determine factors associated with mortality. Sub-analysis was performed.

Results: A total of 26,871 had penetrating brain injury over the 5-year period. Mean age was 36±16y, 86% were males, 53% were white and 32% were African-American. Mechanism of injury was gunshot in 94.6%, of which 44% were self-inflicted. The majority of patients (62%) had severe TBI. Details of operative intervention are summarized in **Table 1**. Overall mortality rate was 34%. The incidence of penetrating TBI increased from 3,042 in 2010 to 7,578 in 2014 per 100,000 trauma patients (**Figure 1)**. On regression analysis, independent predictors of mortality were pre-hospital intubation (OR: 1.9 [1.6-2.3]), penetrating injury with sharp object (non-ballistic) (OR: 1.8 [1.6-2.1]), and suicidal intent (OR: 2.1 [1.8-2.5]). Within the first 24 hours of injury, 59% of patients died, and 17% died on the second day after injury. The incidence of self-inflicted penetrating injuries and mortality rate increased with age. On sub-analysis of patients who underwent operative intervention, adjusted mortality rate was highest for patients who had severe TBI (OR: 7.8 [5.6-9.8]) (**Table 1**).

Conclusions: Incidence and mortality after civilian penetrating TBI has gradually increased over the five-year period. Self-inflicted injury and prehospital intubation were the two most significant predictors of mortality. Injury prevention awareness focused on suicide might help reduce such injuries. In addition, more than half of the deaths occurred within the first 24 hours. Early activation of organ donation protocols as well as resources focused on family support and counseling should be considered.

Table 1. Details of Operative Intervention				
Intervention	Mild TBI (GCS>12) (n=8748)	Moderate TBI (GCS: 9-12) (n=1446)	Severe TBI (GCS<9) (n=16,677)	*p-value*
Craniotomy	8.3%	11.8%	6.5%	<0.001
Craniectomy	3.9%	11.1%	4.7%	<0.001
Lobectomy/excision of brain	4.3%	11.1%	5.3%	<0.001
Operative intervention	(n=1285)	(n=415)	(n=2482)	
Post-Op adjusted mortality rate	1(ref)	2.1 [1.7-3.2]	7.8 [5.6-9.8]	<0.001

Details of Operative Intervention



Penetrating TBI and Mortality Trends

Quick Shots Session V

Quick Shot Paper #45
January 12, 2018
9:15 am

EARLY VITAL CAPACITY PREDICTS THE NEED FOR TRACHEOSTOMY IN CERVICAL SPINAL CORD INJURIES

Kaitlin Ritter, MD, John J. Como, MD, MPH*, Michael Kavanagh,
Gregory Nemunaitis, Jeffrey A. Claridge, MD, MS*
MetroHealth Medical Center

Presenter: Kaitlin Ritter, MD

Objectives: The utility of formally using early PFT's to assist in determining the need of tracheostomy in patients with acute cervical spinal cord injuries (AC-SCI) has yet to be evaluated. This study evaluates the predictive nature of early vital capacity (VC) and need for tracheostomy in patients with AC-SCI.

Methods: An analysis of all patients with AC-SCI admitted to a level 1 trauma center during the period April 2013-April 2016 was performed. Need for tracheostomy was the primary outcome evaluated. Information including patient demographics, mechanism of injury, neurologic level of injury (NLOI) and completeness of cord injury, VC, co-existing chest injuries, and other clinical data was obtained via electronic medical records, the trauma registry, and a prospectively maintained rehabilitation database.

Results: A total of 85 patients with AC-SCI had a mean age of 55 years (SD±17) and 67 patients were male (80%). Median ISS was 17 (IQ 16-21) and blunt mechanism accounted for 97% of injuries. VC was obtained on average 3.8 days post-injury. Of the 85 total patients, 16 (19%) underwent tracheostomy. Those who underwent tracheostomy were younger, more injured, and demonstrated a significantly lower percent of predicted VC (Table 1). A logistic regression analysis of key variables showed younger age (OR, CI 0.85-0.99, p = 0.019), median ISS (OR 1.32, CI 1.08-1.62, p = 0.007), and lower percent predicted VC (OR 0.88, CI 0.81-0.97, p= 0.008) as significant factors predictive of needing a tracheostomy (C statistic = 0.98).

Conclusions: Decreased percent of predicted VC, measured early in the course of hospitalization, is a strong predictor of need for tracheostomy in individuals who have sustained an AC-SCI. Early assessment of pulmonary function can be utilized to help accurately and expediently identify those in need of tracheostomy within this patient population.

Risk Factors for Tracheostomy, n=85			
	No Tracheostomy (n=69)	Tracheostomy (n=16)	p-value
Mean Age (years)	58.0 ± 14.8	42.6 ± 18.5	0.001
Male	52 (77.6%)	13 (81.3%)	1.00
Blunt Mechanism of Injury	64 (95.5%)	16 (100.0%)	1.00
Median ISS (IQR)	16.0 (16.0-20.3)	25.5 (17.8-33.8)	≤0.001
History and Comorbidities			
Current Smoker	20 (29.0%)	4 (25.0%)	1.00
COPD	3 (4.3%)	1 (6.3%)	0.57
Neurologic Injury			
NLOI (C1-C3)	41 (59.4%)	7 (43.8%)	0.28
ASIA A	9 (13.0%)	10 (62.5%)	≤0.001
Concurrent Chest Injuries			
Rib Fracture	13 (18.8%)	3 (18.8%)	1.00
Hemothorax/Pneumothorax	3 (4.3%)	4 (25.0%)	0.02
Pulmonary Contusion	1 (1.4%)	5 (31.3%)	0.001
Pneumonia (prior to tracheostomy)	1 (1.4%)	5 (31.1%)	0.001
Ventilatory Function Testing			
Mean % Predicted Vital Capacity	47.7 ± 21.5	20.7 ±11.4	≤0.001

Table 1.

Quick Shots Session V

Quick Shot Paper #46
January 12, 2018
9:21 am

USE OF "SEPSIS ADVISOR TOOL" IMPROVES MORTALITY IN HIGH-ACUITY SEPTIC PATIENTS

Theophilus Pham, MBA, MS2, Yana Puckett, MD, MPH, MS, MBA, Steven Brooks, MD
Texas Tech University Health Sciences Center at Lubbock

Presenter: Theophilus Pham, MBA,MS2

Objectives: Surviving Sepsis Campaign Guidelines was created in an effort to reduce mortality in septic patients worldwide. Texas Tech University Medical Center, a Level 1 Trauma and Regional Burn Center, has implemented a "Sepsis Advisor Tool" (SAT) into our EMR software that allows the physician to place orders quickly based on Surviving Sepsis Campaign Bundle. We hypothesize that SAT use has helped lower the mortality rate in higher-acuity septic patients.

Methods: Electronic medical records were analyzed from January 2016 to March 2017 for cases of sepsis defined by postoperative ICD-10 code A41, J18.9, N39.0 in patients with an age range of 18-89. The cases were divided into two groups: advisor used (SAT) and not used (no SAT). Demographical data as well as data on mortality, LOS, and treatment promptness were compared between the two groups. Independent t-test was used to compare means between continuous variables and Chi-Square test was used to compare categorical variables. Binary logistic regression analysis was used to adjust for severity of illness and outcome of mortality.

Results: A total of 2,461 patients were diagnosed with sepsis between January 2016 and Marc 2017. Of these, sepsis advisor was used on 10.81% (266). Length of stay, age, and BMI comparable between the two groups. Antibiotics were administered within the first 3 hours for 62.78% (167) of SAT patients and 44.46% (976) noSAT patients (p=0.0001). After adjusting for age, BMI, admission lactate level, mortality risk, and illness severity, SAT patients were 79% less likely to die if their severity of illness was Grade III or IV OR=0.219; 95% CI (0.164-0.487), (P=0.005); and 87.5% less likely to die if their risk of mortality was either Grade III or IV OR= 0.125; 95% CI (0.07-0.222), (P=0.02).

Conclusions: The "Sepsis Advisor Tool" was used more frequently in higher-acuity patients, resulting in improved mortality in these patients.

	SAT (n=266)	NoSAT (n=2195)	P-Value
Age	60.89 (17.745)	58.29 (17.68)	0.993
BMI	27.89 (12.97)	27.92 (15.68)	0.656
Payer Status			0.008
Medicare	62.41% (166)	50.30% (1104)	
Medicaid	10.15% (27)	13.17% (289)	
Private Insurance	15.79% (42)	22.19% (487)	
Self-Pay	11.65% (31)	14.35% (315)	
Risk of Mortality Score			0.0001
Grade I	1.13% (2)	1.42% (22)	
Grade II	5.08% (9)	16.89% (262)	
Grade III	18.08% (32)	26.69% (414)	
Grade IV	75.71% (134)	55.00% (853)	
Severity of Illness Grade			0.0001
Grade I	0.0% (0)	1.00% (22)	
Grade II	7.89% (21)	18.27% (401)	
Grade III	42.85% (114)	35.62% (782)	
Grade IV	48.49% (129)	42.73% (938)	

Description of the study population (mean (SD) for continuous variables or n (%) for categorical variables (n=2,461).

	SAT (n=266)	NoSAT (n=2195)	P-Value
Mortality	14.66% (39)	14.67% (322)	0.997
Total Charges (U.S. Dollars)	126,421.25 (202,399.26)	101,658.35 (173,340)	0.002
Total Payments (U.S. Dollars)	19,850.2 (32,389.01)	15,824.44 (29,681.07)	0.016
Total Cost (U.S. Dollars)	30,474.24 (56174.02)	24096.30 (50,534.76)	0.008
LOS (Days)	11.14 (13.05)	9.9 (10.8)	0.025
1st Lactate Level	2.56 (1.8)	2.4 (2.1)	0.8
2nd Lactate Level	1.73 (1.72)	1.36 (2.2)	0.25
Fluid Volume Given	1722.11 (1373.36)	1542.53 (1429.14)	0.922
Fluid Volume Given ml/kg	22.31 (16.43)	19.82 (18.44)	0.362
Fluids Administered Within 1 Hour	69.92% (186)	62.59% (1374)	0.05
Fluids Administered 30 mg/kg	43.23% (115)	31.11% (683)	0.0001
Antibiotics Administered Within 3 Hours of Presentation	62.78% (167)	44.46% (976)	0.0001
Antibiotics Administered Within 1 Hour of Presentation	8.3% (22)	7.6% (167)	0.328
Length of Stay Less than 1 Day	3.4% (9)	1.0% (56)	0.912

Comparison of outcomes between patients that had “Sepsis Advisor Tool” utilized and those that did not (mean (SD) for continuous variables or n (%) for categorical variables (n=2,461).

Quick Shots Session V

Quick Shot Paper #47
January 12, 2018
9:27 am

UNSEEN BURDEN OF INJURY: POST HOSPITALIZATION MORTALITY IN GERIATRIC TRAUMA PATIENTS

Ciara R. Huntington, MD, Ronald F. Sing, DO*, Kevin Kasten, Tanushree Prasad, Amy Lincourt, Vedra Augenstein, B. Todd Heniford
Carolinas Medical Center

Presenter: Ciara R. Huntington, MD

Objectives: This study utilizes Level I Trauma Center data and the US Social Security Death Database (SSDD) to capture long term, out-of-hospital mortality in geriatric trauma patients.

Methods: Blunt trauma patients age =65 were identified from 2009-2015 in an ACS-verified Level 1 Trauma Center registry database. With IRB approval, dates of death were queried from the SSDD using social security number and unique patient identifiers. Patients without identifiers were excluded. Demographics, injury, diagnoses, treatment, and outcomes were collected and compared with descriptive and univariate analysis; $p<0.05$ was significant.

Results: 6289 geriatric trauma patients were identified, age 65-105 years. Data included: average age 78.5±8.4 years, 3625 (57.0%) female, 3217 (51.8%) transferred from another medical center, and median length of stay 4 days, mean 5.8±11.0. Median time to death was 225 days, mean 483±575 days. 2632 patients (41.9%) died within 8 years of injury; 505 (8.0%) died as an inpatient. Overall 24.1% of patients died within 1 year after injury: 757 (12.0%) died <1 month, 488 (7.8%) between 1-6 months, and 274 (4.4%) between 6-12 months. Of those who died, 80.8% were outpatient. Of 488 patients who died within 1-6 months of trauma, only 8 were inpatient at time of death. Patients who died at 1 month after trauma had significant differences compared to survivors: older age ($p<0.001$) lower mean Glascow coma scale at presentation (10.8±5.0 vs 14.5±1.8, $p<0.001$), and higher Injury Severity Score (18.1±11.5vs 9.7±7.0, $p<0.001$). Fall was the most common mechanism of injury (76%, n=4757), and only 53.5% of patients were alive at long term follow-up. Motor vehicle crash accounted for 19% of geriatric traumas, with 72.4% (n=1212) alive at long term follow-up.

Conclusions: Short term mortality rates fail to fully capture the burden of trauma on the elderly. Though 92% of geriatric trauma patients survive to discharge, almost one-quarter were dead at one year following their injury.

Quick Shots Session V

Quick Shot Paper #48
January 12, 2018
9:33 am

A SELECTIVE PLACEMENT STRATEGY FOR SURGICAL FEEDING TUBES BENEFITS TRAUMA PATIENTS

Joseph H. Marcotte, MD, Joshua P. Hazelton, DO, FACS*, Michael K. Dalton, MPH, Amber Batool, DO*, John Gaughan, Linh Nguyen, John Porter, MD*, Nicole Fox, MD, MPH, FACS*
Cooper University Hospital

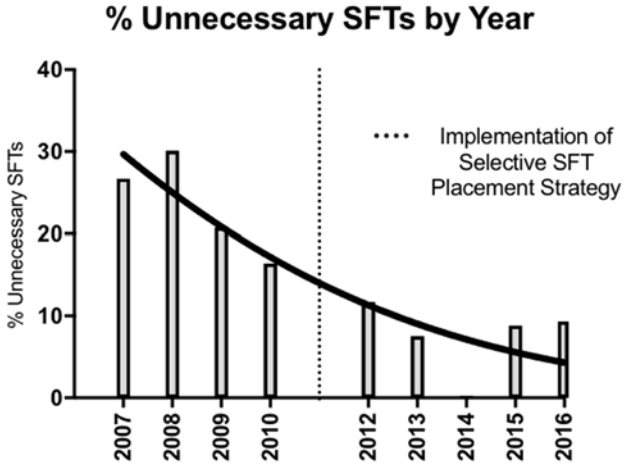
Presenter: Joseph H. Marcotte, MD

Objectives: The indications for surgical feeding tube (SFT) placement in trauma patients are poorly defined. Patient selection is critical as complications from SFTs have been reported in up to 20% of patients. A previous analysis by our group determined that nearly 25% of the SFTs we placed were unnecessary and that older patients, patients with head and spinal cord injuries, and patients who needed a tracheostomy were more likely to require long term SFTs. Following this study, we modified our institutional guidelines for SFT placement. We hypothesized that a more selective placement strategy would result in fewer unnecessary SFTs.

Methods: A retrospective review of all adult patients from 2012-2016 with an ICU LOS ≥4 days and a SFT placed during admission was conducted. This group was compared to our data collected prior to our change in practice (2007-2010). Data from 2011 was excluded as a washout period. "Necessary" SFT was defined per established guidelines as either daily use of the SFT through discharge or for ≥28 days and "unnecessary" SFT as all others. A $p<0.05$ was considered significant.

Results: 257 SFTs were placed from 2007-2010 and 244 from 2012-2016. Following implementation of our selective SFT placement strategy, unnecessary SFT placement decreased from 25% in 2007-2010 to 8% in 2012-2016 ($p<0.0001$) (Fig.1) Significant predictors of necessary SFT placement by univariate regression were: increasing age (OR 1.03/yr CI 1.01-1.04), head injury (OR 2.80 CI 1.71-4.60), cervical spinal cord injury (OR 4.42 CI 1.34-14.50), and need for tracheostomy (OR 1.41 CI 2.21-7.67). The rate of complications related to SFT placement after implementation of a selective strategy was 9%, and was highest following open jejunostomy placement (43%)

Conclusions: A selective placement strategy for surgical feeding tubes in our trauma population resulted in fewer unnecessary SFTs and a complication rate lower than most reported series.



Percentage of unnecessary SFTs by year, with Gaussian line of best fit.

Quick Shots Session V

Quick Shot Paper #49
January 12, 2018
9:39 am

PROGNOSIS OF DIFFUSE AXONAL INJURY (DAI) WITH TRAUMATIC BRAIN INJURY (TBI)

Stephen Humble, BS, MD(c), Laura Wilson, Li Wang, Drew Long, Miya Smith, Jonathan Siktberg, Aashim Bhatia, Sumit Pruthi, Matthew Day, Mina F. Mirhoseini, MD, Susanne Muehlschlegel, Mayur B. Patel, MD, MPH, FACS*
Vanderbilt University Medical Center

Presenter: Stephen Humble, BS, MD(c)

Objectives: To determine the prognostic impact of MRI-defined DAI after TBI on functional outcomes, quality of life, and 3-year mortality.

Methods: This retrospective single center cohort included adult trauma patients (age>17y) admitted from 2006-2012 with TBI. Inclusion criteria were positive head CT with brain MRI within 2 weeks of admission. Exclusion criteria included penetrating TBI or prior neurologic condition.

Separate ordinal logistic models assessed DAI's prognostic value for following scores: 1)hospital-discharge Functional Independence Measure (FIM); 2)long-term Glasgow Outcome Scale-Extended (GOSE); and 3)long-term Quality of Life after Brain Injury-Overall Scale (QOLIBRI-OS). Cox proportional hazards modeling assessed DAI's prognostic value for 3-year survival. Covariates included age, sex, race, insurance status, Injury Severity Score (ISS), admission Glasgow Coma Scale Score, Marshall Head CT Class, clinical DAI on MRI (Y/N), research-level anatomic DAI Grades I-III (I:cortical, II:corpus callosum, III:brainstem), ventilator days, time to follow commands, and time to long-term follow up (for logistic models).

Results: Eligibility criteria was met by 311 patients, who had a median age=40y (IQR:23-57), ISS=29 (IQR:22-38), ICU stay=6d (IQR:2-11), and follow-up=5y (IQR:3-6y). MRIs had DAI 47% clinically. Among 300 readable MRIs, 56% of MRIs had anatomic DAI (25% Grade I, 18% Grade II, 13% Grade III). On regression, only clinical (not anatomic) DAI was predictive of a lower FIM score (OR=2.7 [95% CI:1.39-5.26], P=0.003). Neither clinical nor anatomic DAI were related to survival, GOSE, or QOLIBRI scores.

Conclusions: In this longitudinal cohort, clinical evidence of DAI on MRI may only be useful for predicting short-term in-hospital functional outcome. Given no association of DAI and long-term TBI outcomes, providers should be cautious in attributing DAI to future neurologic function, quality of life, and/or survival.

Quick Shots Session V

Quick Shot Paper #50
January 12, 2018
9:45 am

EMERGENT TRANSFUSION IN LEVEL 1 TRAUMA PATIENTS: ARE WE PULLING THE TRIGGER TOO SOON?

Adrian A. Coleoglou Centeno, MD, Kelly Bochicchio, Qiao Zhang, ROHIT K Rasane, MBBS, MS,
Jarot Guerra, MD, Marlon Torres, Chris Horn,
Douglas J.E. Schuerer, MD, FACS*, Grant V. Bochicchio, MD,MPH*
Washington University in St. Louis

Presenter: Adrian A. Coleoglou Centeno, MD

Objectives: Recent studies suggest that early transfusion (TX) of packed red blood cells (PRBCs) saves lives and improves outcome in severely injured trauma patients. However, as with any strategy that aims to improve outcome, there may be a tendency to "pull the trigger" too soon. Our objective was to determine the incidence of unnecessary TXs of PRBCs in high risk trauma patients.

Methods: We prospectively enrolled all Level 1 trauma patients admitted over 1 year who received at least 1 unit of PRBCs and/or were taken emergently to the OR for bleeding control within 2 hours of injury. Patients were stratified into 3 TX categories: 1) Clinically necessary 2) Unnecessary 3) No TX. Unnecessary TX was defined on a case by case basis which included whether there was truly a clinical need for blood TX based on injury and pre/post TX hemoglobin. Outcomes evaluated included infection, hospital, ICU and ventilator days and mortality.

Results: 140 patients were enrolled. 97 (69%) patients received a clinically necessary TX compared to 25 patients (18%) who received no TX. The remaining 18 patients (13%) were evaluated and considered to have been unnecessarily transfused and received a mean number of 2.9 Units of PRBCs. We compared outcome in patients in the unnecessary TX group to the no TX group. There was no significant difference in age (mean =28.5 years), gender (91% male), mechanism (penetrating =95%) or ISS (mean = 18) between the 2 groups. Unnecessarily TX patients were more likely to be admitted to the ICU [72% vs. 40% ($p<0.03$)] and had more ICU days [2.7 days vs. 0.88 ($p<0.03$)]. There was no significant difference in hospital days, infection rate and sepsis.

Conclusions: 13% of high risk level 1 trauma patients received an immediate unnecessary blood TX which has a potential to have a significant impact on outcome and resource utilization. Further research is needed to determine more appropriate TX triggers.

Quick Shots Session V

Quick Shot Paper #51
January 12, 2018
9:51 am

EXAMINATION OF HEMODYNAMICS IN PATIENTS UNDERGOING RESUSCITATIVE ENDOVASCULAR BALLOON OCCLUSION OF THE AORTA (REBOA)

Philip J Wasicek, MD, Yao Li, Shiming Yang, PhD, William Teeter, MD, MS,
Deborah M. Stein, MD, MPH, FACS, FCCM*, Thomas M. Scalea, MD, FACS, FCCM*,
Peter Hu, PhD, Megan Brenner, MD*
R Adams Cowley Shock Trauma Center, University of Maryland School of Medicine

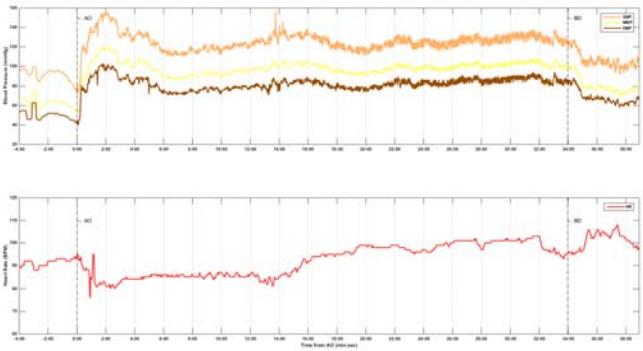
Presenter: Philip J Wasicek, MD

Objectives: The objective of this study was to investigate the hemodynamic effects of aortic occlusion (AO) during REBOA using a sophisticated continuous vital sign (CVS) monitoring tool.

Methods: Patients admitted between February 2013 and May 2017 at a tertiary center that received REBOA were included. Patients in cardiac arrest before or at the time of REBOA were excluded. Time of AO was documented by time-stamped videography and correlated with CVS data.

Results: 28 patients were included, mean ISS was 39?12 and in-hospital mortality was 36%. 71% suffered blunt injury and 29% suffered penetrating trauma. 18 received Zone 1 (distal thoracic aorta) AO and 10 received Zone 3 (distal abdominal aorta) AO. Among Zone 1 patients the pre-AO systolic blood pressure (SBP) nadir was 64?19mmHg (mean?SD), which increased to a mean of 116?35mmHg within 5 minutes after AO ($p<0.001$). Among Zone 3 patients the pre-AO SBP nadir was 75?19mmHg, which increased to a mean of 98?14mmHg within 5 minutes after AO ($p=0.01$). 72% of Zone 1 patients had episodes during AO where SBP was less than 90mmHg as compared to 80% of Zone 3 patients ($p=0.66$). 100% of Zone 1 patients had periods during AO where SBP was greater than 140mmHg as compared to 70% Zone 3 patients ($p=0.01$). The mean decrease in SBP after balloon deflation was 14?21mmHg for Zone 1 ($p=0.06$) and 12?18mmHg for Zone 3 patients ($p=0.10$). Patients undergoing Zone 1 AO were more likely to have an acute change (increase or decrease) in their heart rate immediately after AO as compared to Zone 3 AO ($p=0.04$).

Conclusions: Significant hemodynamic alterations occur before, during, and after AO. The effects of Zone 1 AO on blood pressure and heart rate appear different than Zone 3 AO. This may have important implications for cardiac or cerebral function and perfusion goals, particularly with concomitant injuries such as cardiac contusion or traumatic brain injury.



Vital sign data recorded continuously every 2 seconds from a patient in hemorrhagic shock undergoing REBOA. A dramatic increase in blood pressure (BP) and decrease in heart rate is identified after AO. The timing of AO is confirmed with videography in the resuscitation area and operating room. Upon balloon deflation, the patient experienced a small decrease in BP and increase in heart rate.

Quick Shots Session V

Quick Shot Paper #52
January 12, 2018
9:57 am

BLUNT CEREBRAL VASCULAR INJURY IN ELDER FALL PATIENTS: ARE WE SCREENING ENOUGH AND IS IT WORTH THE RISK

Vince Anto, BS, Andrew B. Peitzman, MD*, Brian Zuckerbraun, Matthew Neal, Gregory A Watson, MD*, Timothy Billiar, MD, Jason L. Sperry, MD, MPH*
University of Pittsburgh Medical Center

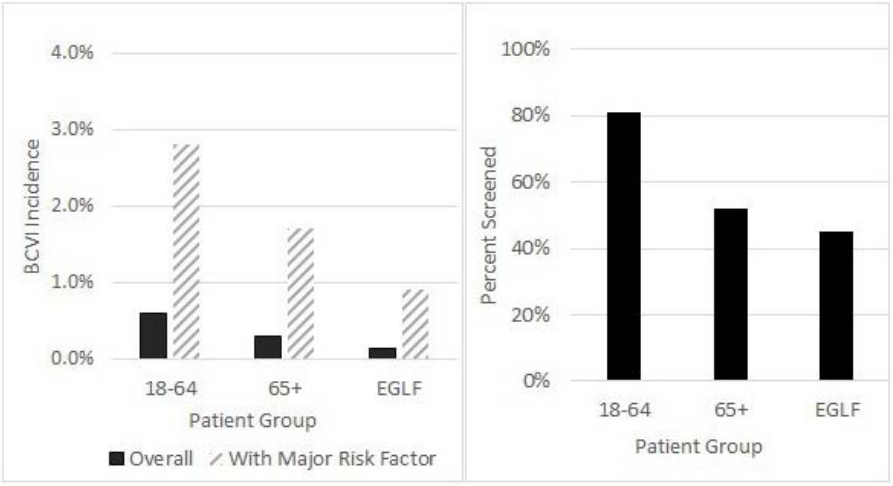
Presenter: Vince Anto, BS

Objectives: Blunt cerebrovascular injuries (BCVI) are generally associated with high-energy injuries. Less is known regarding lower-energy injuries and the risks attributable to screening with intravenous contrast in the elderly. We sought to characterize current BCVI screening practices and associated complications in elderly ground level fall patients (EGFL, =65 years). We hypothesized that BCVI in EGLF patients would be frequent and screened less commonly due to anticipated risks.

Methods: A retrospective study was performed utilizing the National Trauma Data Bank (NTDB, 2007-2014) and single institution data. BCVI risk factors and diagnosis were determined by ICD9 codes and chart review. Presenting creatinine and eGFR, incidence of kidney injury (AKI), and clinical course were obtained by chart review. The NTDB dataset was used to determine the incidence of BCVI and outcomes in the EGLF cohort, local chart review focused on screening complications.

Results: The incidence of BCVI in EGLF patients was 0.14% overall and 0.9% in those with at least one BCVI risk factor. These rates were comparable to those =65 years and age 18-64 years (figure). In EGLF patients, the diagnosis of BCVI was an independent risk factor for mortality (OR-2.1,95% C.I. 1.6-2.6). Over the same period the institutional data had a BCVI incidence of 0.3% (n=4,603) and 2.7% in those with at least one risk factor (n=451). EGLF patients had a significantly lower rate of BCVI screening (45%, figure). Only 8% of EGLF patient not screened had documented contraindications. The incidence of AKI was 9% irrespective of BCVI screening.

Conclusions: The incidence of BCVI is common in EGLF patients and an independent predictor of mortality. Screening is less common in EGLF patients despite few contraindications. This data suggests that using age and injury mechanism to omit BCVI screening in EGLF patients may exclude an at-risk population.



Incidence of BCVI in NTDB dataset and screening rates from local institution data

Quick Shots Session V

Quick Shot Paper #53
January 12, 2018
10:03 am

LIMITED PRE-HOSPITAL CRYSTALLOID ADMINISTRATION IS ASSOCIATED WITH A DECREASED INCIDENCE OF ARDS: A SECONDARY ANALYSIS OF THE PROPPR TRIAL

Aravind K. Bommiasamy, MD, Elizabeth Dewey, Todd Graham, James Murphy, John B. Holcomb, MD*, Eileen M. Bulger, MD, Charles E. Wade, PhD, Kenji Inaba, MD, Martin A. Schreiber, MD, FACS*
Oregon Health and Science University

Presenter: Aravind K. Bommiasamy, MD

Objectives: Crystalloid administration is relied heavily upon to treat hemorrhagic shock in the pre-hospital setting. Current evidence suggests that aggressive fluid administration is detrimental and leads to worse outcomes. We hypothesize that patients who receive limited fluid resuscitation in the pre-hospital setting would have improved outcomes.

Methods: Trauma patients admitted to 12 Level I North American trauma centers were studied. Patients were divided into 3 groups, no pre-hospital crystalloid fluid, low pre-hospital fluid (1-250mL), and high pre-hospital fluid (>250mL). Propensity scores were created and added to subsequent analysis to balance for potentially confounding variables between patients in different fluid groups. Cox proportional hazards clustering on site compared 30-day survival between groups. Logistic regression evaluated 3, 6 and 24 hour mortality and complications.

Results: 392 (58%) patients met inclusion criteria for analysis. Patients who received high amounts of fluid (n=231) had longer transport times, lower Glasgow Coma Scale, and higher incidence of traumatic brain injury (Table 1). Patients who received low fluids (n=65) were less likely to develop Acute Respiratory Distress Syndrome (ARDS) compared to patients who received no fluids (n=96) or high fluids (Table 2).This did not translate to improved mortality when comparing low fluid administration to no fluid or high fluid administration. There were no differences in rates of acute kidney injury, multiple organ failure or sepsis between the 3 groups.

Conclusions: Crystalloid resuscitation has been shown to lead to worse outcomes in trauma patients. Low fluid administration was found to be associated with decreased risk of developing ARDS when compared to no fluid and high fluid. However, in patients predicted to receive a massive transfusion, fluid administration did not impact mortality.

Table 1	High Fluid (>250mL) (n=231)	Low Fluid (1-250mL) (n=65)	No Fluid (0 mL) (n=96)	p*
Age, Mean(Standard Deviation)	39.37(18.14)	37.32(16.66)	38.93(16.43)	0.71
Transport Time, Mean(Standard Deviation)	39.06(22.87)	24.77(12.23)	26.04(13.65)	<0.01
Injury Severity Score, Mean(Standard Deviation)	33.23(12.51)	34.45(12.27)	32.7(12.05)	0.67
Glasgow Coma Scale ,Mean(Standard Deviation)	8.95(5.61)	10.57(5.24)	10.57(5.00)	0.01
TBI (%)	54.55	38.46	43.75	0.03
1:1:1 Treatment Group	46.32	50.77	56.25	0.25
Geriatric Patient (%)	8.66	7.69	9.38	0.93
Blunt Injury (%)	58.44	52.31	56.25	0.31
Hypotension on Admission (%)	48.48	43.08	46.88	0.74
Tachycardia on Admission (%)	73.59	69.23	68.75	0.60
ARDS (%)	22.08	9.23	15.63	0.03
Ground Transport (%)	69.26	86.15	84.38	<0.01
Total Fluids (L),median (IQR)	0.00(0.00)	0.20(0.10)	1.00(1.00)	<0.01

*p value calculated using F-test, Kruskal-Wallis H test, or $\chi 2$

Table 1. Baseline characteristics. Hypotension was defined as a SBP < 100. Tachycardia was defined as a Pulse > 100. TBI was based on AIS head ≥3 or GCS ≤8.

Table 2	OR(95%CI)	p*
3-hour mortality (high vs none)	0.68(0.20,2.26)	0.51
3-hour mortality (low vs none)	1.33(0.49,3.64)	0.56
3-hour mortality (high vs low)	0.51(0.19,1.39)	0.18
6-hour mortality (high vs none)	0.68(0.40,1.17)	0.16
6-hour mortality (low vs none)	0.76(0.36,1.57)	0.44
6-hour mortality (high vs low)	0.91(0.52,1.59)	0.72
24-hour mortality (high vs none)	0.87(0.44,1.69)	0.66
24-hour mortality (low vs none)	1.53(0.83,2.81)	0.16
24-hour mortality (high vs low)	0.57(0.31,1.03)	0.06
ARDS (high vs none)	0.95(0.54,1.69)	0.85
ARDS (low vs none)	0.45(0.20,0.99)	<0.05
ARDS (high vs low)	2.13(1.11,4.09)	0.02
AKI (high vs none)	1.31(0.66,2.60)	0.42
AKI (low vs none)	1.07(0.34,3.34)	0.91
AKI (high vs low)	1.23(0.58,2.61)	0.57
MOF (high vs none)	1.14(0.33,3.96)	0.83
MOF (low vs none)	0.77(0.18,3.24)	0.71
MOF (high vs low)	1.49(0.43,5.14)	0.51
Sepsis (high vs none)	1.13(0.64,2.01)	0.65
Sepsis (low vs none)	0.74(0.41,1.35)	0.31
Sepsis (high vs low)	1.53(0.86,2.72)	0.14

*p calculated using multivariate logistic regression or Cox proportional hazard model

Table 2. Multivariate logistic regression model for complications.

Quick Shots Session V

Quick Shot Paper #54
January 12, 2018
10:09 am

MULTICENTER STUDY OF CRYSTALLOID BOLUSES AND TRANSFUSION IN PEDIATRIC TRAUMA - WHEN TO GO TO BLOOD?

Stephanie F. Polites, MD, Rachel M. Nygaard, PhD, Martin D. Zielinski, MD, FACS*, Chad J. Richardson, Donald Dean Potter, MD*, Denise B. Klinkner, Christopher Moir, MD*
Mayo Clinic

Presenter: Stephanie F. Polites, MD

Objectives: The 9th edition of ATLS recommends up to three crystalloid boluses in pediatric trauma patients with consideration of transfusion after the second bolus however this approach is debated. We aimed to determine if nonresponse to incremental crystalloid boluses is associated with transfusion in injured children.

Methods: 2010-2016 highest tier activation patients <15 years of age from two ACS Level I pediatric trauma centers were identified from prospectively maintained trauma databases. Those with a shock index (heart rate/systolic blood pressure) >0.9 were included. Crystalloid boluses (20±10 cc/kg) and transfusions administered prehospital and within 12 hours of hospital arrival were determined. Univariate and multivariable analyses were conducted to determine association between crystalloid volume and transfusion.

Results: Among 208 patients, the mean age was 5±4 years (60% male), 91% sustained blunt injuries, and median (IQR) ISS was 11 (6,25). 29% received one bolus, 17% received two, and 10% received at least three. Transfusion of any blood product occurred in 69 (18%) patients; mean (range) RBC was 23 (0-89) cc/kg, plasma 8 (0-69), and platelets 1 (0,18). The likelihood of transfusion increased logarithmically from 11% to 43% for those requiring ≥2 boluses (Figure 1). This relationship persisted on multivariable analysis that adjusted for institution, age, and shock index with good discrimination (AUROC 0.84). Shock index was also strongly associated with transfusion (Table 1).

Conclusions: Almost half of pediatric trauma patients with elevated shock index require transfusion following two crystalloid boluses and the odds of requiring a transfusion plateau at this point in resuscitation. This supports consideration of blood after the second bolus in conjunction with shock index though prospective studies are needed to confirm this and evaluate the impact on outcomes.

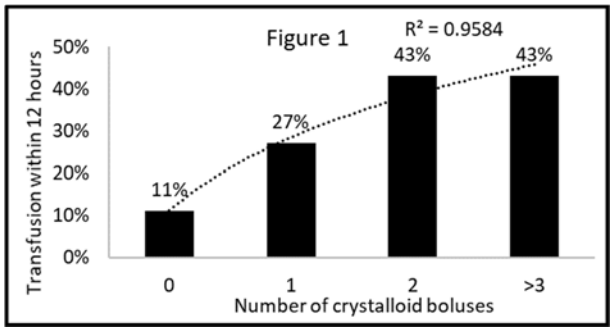


Table 1: Multivariable analysis of characteristics associated with transfusion

	Patient Factor	Odds Ratio	Confidence Interval	p value
Number of crystalloid boluses (vs <1)	1	2.28	0.91-5.86	0.08
	2	6.07	2.31-16.68	<.001
	3	4.28	1.30-14.08	0.017
Shock Index Quartile (vs 0.9-1.0)	>1.0-1.2	8.43	2.04-34.85	.003
	>1.2-1.5	25.00	7.10-87.91	<.001
	>1.5	18.15	4.92-67.02	<.001
*Also adjusted for institution and age				

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