THIRTY-NINTH ANNUAL MEETING

Western Trauma Association

Crested Butte 2009

February 22 – February 28, 2009

Crested Butte, Colorado
Study availability - delay mandate fee - 20%
is activity has been planned and implemented in accordance with the Essential Areas, Elements and Policies of the Wisconsin Medical Society through the joint sponsorship of Gundersen Lutheran Medical Foundation and the Eastern Trauma Association. The Gundersen Lutheran Medical Foundation is accredited by the Wisconsin Medical Society to provide continuing medical education for physicians.

Gundersen Lutheran Medical Foundation designates this educational activity for a maximum of 17.25 AMA PRA Category I Credit(s). Physicians should only claim credit commensurate with the extent of their participation in the activity.
<table>
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<tr>
<th>Name</th>
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<td>Albrecht, Roxie</td>
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<td>Other Financial or Material Support - Hemostasis Laboratories, (314) N. Paul, MN</td>
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<td>Allison, C</td>
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<td>Knudon, P</td>
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<td>Amin, PB</td>
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<td>Ball, CG</td>
<td>Nothing to disclose</td>
<td>Ley, E</td>
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<td>Beekley, A</td>
<td>In-Spectra devices provided on-loan for project by Hutchinson Technology</td>
<td>Livingston, David</td>
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<td>Biffi, Walter</td>
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<td>Long, J</td>
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<td>Borkon, MJ</td>
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<td>Mangram, A</td>
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<td>Byrne, M</td>
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<td>Coanour, CS</td>
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<td>Cogbill, Tom</td>
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<td>Moore, H</td>
<td>Grant/Research Support/Patents - UVM - School of Medicine &amp; Dept. of Surgery - Fletcher Allen Healthcare</td>
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<td>Coimbra, Raul</td>
<td>Nothing to disclose</td>
<td>Morrison, C</td>
<td>Spouse is an employee of MedVance which make Arctic Sun device</td>
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<td>Schreiber, Martin</td>
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<td>Holcomb, JB</td>
<td>Consultant, Hemson/Scientific Advisory Board for Novo Nordisk</td>
<td>Smith, RS</td>
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39th Annual Meeting
Crested Butte, Colorado
2008-2009

CERS:
Grace S. Rozycki, MD
President
Robert C. Mackersle, MD
President-Elect
M. Gage Ochsner, MD
Vice President
David Livingston, MD
Secretary
R. Lawrence Reed, II, MD
Treasurer
R. Christie Wray, MD
Historian

RD OF DIRECTORS:
Denis Bensard, MD
2009
Peter Rhee, MD
2009
Kimberly A. Davis, MD
2010
Soumitra R. Eechempati, MD
2010
Raul Coimbra, MD
2011
Rosemary A. Kozar, MD
2011

GRAM COMMITTEE:
Christine Cocanour, MD, Chair
Grace Rozycki, MD
Steve Smith, MD
Carol R. Schermer, MD
Herbert J. Thomas, III, MD
Dennis W. Vane, MD
Christopher C. Baker, MD
C. Clay Cothren, MD
M. Margaret Knudson, MD
Riyad C. Karmy-Jones, MD

JICATIONS COMMITTEE:
M. Margaret Knudson, Chair
Hasan Alam, MD
Roxie M. Albrecht, MD
Christopher Baker, MD
Eric Barquist, MD
Walt Biffi, MD
Karen J. Brasel, MD
Susan Brundage, MD
Michael Chang, MD
David Ciesla, MD
Mitchell Cohen, MD
Raul Coimbra, MD
Kimberly A. Davis, MD
James Davis, MD
Rochelle Dicker, MD
David Feliciano, MD
Larry Gantileho, MD
Enrique Ginzburg, MD
Vincent Gracias, MD
James Haan, MD
John Holcomb, MD
Jay Johannigman, MD
Krista L. Kaups, MD
Rosemary Kozar, MD
Barbara Latenser, MD
David Livingston, MD
Richard Miller
Eugene Moore, MD
Frederick Moore, MD
Ram Nirula, MD
Scott Peterson, MD
Peter Rhee, MD
Jeffrey Saffle, MD
Martin Schreiber, MD
Steve Shackford, MD
Stephen Smith, MD
Dennis Vane, MD
Dan Vargo, MD
Michael West, MD
Chris Wray, MD

INATING COMMITTEE:
James W. Davis, MD, Chair
Susan Brundage, MD
Steve Shackford, MD
Herbert J. Thomas, III, MD

NI-CENTER TRIALS COMMITTEE:
Krista L. Kaups, MD, Chair
<table>
<thead>
<tr>
<th>President</th>
<th>Year</th>
<th>Location</th>
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<tr>
<td>Robert G. Volz, M.D.</td>
<td>1971</td>
<td>Vail</td>
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<tr>
<td>Robert G. Volz, M.</td>
<td>1972</td>
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<tr>
<td>Peter V. Teal, M.D.</td>
<td>1973</td>
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<tr>
<td>William R. Hamsa, M.D.</td>
<td>1974</td>
<td>Aspen</td>
</tr>
<tr>
<td>Arthur M. McGuire, M.D.</td>
<td>1975</td>
<td>Sun Valley</td>
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<tr>
<td>Lynn Ketchum, M.D.</td>
<td>1976</td>
<td>Snowmass</td>
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<tr>
<td>Fred C. Chang, M.D.</td>
<td>1977</td>
<td>Park City</td>
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<tr>
<td>Glen D. Nelson, M.D.</td>
<td>1978</td>
<td>Steamboat</td>
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<tr>
<td>Gerald D. Nelson, M.D.</td>
<td>1979</td>
<td>Snowmass</td>
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<tr>
<td>Kevin G. Ryan, M.D.</td>
<td>1980</td>
<td>Snowbird</td>
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<tr>
<td>David S. Bradford, M.D.</td>
<td>1981</td>
<td>Jackson Hole</td>
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<tr>
<td>Erick R. Ratzer, M.D.</td>
<td>1982</td>
<td>Vail</td>
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<tr>
<td>William R. Olsen, M.D.</td>
<td>1983</td>
<td>Jackson Hole</td>
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<tr>
<td>Earl G. Young, M.D.</td>
<td>1984</td>
<td>Steamboat</td>
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<td>Robert B. Rutherford, M.D.</td>
<td>1985</td>
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<tr>
<td>Rudolph A. Klassen, M.D.</td>
<td>1986</td>
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<td>Robert J. Neviaser, M.D.</td>
<td>1987</td>
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<td>Robert C. Edmondson, M.D.</td>
<td>1988</td>
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<td>Ernest E. Moore, M.D.</td>
<td>1989</td>
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<td>Stephen W. Carveth, M.D.</td>
<td>1990</td>
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<td>George E. Pierce, M.D.</td>
<td>1991</td>
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<td>Peter Mucha, Jr., M.D.</td>
<td>1992</td>
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<td>David V. Feliciano, M.D.</td>
<td>1993</td>
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<td>R. Chris Wray, M.D.</td>
<td>1994</td>
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<td>David Kappel, M.D.</td>
<td>1995</td>
<td>Big Sky</td>
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<td>Thomas H. Cogbill, M.D.</td>
<td>1996</td>
<td>Grand Targhee</td>
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<td>G. Jerry Jurkovich, M.D.</td>
<td>1997</td>
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<tr>
<td>James B. Benjamin, M.D.</td>
<td>1998</td>
<td>Lake Louise</td>
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<td>Herbert J. Thomas III, M.D.</td>
<td>1999</td>
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<tr>
<td>Barry C. Esrig, M.D.</td>
<td>2000</td>
<td>Squaw Valley</td>
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<tr>
<td>Steven R. Shackford, M.D.</td>
<td>2001</td>
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<tr>
<td>James A. Edney, M.D.</td>
<td>2002</td>
<td>Whistler-Blackcomb</td>
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<td>J. Scott Millikan, M.D.</td>
<td>2003</td>
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<td>Harvey J. Sugerman, M.D.</td>
<td>2004</td>
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<td>Scott R. Petersen, M.D.</td>
<td>2005</td>
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<td>Harold F. Sherman, M.D.</td>
<td>2006</td>
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<td>Frederick A. Moore, M.D.</td>
<td>2007</td>
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<td>James Davis, M.D.</td>
<td>2008</td>
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<td>Grace S. Rozycki, M.D.</td>
<td>2009</td>
<td>Crested Butte</td>
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The 2010 WESTERN TRAUMA ASSOCIATION Meeting will be held at:

Telluride, Colorado
February 27 – March 7, 2010
WESTERN TRAUMA FOUNDATION DONORS
(Current Lifetime Accumulation Status)

COULIOIR SOCIETY

Christine Cocanour  James Davis  Barry Esgig
David Feliciano  Founder (anonymous)  David Livingston
Grace S. Rozycki  Thomas Scalea  Dennis Vane

DOUBLE BLACK DIAMOND CLUB

Roxie Albrecht  Denis Bensard  Robert Neviaser
Scott Petersen  R. Lawrence Reed  Steven Ross
Steven Shackford  Harvey Sugarman  H.J. (Tom) Thomas

BLACK DIAMOND CIRCLE

Mariliu Bintz  Thomas Cogbill  John Hall
Gregory J. Jurkovich  Guy Lanzi  Ted McAuley
Robert Mackersie  Robert McIntyre  Mark Metzdorf
Andrew Michaels  Scott Millikan  E. Eugene Moore
Frederick Moore  Robert Osborne  Laurens Pickard
Anne Rizzo  Harold Sherman  Steven Wald
R. Christie Wray  Scott Zietlow

BLUE TRAIL ASSOCIATE

James Benjamin  Kenneth Cherry  Roy Cobeon
Raul Coimbra  Alain Corcos  Kimberly Davis
Enrique Ginsberg  Carl Hauser  David Hoyt
Krista Kaups  Brent King  Rosemary Kozar
William Long  David Shatz

GREEN TRAIL ASSOCIATE

Anonymous  Walter Biff  Larry Gentilello
Rajan Gupta  Margaret Knudson  Peter Mucha
Gage Ochsner  Peter Rhee  Daniel Vargo
Michael West

FRIENDS OF THE WTA

Bonny Baron  Donald Carter  Jody DiGiacomo
Sounitra Echempati  John Fields  Warren Gall
Richard Gamelli  Dean Gubler  Michael Hauty
James Hebert  Jay Johannigman  Riyad Karmy-Jones
Ash Mansour  Kimberly Nagy  Nicholas Namias
Leon Pachter  George Pierce  Basil Pruitt
Carol Schermer  Amy Wyrzkowski
Earl G. Young, M.D.
(1928-1989)

RESIDENT PAPER COMPETITION

Dr. Earl G. Young of Minneapolis was a founding member of the Western Trauma Association and President. He died of a myocardial infarction, Monday, February 27, 1989, while skiing at Snowbird during Annual Meeting of the Association.

Dr. Young received his medical degree from the University of Rochester, N.Y. and Ph.D. in surgery f University of Minnesota. He completed advanced training in cancer research at Harvard, a fellow cardiovascular surgery at Baylor University in Houston and studied microvascular surgery at the Uni California—San Diego.

He was a clinical professor of surgery at the University of Minnesota Medical School, and a practicing gen- vascular surgeon at the Park-Nicollet Clinic in Minneapolis from 1960. He was nationally known and was involved in research and education throughout his career. In 1988, one year before his untimely death received the Owen H. Wangensteen Award for Academic Excellence from the University of Minnesota Science Center. It was awarded by an unprecedented unanimous vote of all 72 surgical residents.

The Residents Paper competition was begun in 1991 as a tribute to Dr. Young’s memory and his “spirit of love of learning … and commitment in service to mankind.”* The award is given to the best resident presented at the Annual Meeting.

- Dr. John Najarian characterizing Earl at a memorial service in his honor at the University of Minn
<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Year</th>
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<tr>
<td>l Schmoker, MD</td>
<td>University of Vermont</td>
<td>1991</td>
</tr>
<tr>
<td>h Schmoker, MD</td>
<td>University of Vermont</td>
<td>1992</td>
</tr>
<tr>
<td>es Mock, MD</td>
<td>University of Washington</td>
<td>1993</td>
</tr>
<tr>
<td>Travisani, MD</td>
<td>University of Vermont</td>
<td>1994</td>
</tr>
<tr>
<td>o C. Ridings, MD</td>
<td>Medical College of Virginia</td>
<td>1995</td>
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<tr>
<td>l Han, MD</td>
<td>Emory University</td>
<td>1996</td>
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<tr>
<td>on R. Miller, MD</td>
<td>Wake Forest University</td>
<td>1997</td>
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<tr>
<td>irey Manley, MD, PhD</td>
<td>University of California-San Francisco</td>
<td>1998</td>
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<td>s M. Doty, MD</td>
<td>Medical College of Virginia</td>
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<td>iesta, MD</td>
<td>Denver Health Medical Center</td>
<td>2000</td>
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<td>o J. Gonzales, MD</td>
<td>Denver Health Medical Center</td>
<td>2001</td>
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<td>. C. Brakenridge</td>
<td>Cook County Hospital</td>
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<td>a J. Osband, MD</td>
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<td>2003</td>
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<td>UMDNJ-New Jersey Medical School</td>
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<td>st A. Gonzalez, MD</td>
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<td>2005</td>
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<td>er M. Watters, MD</td>
<td>Oregon Health &amp; Science University</td>
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<td>er J. Wan, MD</td>
<td>University of California-San Francisco</td>
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<tr>
<td>J. Warner, MD</td>
<td>University of Washington</td>
<td>2008</td>
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WESTERN TRAUMA ASSOCIATION

IN MEMORIUM

Earl G. Young, MD
February 27, 1989

Gerald S. Gussack
August 25, 1997

Peter Mucha, Jr.
August 9, 2006

W. Bishop McGill
October 2007
<table>
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<tr>
<td>Jerry Jurkovich, M.D.</td>
<td>1997</td>
<td>Snowbird, Utah</td>
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<td>1 W. McGill, M.D.</td>
<td>1998</td>
<td>Chateau Lake Louise, Alberta</td>
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<tr>
<td>Tam T. Close, M.D.</td>
<td>1999</td>
<td>Crested Butte, Colorado</td>
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<td>My Cornell</td>
<td>2000</td>
<td>Squaw Valley, California</td>
</tr>
<tr>
<td>ff Tabin, M.D.</td>
<td>2001</td>
<td>Big Sky, Montana</td>
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<tr>
<td>es H. “Red” Duke, M.D.</td>
<td>2002</td>
<td>Chateau Whistler, British Columbia</td>
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<tr>
<td>id V. Shatz, M.D.</td>
<td>2003</td>
<td>Snowbird, Utah</td>
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<tr>
<td>han and Tim Baker</td>
<td>2004</td>
<td>Steamboat Springs, Colorado</td>
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<td>Habel, M.D.</td>
<td>2005</td>
<td>Jackson Hole, Wyoming</td>
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<td>rew Schneider</td>
<td>2006</td>
<td>Big Sky, Montana</td>
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<td>est E. Moore, MD</td>
<td>2007</td>
<td>Steamboat Springs, Colorado</td>
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<tr>
<td>nela Kallsen</td>
<td>2008</td>
<td>Squaw Valley, California</td>
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<td>ia Campbell, MD</td>
<td>2009</td>
<td>Crested Butte, Colorado</td>
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# WESTERN TRAUMA ASSOCIATION
## Schedule of Events
### February 22 – February 28, 2009

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<th>Sunday, February 22</th>
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<tr>
<td>4:30pm – 7:30pm</td>
<td>Registration Elko/Floresta Foyer, LMS</td>
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<td>5:00pm – 7:00pm</td>
<td>Welcome Reception Elko/Floresta Room, LMS</td>
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<td>5:00pm – 7:00pm</td>
<td>Children's Reception Alpine Room, LMS</td>
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<td>7:00pm – 8:00pm</td>
<td>Past President's Meeting Al Johnson Boardroom, 1</td>
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<td><strong>Monday, February 23</strong></td>
<td><strong>Room</strong></td>
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<td>6:30am – 8:00am</td>
<td>Attendee Breakfast Alpine Room, LMS</td>
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<tr>
<td>7:00am – 9:00am</td>
<td>Scientific Session Elko/Floresta Room, LMS</td>
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<tr>
<td>7:30am – 9:00am</td>
<td>Friends &amp; Family Breakfast 9380 Prime, Elevation Hc</td>
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<tr>
<td>4:00pm – 6:00pm</td>
<td>Scientific Session Elko/Floresta Room, LMS</td>
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<tr>
<td>6:00pm – 7:00pm</td>
<td>Board of Directors Meeting Capitol Room, Elevation</td>
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<td><strong>Tuesday, February 24</strong></td>
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<td>6:30am – 8:00am</td>
<td>Attendee Breakfast Alpine Room, LMS</td>
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<td>7:00am – 9:00am</td>
<td>Scientific Session Elko/Floresta Room, LMS</td>
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<tr>
<td>7:30am – 9:00am</td>
<td>Friends &amp; Family Breakfast 9380 Prime, Elevation Hc</td>
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<tr>
<td>10:00am – 12:00pm</td>
<td>NASTAR Ski Race Smith Hill</td>
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<td>12:00pm – 1:30pm</td>
<td>BBQ Deck</td>
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<tr>
<td>4:00pm – 6:00pm</td>
<td>Scientific Session &amp; Presidential Address Elko/Floresta Room, LMS</td>
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<tr>
<td>6:00pm – 7:00pm</td>
<td>WTA Multi-Center Trials Meeting Elko/Floresta Room, LMS</td>
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<tr>
<td><strong>Wednesday, February 25</strong></td>
<td><strong>Room</strong></td>
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<tr>
<td>6:30am – 8:00am</td>
<td>Attendee Breakfast Alpine Room, LMS</td>
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<tr>
<td>7:00am – 9:00am</td>
<td>Scientific Session Elko/Floresta Room, LMS</td>
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<tr>
<td>7:30am – 9:00am</td>
<td>Friends &amp; Family Breakfast 9380 Prime, Elevation Hc</td>
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<td>4:00pm – 5:00pm</td>
<td>&quot;Paint the Ceiling&quot; Lecture Elko/Floresta Room, LMS</td>
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<td>5:00pm – 6:00pm</td>
<td>Business Meeting Elko/Floresta Room, LMS</td>
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<td>5:00pm – 6:00pm</td>
<td>Book Club Woodstone Grill Alcove, 1</td>
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<tr>
<td><strong>Thursday, February 26</strong></td>
<td><strong>Room</strong></td>
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<tr>
<td>6:30am – 8:00am</td>
<td>Attendee Breakfast Alpine Room, LMS</td>
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<td>7:00am – 9:00am</td>
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<td>Scientific Session Elko/Floresta Room, LMS</td>
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<tr>
<td>5:00pm – 6:00pm</td>
<td>Panel of Experts Elko/Floresta Room, LMS</td>
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<td>6:30pm – 10:00pm</td>
<td>Children's Party Alpine Room, LMS</td>
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<td>7:00pm – 10:00pm</td>
<td>Adult Banquet &amp; Dance Elko/Floresta Room, LMS</td>
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<tr>
<td><strong>Friday, February 27</strong></td>
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<td>6:30am – 8:00am</td>
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<td>4:00pm – 6:00pm</td>
<td>Scientific Session Elko/Floresta Room, LMS</td>
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LMS: Lodge at Mountaineer Square  
GL: Grand Lodge
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<tr>
<th>Time</th>
<th>Title/Authors</th>
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<tbody>
<tr>
<td>7:00 AM</td>
<td><strong>Welcome to the 39th Annual Meeting of the WTA</strong></td>
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<tr>
<td></td>
<td>Grace S. Rozycki, MD</td>
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<td>President, WTA 2009</td>
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<tr>
<td>7:20 AM</td>
<td><strong>Facial Trauma: Can We Reduce Variability in Management?</strong></td>
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<td>AJ Kaye, AE Kaye, P Kim, V Gracias, S Bartlett, J Serletti</td>
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<tr>
<td>7:40 AM</td>
<td><strong>Antibiotic Duration and Post Operative Infection Rates in Mandibular Fractures</strong></td>
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<td>Y Hindawi, G Oakley, K Lindsay, A Scifres</td>
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<tr>
<td>8:00 AM</td>
<td><strong>A Statewide, Multi-Center Analysis of Surgeon’s Response Time at Level III Trauma Centers and the Impact on Patient Care: It’s All About Commitment</strong></td>
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<td>A. Ingham, MD, J.Riebe, BA CSTR, R.Shukla, PhD, M. M.Knudson, MD,</td>
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<td>J.Johannigman, MD, and the Ohio Level III Trauma Center Consortium</td>
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<td>8:20 AM</td>
<td><strong>Traffic Camera Enforcement at High Crash Volume Intersections: Sustained Effects on Driver Behavior</strong></td>
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<td>G.M. Wahl, MD; T. Islam, MD, MPH; L. Stukes, MD, MPH; A. Marr, MD; J. Hunt, MD, MPH; C. Baker, MD; N.E. McSwain MD; J. Duchesne, MD</td>
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<tr>
<td>8:40 AM</td>
<td><strong>Randomized Double-Blinded Placebo Control Trial Using Lidoderm Patch in Traumatic Rib Fractures</strong></td>
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<td>N. Ingalls MD, Z. Horton MD, M. Bettendorf MD, S. Frye MD, C. Rodriguez MD</td>
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*Young Competition*
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<thead>
<tr>
<th>Paper</th>
<th>Time</th>
<th>Title/Authors</th>
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| 6     | 4:00 PM | Early and Late Propranolol Dosing Improve Cerebral Perfusion After Traumatic Brain Injury in Vivio  
E. Ley, J. Schenet, R. Park, G. Dagliyan, D. Margolies, A. Salim |
| 7     | 4:20 PM | The Transfusion Trigger in Traumatic Brain Injury: Is a Higher Hemoglobin Advantageous?  
| 8     | 4:40 PM | The Cervicothoracic Seatbelt Sign as an Easily Identifiable Marker for Occult Cervical Vascular Injury: A Prospective Study  
A. Wyrzykowski, G. Rozycki, A. Fountain, C. Dente, J. Nicholas, D. Feliciano |
|       | 5:00 PM | Critical Decisions in Trauma  
Moderator: Robert McIntyre  
Blunt Cerebrovascular Injury: Walter Biffl, MD  
Liver Injury: Rosemary A. Kozar, MD |
|       | 6:00 PM | Board of Directors Meeting |

† Earl Young Competition
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<tr>
<th>Time</th>
<th>Title/Autors</th>
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<tbody>
<tr>
<td>7:00 AM</td>
<td>Exogenous Sex Hormones Modulate the Inflammatory Response to Endotoxin C. Allison, M.D., A. Gee, M.D., PhD., J. Differding, M.P.H., S. Underwood, M.S., S. Rowell, M.D., M. Schreiber, M.D</td>
<td>49</td>
</tr>
<tr>
<td>7:20 AM</td>
<td>SIGA Abrogates Inflammatory Responses and Improves Mortality Following Pseudomonas Pneumonia Amin PB, Diebel LN, Liberati DM</td>
<td>51</td>
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<tr>
<td>8:00 AM</td>
<td>Point: Counterpoint I Colostomy vs Primary Repair after Damage Control Surgery M. Schreiber, MD and S. Brundage, MD</td>
<td>55</td>
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<tr>
<td>8:30 AM</td>
<td>Point: Counterpoint II Acute Care Surgery: Real or Imagined Threat to the General Surgeon T. Cogbill, MD and GJ Jurkovich, MD</td>
<td>57</td>
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<tr>
<td>Paper</td>
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<tr>
<td>12</td>
<td>4:00 PM</td>
<td>† Blunt Trauma Induced Splenic Blushes are Not Created Equal&lt;br&gt;LE Zumwinkle BA, CC Cothren MD, EE Moore MD, JL Kashuk MD, JL Johnson MD, WL Biffle MD</td>
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<tr>
<td>13</td>
<td>4:20 PM</td>
<td>† Long-Term Follow Up of Non-Operative Management for Blunt Splenic Injuries in Children&lt;br&gt;H. Moore, D. Vane</td>
</tr>
<tr>
<td>14</td>
<td>4:40 PM</td>
<td>† Combined Splenectomy and Left Nephrectomy for Trauma: Have Outcomes Improved Over the Last 30 Years?&lt;br&gt;CG Ball, DV Feliciano</td>
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<td>5:05 PM</td>
<td>Presidential Address&lt;br&gt;&quot;The Gift&quot;&lt;br&gt;Grace S. Rozycki, MD</td>
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<td></td>
<td>6:00 PM</td>
<td>Multi-Institutional Trials Committee</td>
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<tr>
<td>7:00 AM</td>
<td>Genomic Expression Analysis is Dependent Upon Method of PMN Isolation</td>
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<td>E Warner, K Kotz, C Tannahill, R Ungaro, C Lopez, A Cuenca, K Kelly-Scumpia,</td>
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<td>M Delano, H Baker, L Martin, S Armen, M Toner, L Moldawer</td>
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<td>7:20 AM</td>
<td>Burns, Inflammation, and Intestinal Injury:</td>
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<td>Protective Effects of an Anti-Inflammatory Resuscitation Strategy</td>
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<td>TW Costantini, MD, CY Peterson, MD, LM Kroll, WH Loomis, BS, JG Putnam,</td>
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<td>BS, BP Eliceiri, PhD, A Baird, PhD, V Bansal, MD, R Coimbra, MD, PhD</td>
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<td>7:40 AM</td>
<td>Low Peripheral Leukocyte Apoptosis Levels are Associated with Increased</td>
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<td>Risk of Infection in Trauma Patients with Hemorrhagic Shock</td>
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<td>C Morrison, A Moran, M Carrick</td>
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<td>8:00 AM</td>
<td>A Trauma Outreach Program Provided by a Level One Trauma Center is an</td>
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<td>Effective Way to Initiate Peer Review at Referring Hospitals and Foster</td>
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<td>Process Improvements</td>
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<td>M Byrnes, MD; E Irwin, MD; J Chipman, MD; G Beilman, MD; M Thorson, MS;</td>
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<td>Paul Harrison, MD; K Croston, MD</td>
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<td>8:20 AM</td>
<td>Operative Intervention for Complete Pancreatic Transection after Blunt</td>
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<td>Abdominal Trauma in Children: Revisiting an Organ Salvage Technique</td>
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<td>MJ Borkon MD, SE Morrow MD, EA Koehler MS, Y Shyr PHD, MA Hilmes MD, RS</td>
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<td>Miller MD, WW Neblett MD, HN Lovvorn III MD</td>
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<td>8:40 AM</td>
<td>Shoots and Ladders: A Review of Hunting Related Injuries</td>
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<td>A Crockett, P Beery, Y Thomas, D Lindsey, S Stawicki, M Whitmill, S</td>
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<td>Steinberg, A Jarvis, C Wang, C Cook</td>
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19 Young Competition
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<tr>
<th>Paper</th>
<th>Time</th>
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<tr>
<td>22</td>
<td>4:00 PM</td>
<td>Family abstract:</td>
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<td><strong>Cold Steel: Cure for What Ails You</strong> Study</td>
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<td>and Pursuit of the Steelhead Trout</td>
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<td>Mark T. Metzdorff, MD</td>
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<td>4:05 PM</td>
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<td><strong>Paint the Ceiling Lecture</strong></td>
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<td><strong>&quot;The Journey is the Destination&quot;</strong></td>
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<td>Dr. Sylvia Campbell</td>
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<td>5:00 PM</td>
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<td>Business Meeting</td>
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<td>5:00 PM</td>
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<td>Book Club – Woodstone Grill Alcove, Grand Lodge</td>
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<tr>
<td>7:00 AM</td>
<td>Poloxamer 188 Prolongs Survival of Hypotensive Resuscitation and Decreases Vital Tissue Edema After Full Resuscitation R.Z. Zhang, MD, PhD, R. Hunter MD, PhD, E Gonzalez MD, FA Moore MD</td>
<td>85</td>
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<tr>
<td>7:20 AM</td>
<td>Increased Platelet:RBC Ratios are Associated with Improved Survival After Massive Transfusion Holcomb JB*, Zarzabal LA, Michalek JE, Kozar RA*, Gonzalez EA, Spinella PC, Perkins JG, Wade CE</td>
<td>87</td>
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<tr>
<td>7:40 AM</td>
<td>Improved Survival after Hemostatic Resuscitation: Does the Emperor Have No Clothes? L.J. Magnotti, M.D., B.L. Zarzaur, M.D., MPH, M.A. Croce, M.D., P.E. Fischer, M.D., MS, R. Williams, M.D., T.C. Fabian, M.D.</td>
<td>89</td>
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<tr>
<td>8:00 AM</td>
<td>Older Age and Blood Transfusion are Co-Conspirators in the Development of Post Injury Multiple Organ Failure and Subsequent Death W Biff, J Johnson, E Moore, C Cothren, J Kashuk, A Banerjee, A Sauraia.</td>
<td>91</td>
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<tr>
<td>8:20 AM</td>
<td>Invited Basic Science Lecture “Injury and Intestinal Barrier Dysfunction: Past, Present, and Future” Dr. Raul Coimbra</td>
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<td>27</td>
<td>4:00 PM</td>
<td>A Randomized Prospective Trial of Airway Pressure Release Ventilation and Lung Protective Ventilation in Adult Trauma Patients with Acute Respiratory Failure RA Maxwell MD, J Waldrop MD, JM Green MD, BW Dart MD, PW Smith MD, PL Lewis RN, D Brooks RT, DE Barker MD</td>
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<tr>
<td>28</td>
<td>4:20 PM</td>
<td>Pulmonary Hypertension After Injury is Associated with Left Heart Dysfunction A.Driggs MD, N.Bir MD, K.Bullard MD</td>
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<td>29</td>
<td>4:40 PM</td>
<td>Cholesterol Repletion Corrects Effete Neutrophil Signaling after Major Trauma via Lipid Raft Trafficking C Hauser</td>
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<td>5:00 PM</td>
<td>Panel of Experts&lt;br&gt;Roxie Albrecht, MD. Fred Moore, MD, and David Livingston, MD&lt;br&gt;Moderator: Peggy Knudson</td>
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<td>7:00 AM</td>
<td><strong>Does the RTTDC (Rural Trauma Team Development Course) Shorten the Interval from Trauma Patient Arrival to Decision to Transfer</strong>&lt;br&gt;D. Kappel D. Rossi E. Polack T. Avtgis M. Martin</td>
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<td>7:20 AM</td>
<td><strong>Hypertonic Saline Solution for Resuscitation in Trauma</strong>&lt;br&gt;R,Smith V,Choudhry S,Helmer</td>
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<td>7:40 AM</td>
<td><strong>Prospective Study of Continuous Non-Invasive Tissue Oximetry in the Early Evaluation of the Combat Casualty</strong>&lt;br&gt;A Beekley, M Martin, T Nelson, K Grathwohl, M Griffith, G Bellman, J Holcomb</td>
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<td>8:00 AM</td>
<td><strong>Pulseless Electrical Activity, The Focused Abdominal Sonogram for Trauma, and Cardiac Contractile Activity as Predictors of Survival after Trauma</strong>&lt;br&gt;KM Schuster MD, R Lofthouse RN, LJ Kaplan MD, DC Johnson MD, FY Lui MD, LM Maerz MD, A Maung MD, KA Davis MD</td>
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<td>8:20 AM</td>
<td><strong>Hemostatic Foam for First Responders in the Treatment of Severe Intracavitary Non-Compressible Hemorrhage</strong>&lt;br&gt;M. Kilbourne, MD K. Keledjian, MD G. Falus, PhD B. Ginevan, BS T. Scalea, MD G. Bochicchio, MD, MPH</td>
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<td>8:40 AM</td>
<td><strong>Barriers to Obtaining Family Consent for Potential Organ Donors</strong>&lt;br&gt;C Brown, K Hejl, B Coopwood</td>
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| 36    | 4:00 PM| Family Abstract: Father and Son: Same Mission, Different Paths  
D. V. Feliciano, MD  
CASE REPORTS |
| 37    | 4:05 PM| Hard Decisions: Conflicts Between Medical Ethics and Medical Rules of Engagement in Current Combat Operations  
S Telian, MD; A. Beekley, MD; M. Martin, MD |
| 38    | 4:20 PM| Stab to the Heart and Who's to Blame: You Give Eyeglasses a Bad Name  
TJ Berkseth, MD1; NY Patel, MD2; TH Cogbill, MD2 |
| 39    | 4:35 PM| Stabbed in the Aorta: Fixing It from the Inside Out  
J Lodermeier, J Galante, W Pevec, L Scherer. |
| 40    | 4:50 PM| Non-Invasive Surface Rewarming of Severe Hypothermia is Safe and Feasible  
P.J. Offner, MD, MPH |
| 41    | 5:05 PM| Successful Resuscitation and Recovery of a Young College Student Who Sustained Cardiac Arrest, Hypothermic and Hemorrhagic Shock and Multiple Injuries Following Impact from a 400 Pound Boulder on Mount Adams  
J G Hill, MD, J Wang, MD, J Chen, MD, J Krieg, MD, R Bracis, MD, R Petrillo, MD, J Long, and W B Long, MD |
| 42    | 5:20 PM| A Major Metropolitan “Field Amputation” Team: A Call to Arms....and Legs  
ABSTRACTS
IAL TRAUMA: CAN WE REDUCE VARIABILITY IN MANAGEMENT?

Aye, AE Kaye, P Kim, V Gracias, S Bartlett, J Serletti

University of Pennsylvania School of Medicine

enter: Adam Kaye, MD

Senior Sponsor: Vicente Gracias, MD

Rationale: At our institution, maxillofacial trauma is cared for on a rotating basis by three surgical subspecialties: plastic surgery (PRS), otolaryngology (ORL), and oral-maxillofacial surgery (OMFS). As a result, no formalized interdisciplinary trauma protocols exist for management of facial fractures. The goal of this research is to determine the similarities and differences in management strategies among surgical subspecialties at our institution with respect to operative timing, operative approaches, perioperative care, and outcomes. Methods: A retrospective review of the trauma database to identify all head and neck-related trauma patients admitted from 2001 - 2005 was made. 1143 patients were identified with one or more facial bone fractures. A chart review identified patient demographics and mechanism and patterns of injury. For each of the services fracture management details including surgical timing, operative approach, antibiotic usage, mission rates, and complications were recorded. Results: We review the first 15 months of our in-depth patient data analysis, representing 5 months of trauma call coverage for each service. From Oct '04 to Dec '05 a total of 351 facial fracture patients were evaluated and treated (PRS = 115, ORL = 114, OMFS = 122). Patients included 275 males and 76 females aged 15 to 94 years. Mechanisms of injuries included: falls (N=77), assaults (N=80), MVC (N=95), GSW (N=29), pedestrian accidents (N=18), and other (N=52). Fractures (either isolated or in combination) included frontal bone (66), orbital (N=629), zygoma (N=319), ethmoid (N=68), nasal (N=606), maxilla (40), and mandible (N=303) injuries. Operative treatment was performed in 97% of patients. Although patient injury data was evenly split amongst each service, operative timing was lower for ORL than for PRS and OMFS. Mandible fracture reductions were the most frequent operations (N=37), not including those associated with pan-facial trauma. Timing of operative management was highly variable within and between each group, ranging from 0 to 27 days. 19 patients underwent surgeries related to other trauma. 15 patients (16%) who received a tracheostomy and/or gastrostomy tube had either an active mandible or Le Fort fracture. Antibiotic use data showed a large number of gentamicin and/or ciprofloxacin being utilized. The most common antibiotics used were clindamycin (43%) and multi-drug regimen (30%). 14% of patients were not treated with antibiotics. Conclusions: At our institution PRS, ORL, and OMFS share a near equal number and variety of facial trauma consults on a rotating basis. Our introductory look at the management of these patients demonstrates numerous strategies related to timing of active repair, operative approach, and perioperative care for all types of facial fractures. Pending this study to incorporate additional years of patient data will provide for a comprehensive review of these patients and their outcomes which will help guide the best combined practices of the three facial trauma services. Ultimately we define a multidisciplinary trauma protocol for the future care of maxillofacial trauma.
BIOTIC DURATION AND POST OPERATIVE INFECTION RATES IN MANDIBULAR FRACTURES

Ndawi, G Oakley, K Lindsay, A Scifres
University School of Medicine

Center: Yonitte Hindawi

Senior Sponsor: Aaron Scifres

Introduction: The optimal duration of systemic antibiotic use following mandibular bone repair remains uncertain. Though surgical site infection is a feared complication after these procedures, excessive antibiotic use can lead to higher microbial resistance and antibiotic-related complications. We hypothesize prolonged courses of antibiotics after mandibular fracture repair do not reduce surgical site infection rates.

Materials and Methods: This is a retrospective cohort study of all patients presenting to an urban trauma center between December 2001 and July 2006 with diagnosis of mandibular fracture. A total of 199 patients were identified. Clinical demographic information collected included patient age, gender, injury severity, total duration of hospitalization, type of antibiotic therapy, duration of antibiotic therapy, location of fracture, whether or not the fracture was open or closed, and time from injury to surgery. Statistical analysis was conducted using t test, chi squared analysis and Fisher’s exact test.

Results: Of the 199 patients studied, 9 (4.5 percent) patients acquired postoperative infections. There were no statistical differences among the collected tables when comparing patients receiving 3 or fewer days of therapy to those living 7 or more days. Patients receiving shorter duration antibiotics had an infection rate of 4.6 percent, whereas patients who received the longer duration an infection rate of 4.2 percent (RR 0.9, 95% CI 0.15-9.5, p = 0.9).

Conclusion: Prolonged courses of antibiotics following mandibular fracture repair do reduce the incidence of surgical site infection.
ATEWIDE, MULTI-CENTER ANALYSIS OF SURGEONS' RESPONSE TIME AT LEVEL III TRAUMA CENTERS AND THE IMPACT ON PATIENT CARE: IT'S ALL IN COMMITMENT

graham, MD, J.Riebe, BA CSTR, R.Shukla, PhD, M. M.Knudson, MD, J.Johannigman, and the Ohio Level III Trauma Center Consortium University of Cincinnati Medical Center

enter: Angela Ingraham, MD Senior Sponsor: Jay Johannigman, MD

Background: The American College of Surgeons' Committee on Trauma guidelines for the resources needed to provide optimal care for the injured patient has rarely been subjected to rigorous scientific investigation regarding their effect on patient outcomes. The guideline requiring the presence of the surgeon in the emergency room within 15 minutes of arrival for critically injured patients has recently been extended to 30 minutes at Level III trauma centers. The purpose of this study was to evaluate the potential impact of this guideline change on the delivery of care at Level III trauma centers in our community. We hypothesized that there would be no measurable difference in the quality of care, severity, or mortality after enactment of this change in response time.

Methods: Data was collected from the trauma registries of thirteen ACS COT verified Level III trauma centers beginning two years before and ending two years after June 30, 2004, by which time the response time was extended to thirty minutes. Statistical analyses were completed comparing the two groups in terms of demographic and clinical characteristics, severity score, surgeon response time, disposition, length of stay in the emergency department, and mortality.

Results: A total of 1,076 patients were treated over the four-year period. The cause and severity of trauma, age, and ISS were similar between the two groups. The surgeon response times before and after the rule change were 14.7 minutes and 15.5 minutes, respectively. Both groups also demonstrated similar lengths of stay in the Emergency Department, times of transfer to higher level centers, and mortality rates.

Conclusion: This study represents the largest aggregate analysis of activity and performance characteristics at ACS verified Level III trauma centers within a single state. The extension of the surgeon response time from fifteen to thirty minutes did not appear to adversely affect the outcomes of trauma patients at the level III trauma centers in our state. Furthermore, the surgeon response times were similar before and after the rule change, demonstrating that the commitment of the general surgeon to being readily available for seriously injured patients remains a critical element in a comprehensive trauma system.

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FFIC CAMERA ENFORCEMENT AT HIGH CRASH VOLUME INTERSECTIONS: TAIRED EFFECTS ON DRIVER BEHAVIOR

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Senior Sponsor: Alan Marr, MD

Abstract: Installation of red light enforcement cameras (RLC) at intersections associated with a high number of traffic accidents are currently in use in order to reduce the number of traffic collisions. Primary objective of study was to evaluate the sustained effect of RLC on driver behavior. Secondary objective was to evaluate the number of collisions before and after RLC implementation. Methods: For the primary objective an eight month prospective observational study after installation of RLC was undertaken at the intersection with the highest incidence of traffic accidents in the state of Louisiana. For the secondary objective collision occurrences were collected ten months pre and post RLC implementation. Mean number of citations was calculated by month and statistical significance of trend was determined from a linear regression model. Results: Average number of citation started to drop significantly from October 2007 and continued to do so in the subsequent months. In a linear regression model the average number of citations dropped from October 2007 to June 2008 from 1018 to 356; p <0.001. Although there was a trend in reduction of collisions from 122 to 97 pre and post RLC, this did not reach statistical significance; p = 0.18.

Conclusion: A significant reduction in the number of issued citations occurred as driving behavior was modified, without a significant reduction in number of accidents. Despite the proven benefit of reducing the number of cars entering the intersection during a red light, it do not prevent traffic collisions at monitored intersections. Alternative means of injury prevention must be investigated.
IDOMIZED DOUBLE-BLINDEED PLACEBO CONTROL TRIAL USING LIDODERM CH IN TRAUMATIC RIB FRACTURES

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and Rapids Medical Education and Research Center / Michigan State University

Center: N. Ingalls, MD

Senior Sponsor: M. Ashraf Mansour, MD

INTRODUCTION: The Lidoderm® (5% lidocaine) patch was originally developed to treat related to postherpetic neuralgia. Anecdotal experience at our institution suggests the derm® patch decreases narcotic use in patients with traumatic rib fractures. Pain associated with these injuries can be debilitating and lead to increased pulmonary complications and length of hospital stay. A double-blinded placebo control trial was designed to define the patch's efficacy.

METHODS: Patients with rib fractures admitted to the trauma service at our Level I trauma center were enrolled and randomized to receive Lidoderm® patch or placebo patch. Fifty-three patients who met the inclusion criteria were enrolled from January 2007 to August 3. Demographic information including gender, age, mechanism of trauma, number of actures, chest tube placement, associated injuries, history of lung disease or smoking was recorded. The patients' narcotic use (IV and oral), non-narcotic pain medication use, age, pain score, pulmonary complications, and length of stay were recorded. Our institution's IRB approved the study. Statistics used included t-test, Man-Whitney U test, squared test, Fisher's exact test, 2-way ANOVA, and Kruskal-Wallis ANOVA. Significance was assessed at p<0.05.

RESULTS: Thirty-three subjects received the Lidoderm® patch and 25 received the placebo patch. There were no significant differences for age (54.8, 49.7 years, p=0.31), gender (56.3% male, 27.2%, 76%, p=0.78), pre-injury disease (9.1%, 20%, p=0.27), smoking history (39.4%, 24%, p=0.22), percent of current smokers (24.2%, 20%, p=0.7), and need for placement of chest tube (36.4%, 24%, 31), between the Lidoderm® and placebo groups, respectively. Also, each group had similar number of patients in the following categories of injury mechanism: motor vehicle accident, motorcycle accident, all-terrain vehicle accident, pedestrian versus auto, fall, and other. There was no difference between the Lidoderm® and placebo group, respectively, with regards to: total IV narcotic use (p=0.88), total oral narcotics (p=0.22), total oral non-narcotic pain medications (p=0.51), pain score (p=0.39), percentage of patients with pulmonary complications (p=0.95), or length of stay (7.8, 6.2 days, p=0.28). Subgroup analysis demonstrated gender differences in length of stay (reduced in men), less non-narcotic pain medication in patients less than 65 years of age, and less pain (lower pain scores) observed in patients who were current smokers.

CONCLUSIONS: Lidoderm® patch does not significantly improve pain control of trauma patients with traumatic rib fractures. It may be useful in certain subpopulations of severely injured patients. The Lidoderm® patch might be useful in isolated rib fractures, requires further study.
LY AND LATE PROPRANOLOL DOSING IMPROVE CEREBRAL PERFUSION AFTER TRAUMATIC BRAIN INJURY IN VIVO

J. Schenet, R. Park, G. Dagliyan, D. Margolies, A. Salim

Senior Sponsor: A. Salim

Center: E. Ley

Background: In vivo models of traumatic brain injury (TBI) demonstrate increased cerebral edema, decreased cerebral hypoxia, reduced cerebral edema and improved neurological outcome with propranolol treatment. We recently demonstrated that higher doses of propranolol in vivo improved cerebral perfusion compared to lower doses using micro PET imaging. The effect of delayed treatment on cerebral perfusion is clinically important; the time between injury and medical evaluation in the real world frequently exceeds the timing in vivo. The purpose of this study was to determine the effect of early versus late propranolol administration on cerebral perfusion after TBI in vivo.

Methods: Sixteen 12-week old BALB-C mice underwent TBI as previously described. Mice were randomized in a blinded fashion to receive intravenous injections of 120 μl PBS alone or 20 μl of PBS with 4 mg/kg propranolol (120 μg for a 30 g mouse) 15 minutes or 60 minutes after traumatic brain injury. Mice then received intravenous Cu64 and cerebral perfusion was imaged by micro PET imaging.

Results: On micro PET imaging, the normal mouse cerebral perfusion after injection with placebo as measured by standard uptake value (SUV) was 0.71 ± 0.02. After traumatic brain injury and treatment with placebo, SUV was 0.40 ± 0.01 at 15 minutes and 0.26 ± 0.02 at 60 minutes. With propranolol treatment the SUV was 0.52 ± 0.04 at 15 minutes (165% of placebo at 15 minutes) and 0.43 ± 0.02 at 60 minutes (165% of placebo at 60 minutes).

Conclusion: In a murine model of TBI, cerebral perfusion on micro PET imaging decreased 15 minutes to 60 minutes regardless of treatment. Propranolol improved cerebral perfusion early (15 minutes) and late (60 minutes) compared to treatment with placebo. Research indicates that treatment with propranolol after traumatic brain injury improves cerebral perfusion when administered up to one hour after initial injury.
TRANSFUSION TRIGGER IN TRAUMATIC BRAIN INJURY: IS A HIGHER HGBLLOBIN ADVANTAGEOUS?

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La University Medical Center

enter: Lauren Sakai
Senior Sponsor: Carol R. Schermer

Background: The role of anemia and blood transfusion in traumatic brain injury (TBI) patients has not been well studied. Many neurosurgeons recommend maintaining a hemoglobin (Hgb) of 10 g/dL, but transfusion in trauma patients has been associated with delayed complications. The objective of the study was to examine the impact of the level of anemia in patients with TBI. The hypothesis was that a Hgb < 9 g/dL would not adversely affect short term outcomes.

Methods: Data were collected from a review of medical records. Inclusion criteria were patients with TBI, GCS < 12 at 48 hours, whose initial resuscitation was limited to < 6 units of blood and survived to discharge. Average low Hgb values were calculated for the first 10 days. Patients were stratified into high and low Hgb groups by their average Hgb ≥ 9 g/dL and Hgb < 9 g/dL, respectively. Baseline demographics and outcome measures during hospitalization were examined.

Results: Eighty-two patients met inclusion criteria. More than 90% of patients had no surgical recommendations to maintain Hgb > 10 g/dL. Males were 79.3% of the population. The average age of patients was 45.2 years and 49 patients (59.8%) received transfusion of one unit of blood. Subdural hemorrhage was described in 53 (64.6%), epidural hemorrhage in 12 (14.6%), and intracerebral hemorrhage in 13 (15.9%) of patients. Fifty-six (69.3%) had intracranial monitoring and 19 (23.2%) patients underwent craniotomy/craniectomy. On average, patients in the low Hgb stratum (<9 g/dL, n=10) received 4.7 units versus 2.4 units in the high Hgb stratum (Hgb ≥ 9, n=72; p=.02) but had no difference in pneumonia 40% vs 35% (high), p=.74. Admission Hgb, and lowest Hgb were lower in the low stratum (12) but there were no differences in the admission or 48 hour APACHE II scores, age Hgb, GCS score on admission, GCS at 48 hours, or discharge GCS. There were no differences in tracheostomy status or discharge disposition. Multivariate analysis revealed that 48 hour GCS predicted discharge GCS independently of anemia strata.

Conclusion: Maintenance of a lower Hgb in TBI patients for the first 10 days of hospitalization did not adversely impact short term outcomes. It is not clear that anemia of a particular Hgb confers any advantage. Given the overwhelming data against liberal transfusion in the ICU and the lack of human data supporting transfusion to a certain Hgb in TBI patients, we strongly recommend holding off on liberal transfusion until more convincing data are elucidated.
Cervicothoracic Seatbelt Sign as an Easily Identifiable Marker for Occult Vascular Injury: A Prospective Study

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University School of Medicine Grady Memorial Hospital

Center: Amy D. Wyrzykowski

Senior Sponsor: Grace S. Rozycki

Rationale: A missed cervicothoracic injury has potentially devastating sequences, but current indications for screening to detect these injuries remain broad. Improved technology (32 slice CTA), we sought to determine if the cervicothoracic belt sign (CSS) was a valid marker of occult cervical vascular injury.

Methods: Adult and pediatric patients who sustained a CSS underwent a CTA of the thorax and neck regions. Demographic data, Injury Severity Score (ISS), Glasgow a Score (GCS), CTA results, treatments and outcomes, especially cerebrovascular tients (CVA) were recorded. Patients were followed throughout hospitalization and discharge.

Results: From 2003 through 2007, 250 patients (age range 4-82, mean 37±13; 97 male, 153 male) underwent a CTA of the neck following a motor vehicle crash. In 179 patients (72%), a CSS was noted, and 12 (6.7%) occult injuries to the carotid arteries were cated (10 dissections, 2 carotid cavernous fistulae). In 6 patients with CSS, 7 vertebral y injuries were identified. Of these 6, were associated with a cervical spine fracture and was an incidental finding. There was no statistically significant relationship between the ence of a carotid or vertebral vascular injury and either admission GCS or ISS in ents with a CSS. Two patients with carotid injuries who were not candidates for platelet therapy because of associated injuries suffered a CVA, and both died. There no adverse neurologic events in the 167 patients with a restraint sign and a negative . In 71 patients (28%) undergoing CTA for either a basilar skull fracture or a cervical ure, there were no injuries to the cervical carotid artery identified and no adverse ologic events.

Inclusion: 1. Any patient, who has a CSS, regardless of admission GCS or ISS, d undergo CTA of the neck to exclude an injury to the carotid artery. 2. The bination of CSS and cervical spine fracture may increase the likelihood of vertebral yi injury.
Critical Decisions in Trauma

Blunt Cerebrovascular Injury

Walter Biffl, MD

Liver Injury

Rosemary A. Kozar, MD
GENOUS SEX HORMONES MODULATE THE INFLAMMATORY RESPONSE TO OTOXIN


ion Health & Science University

enter: Carrie E. Allison Senior Sponsor: Martin Schreiber

jectives: In vitro and animal studies have demonstrated gender dimorphism in sepsis ile sex conferring protection. In this study, we evaluated whether exogenous sex ones would modulate the human cytokine response to endotoxin stimulation in vitro whether baseline hormonal status affects this response. We hypothesized that onous female sex hormones would attenuate the inflammatory response to endotoxin.

hods: Leukocytes from 30 healthy volunteers were isolated and incubated in cell re overnight with estradiol, progesterone, or testosterone. Sterile E. coli endotoxin then added, and after 6 hours the cytokine response was quantified using ELISA. ects' baseline hormone levels were quantified with ELISA, and linear regression was formed to determine whether a correlation existed between baseline hormone levels and the subsequent cytokine response to endotoxin. P<0.05 was considered significant.

uits: Exogenous estrogen and progesterone amplified the inflammatory response to xin in women by increasing pro-inflammatory TNF-alpha and decreasing anti-
matory IL-10. Testosterone produced a similar but attenuated pattern. Men were not ed by exogenous hormones. Baseline estrogen levels in post-menopausal women ated weakly with cytokine response (r² 0.41-0.62) but did not correlate in any other p.

<table>
<thead>
<tr>
<th>Alteration of Cytokine Response Due to Exogenous Hormone*</th>
<th>Pre-Menopausal</th>
<th>Post-Menopausal</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TNF</td>
<td>IL-10</td>
<td>TNF</td>
</tr>
<tr>
<td>Estrogen</td>
<td>1.9**</td>
<td>0.7</td>
<td>1.8**</td>
</tr>
<tr>
<td>Progesterone</td>
<td>1.2</td>
<td>0.6**</td>
<td>1.6**</td>
</tr>
<tr>
<td>Testosterone</td>
<td>1.2**</td>
<td>0.8**</td>
<td>1.1**</td>
</tr>
</tbody>
</table>

*Median fold change in cytokine concentration (hormone + endotoxin stimulated cells): (endotoxin stimulated cells) ** p<0.05 Wilcoxon

clusion: Exogenous estrogen and progesterone amplify the inflammatory response to endotoxin in women but not in men. These data do not support the therapeutic use of exogenous hormones in sepsis and suggest instead that sex hormone antagonism may resent a potential target to decrease the inflammatory response in women with sepsis. line estrogen levels in post-menopausal women also may play a role in their equent response to sepsis.
A ABROGATES INFLAMMATORY RESPONSES AND IMPROVES MORTALITY FOLLOWING PSEUDOMONAS PNEUMONIA

PB, Diebel LN, Liberati DM
State University, Detroit Receiving Hospital

enter: Parth Amin, M.D. Senior Sponsor: Lawrence Diebel, M.D.

eduction: Post-traumatic pneumonia (Pn) and other infectious complications are ed by enteral nutritional support. Proposed mechanism(s) for this include preservation osal integrity and immune function. Secretory immunoglobulin A (SIgA) is the ple antibody at respiratory and other mucosal sites. Its concentration in mucosal tions is influenced by route of nutrition and insults common to the trauma patient. has anti-inflammatory effects which may protect against exaggerated inflammatory responses following infection. SIgA is transported to mucosal surfaces via a specific mmunoglobulin receptor (plgR). PlgR knockout (KO) mice, which do not have SIgA osal secretions but are otherwise immunologically intact, were used to study the nce of SIgA in respiratory secretions following bacterial pneumonia.

ethods: Pseudomonas aeruginosa (9x10^7) was administered intratracheally to plgR-KO onventional mice. Mortality was noted at 72 hours. Surviving animals were sacrificed blood, lung and bronchoalveolar lavage (BAL) fluid samples were obtained and yzed for myeloperoxidase (MPO), cytokine and IgG levels.

lts: (mean±SD)

<table>
<thead>
<tr>
<th></th>
<th>Conventional-Sham (N=6)</th>
<th>Conventional + Pn (N=10)</th>
<th>plgR-KO + Pn (N=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>cd TNF (pg/ml)</td>
<td>8.0±1.0</td>
<td>19.1±0.5*</td>
<td>20.3±3.9*</td>
</tr>
<tr>
<td>cd IL-6 (pg/ml)</td>
<td>3.2±0.7</td>
<td>16.8±1.5*</td>
<td>35.5±4.3*</td>
</tr>
<tr>
<td>lg MPO (µg/ml)</td>
<td>5.9±2.1</td>
<td>10.6±2.3*</td>
<td>22.8±2.6*</td>
</tr>
<tr>
<td>c TNF (pg/ml)</td>
<td>4.2±3.7</td>
<td>16.6±1.7*</td>
<td>30.6±6.4*</td>
</tr>
<tr>
<td>c IL-6 (pg/ml)</td>
<td>3.9±1.0</td>
<td>12.9±1.2*</td>
<td>28.6±6.7*</td>
</tr>
<tr>
<td>lgG (ng/ml)</td>
<td>135.7±4.1</td>
<td>129.3±8.2</td>
<td>159.4±6.6#</td>
</tr>
</tbody>
</table>

< 0.001 vs. Conventional, #p < 0.001 vs. Conventional + Pn

ality rates were 13% vs. 36% for Conventional + Pn vs. plgR-KO + Pn mice, ctively (p< 0.005).

clusions: SIgA deficiency led to increased mortality and an exaggerated local and emic inflammatory response to Pseudomonas pneumonia. This study supports clinical ts to preserve mucosal immunity in the trauma patient. Monitoring SIgA levels in osal secretions may predict infection risk and subsequent outcome.
ONIC DISCONTINUITY AFTER DAMAGE CONTROL LAPAROTOMY: WHAT T?

Kopelman, M.D., P.J. O'Neill, Ph.D. M.D., C. Justiniano, M.D., J Cox, M.D., Mews, M.D., SJ Vail, MD
Orpa Medical Center

enter: Patrick J. O'Neill Senior Sponsor: Richard Miller

duction: Damage control laparotomy (DCL) represents a crucial advance in trauma intervention practice. For patients who are left in colonic discontinuity after DCL, questions still remain regarding what constitutes the best surgical option. The purpose of this study was to compare patients undergoing colonic resections and immediate Anastomosis (IA) with those undergoing DCL delayed Anastomosis (DA) or delayed ostomy (DO) to determine potential risk factors for the operation of bowel-related complications.

ods: Following expedited IRB approval, a retrospective review was performed at an urban Level I trauma center of patients with destructive colonic injuries requiring resection who presented over a 1-year time period. Patients were stratified into non-DCL with IA, DCL with DA or DCL with DO resection. Patient demographics, injury scoring and colon-related complications were collected. Analysis was performed to identify the factors associated with an increased risk of anastomotic leakage in the face of DCL colon resection. Statistical significance was calculated for each variable using a student’s t-test for independent means. For proportions, a Chi-square test with Yates’ correction for continuity was applied. All p-values reported are two-tailed.

its: Over the study period, 35 patients met inclusion criteria. Demographic data revealed that undergoing DCL with DA and DO to have statistically increased injury severity score (ISS), minal trauma index (ATI), and transfusion of packed red blood cells (PRBC) when compared to IA all groups, there were no significant differences in either the rate of abscess formation or colon-related mortality; however, there was a significantly higher anastomotic leak rate in the DA group.

<table>
<thead>
<tr>
<th>ISS</th>
<th>ATI</th>
<th>PRBC (units)</th>
<th>Abscess Rate (%)</th>
<th>Anastomotic Leak Rate (%)</th>
<th>Colon-Related Mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=17</td>
<td>13.4</td>
<td>24.2</td>
<td>0.9</td>
<td>29</td>
<td>6</td>
</tr>
<tr>
<td>(n=8)</td>
<td>25.0*</td>
<td>36.7*</td>
<td>6.9*</td>
<td>25</td>
<td>62.5*</td>
</tr>
<tr>
<td>(n=10)</td>
<td>29.6*</td>
<td>33.0*</td>
<td>17.1*</td>
<td>30</td>
<td>N/A</td>
</tr>
</tbody>
</table>

(<0.05 in relation to IA; N/A= not applicable)

Univariate analysis of previously described risk factors for anastomotic leak (i.e., ISS > 25, ATI > 25, transfusion > 4 units PRBC) failed to reveal any statistical significance in this patient population. Addition, the inability to close the abdomen at the time of anastomosis was not identified as a risk factor in the development of anastomotic complications. Of note, the average time to diagnosis of anastomotic leak was 7.0 days.

ision: Our study indicates that patients undergoing DA after DCL have a significantly higher rate of anastomotic complications but not colon-related mortality versus those patients undergoing IA. A creation should therefore be strongly considered in patients left in colonic discontinuity after DCL until risk factors for anastomotic leak may be better defined.
COLOSTOMY VS PRIMARY REPAIR AFTER DAMAGE CONTROL SURGERY

Susan Brundage, MD
Stanford University

Martin Schreiber, MD
Oregon Health Science University
ACUTE CARE SURGERY:

REAL OR IMAGINED THREAT TO THE GENERAL SURGEON

Tom Cogbill, MD
Gunderson Lutheran

G. Jerry Jurkovich, MD
Harborview Medical Center
**NT TRAUMA INDUCED SPLENIC BLUSHES ARE NOT CREATED EQUAL**

Umwinkle BA, CC Cothren MD, EE Moore MD, JL Kashuk MD, JL Johnson MD, WL MD
Veteran Health Medical Center

**enter:** Lucy Zumwinkle   **Senior Sponsor:** C. Clay Cothren, MD

**ground:** Currently, evidence of contrast extravasation on computed tomography (CT) is regarded as an indication for angioembolization or operation. In our recent experience, patients transferred from other institutions for angioembolization have often received the "blush" upon repeat imaging at our hospital. We hypothesized that not all radiologic blushes require intervention and that patients may be selectively observed based on physiologic status.

**ods:** During a 10 year period, all patients transferred with blunt splenic injuries and evidence of active contrast extravasation on initial postinjury CT scan were evaluated. Patients undergoing intervention (angioembolization or splenectomy) were compared to those managed without intervention.

**its:** During the study period, 241 patients with splenic injuries were transferred from outside hospital, of which 16 had a contrast blush on CT imaging. The majority (88%) of these patients were men with a mean age of 35 ± 5 and mean ISS of 26 ± 3. Eight (50%) of these patients were managed without angioembolization or operation. There was a significant difference in admission heart rate and decline in hematocrit following transfer in patients undergoing intervention, but not in injury grade:

<table>
<thead>
<tr>
<th>Management</th>
<th>Injury Grade</th>
<th>Age</th>
<th>SBP</th>
<th>HR</th>
<th>Decline in Hct after transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonoperative</td>
<td>3.5 ± 0.3</td>
<td>30.9 ± 4.7</td>
<td>115 ± 6</td>
<td>83 ± 6</td>
<td>1.0 ± 0.3</td>
</tr>
<tr>
<td>Intervention</td>
<td>3.9 ± 0.2</td>
<td>38.5 ± 8.2</td>
<td>125 ± 10</td>
<td>106 ± 9*</td>
<td>5.3 ± 2.0*</td>
</tr>
</tbody>
</table>

* = systolic blood pressure; HR = heart rate; Hct = hematocrit  *p-value < 0.05 shows statistically significant difference.

8 patients managed with observation, 3 underwent repeat imaging immediately after transfer; CT scan revealed the blush had resolved. In the intervention group, 4 patients underwent extravasation on repeat imaging an underwent intervention, 2 patients underwent empiric embolization, and 2 patients underwent immediate splenectomy for clinical indices.

**usions:** For blunt splenic trauma, evidence of contrast extravasation on initial CT imaging is not an absolute indication for intervention. A period of close observation and repeat imaging may be considered and could avoid costly, invasive interventions and their associated sequelae.
G-TERM FOLLOW UP OF NON-OPERATIVE MANAGEMENT FOR BLUNT ENIC INJURIES IN CHILDREN

Moore, D. Vane

Geral Glennon Children's Medical Center, Saint Louis University and University of Mont College of Medicine

**enter:** H. Moore  
**Senior Sponsor:** Dennis Vane

**Pose:** Debate no longer involves the initial effectiveness of non-operative care of enic injuries in children but revolves around safe recovery time and long term implications. To date no long term follow up for non-operative management of these en has been carried out. The purpose of this study was to assess the safety of theocols used by our institution for blunt splenic injury and evaluate long term outcomes children managed in this fashion.

**thesis:** Present protocols are safe and effective and no significant long term implications arise in children undergoing our non operative management algorithm.

**ods:** From 1993 to 2008 153 children (age 1-17yrs, mean=12) with blunt splenic es were admitted. Patients were contacted by telephone and answered a standardized onnaire. Medical records were reviewed to validate injury grade, hospital stay, andlications.

**ilts:** 80 patients were contacted (52%). 16 were excluded (8 Splenectomies, 3 atose, 2 Language issues and 3 whose medical records were not available). Follow-up remaining cohort ranged from 5 to 165 months post discharge (mean 74). There 9 grade I, 9 grade II, 22 grade III, 20 grade IV, and 3 grade V injuries. The most non mechanism of injury was from MVC's (14) followed by falls (11), ATV crashes snow related (14), misc. recreation (13). All children were seen in follow-up 2 wks discharge. Two were readmitted for spleen specific complications. Neither required onal medical treatment. (CT diagnosed cyst and residual hematoma) Radiographic ing showed both abnormalities resolved after 6 months. 8 patients reportedlications: 5 immunologic (asthma, rashes, and increased frequency of minor ess), 1 fatigue, 2 occasional abdominal pain, and 2 psychiatric related to fear ofuring their spleen. One patient with a grade V splenic injury, and a salvaged spleen, ted major medical complications resulting in multiple hospitalizations for infections (no splenectomy sepsis and Spleen intact on follow-up). 3 sustained second blunt splenic es. One reported a pale complexion, however, all had successful non-operative amement of their second injury with no long term complications.

**lusions:** Long term follow-up indicates that non-operative management of blunt enic injuries is safe and without long term morbidity or mortality. Patients report some after injury but none out of proportion from occurrence in non-injured populations. ndary splenic injury appears also to be safely managed with non-operative amement.
IBINED SPLENECTOMY AND LEFT NEPHRECTOMY FOR TRAUMA: HAVE COMES IMPROVED OVER THE LAST 30 YEARS?

Hall, DV Feliciano
University; Grady Memorial Hospital

Center: Chad G. Ball
Senior Sponsor: David V. Feliciano

Background: Injury to the spleen or kidney is associated with an individual mortality rate reaching 23%-26%. When the magnitude of the injury mandates simultaneous splenectomy and left nephrectomy, mortality rates greater than 40-45% have been noted. The goals of this study were to: 1) document current morbidity and mortality in patients with combined injuries, and 2) compare these outcomes to those from the era of so-called "damage control" trauma operations in shock patients.

Methods: A retrospective chart review of all injured patients who underwent a concurrent splenectomy and left nephrectomy at Grady Memorial Hospital (GMH) (Atlanta) from 1995 to 2007 was performed. The results were then compared to patients with similar injuries who were treated at Ben Taub (BT) General Hospital (Houston) from 1978 to 1987.

Results: Concurrent splenectomy and left nephrectomy after trauma was performed in 48 patients at BT and in 30 patients at GMH during the defined time periods. Patient demographics were similar in both groups (male = 94% and 80%; mean age = 31 and 29 years; p>0.05). More patients at GMH had a blunt mechanism of injury (34% vs. 12%; p<0.05). The pattern of associated injuries was the same in both series, but more injuries occurred at GMH (4.1 vs. 2.0/ patient; p<0.05). Postoperative complications occurred in 81% of patients in both series. In both groups, 33% of patients bleeding beyond 5 days of injury developed a left subphrenic abscess. The mortality rates were similar, and were most commonly due to shock hemorrhagic shock within 24 hours (84% (BT) and 56% (GMH); p<0.05).

Conclusions: Despite advances in operative management ("damage control") and operative critical care over the past 30 years, the complication rate, incidence of left subphrenic abscesses, and mortality rate are unchanged when a modern group of patients is compared to another series (BT) treated 20 years earlier. The combination of blood loss from organs receiving 15% of the circulating volume/minute, presence of injured injuries, and failure of current damage control techniques, contribute to the observed morbidity/mortality of these combined injuries.
ISM: A CUP HALF FULL?


Center: Riyad Karmy-Jones
Senior Sponsor: Riyad Karmy-Jones

Autism is a spectrum of disorders defined behaviorally. Incidence of classic autism is now estimated to be 1 in 88, but in some geographical areas the incidence is as high as 1/62. Common features include: isolating and perseverating on parts of a whole object (spinning wheels on a toy car, rotating blades of a fan, etc.); atypical repetitive and dysfunctional body movements (head-banging, spinning, etc.); difficulty with language (syntax or expressive); difficulty making contact; difficulties navigating social situations; difficulty seeing situations from different perspectives; difficulty processing sensory input. The etiology is not clearly defined, but there is a strong genetic component. There may be environmental triggers, which may differ for different children. Classically, there are two patterns: children who appear to have a normal developmental history who begin to regress and those who have a pattern of delay from birth. Diagnosis can be difficult, prevention is unknown and treatment and prognosis uncertain. Treatment and diagnosis has been hindered by designation as a psychiatric disorder, which has medical coverage to 60 hours a year. The primary treatment method, Applied Behavioral Analysis (ABA) requires that every step of socialization, adaptive care and living be broken down into simple steps, taught in a hierarchical fashion, and individualized to each child. Treatment must include home, therapy and school and involves integration of both developmental and social skills. Unfortunately, the volume of ten has precluded any reliable measure of support outside of the home, and the costs can range from 40-100K/annum to the family. Our own personal experiences have resulted in significant job and family changes. Many of these changes have been positive. Our daughters have benefited from their exposure both to children of differing ages as well as from what we have learned in teaching techniques. Although our son’s case is uncertain, there has been significant progress such that far from being institutionalized we can now see him as an independent young man with his own assessed hopes and ambitions. Although he has faced prejudice, fear, and frustration, all as we have taken a team approach and grown as a family.
Presidential Address

"The Gift"

Grace S. Rozycki, MD
OMIC EXPRESSION ANALYSIS IS DEPENDENT UPON METHOD OF PMN ISOLATION

University of Florida
enter: Elizabeth A Warner Senior Sponsor: Larry C. Martin.

ground: Contemporary trauma research involves gene expression profiling to predict nt outcomes and identify patients who may benefit from targeted therapies. The tive ability of expression analysis can be dramatically reduced by artifacts introduced g cell isolation. We compared the current gold standard method for isolating phils (PMNs) from whole blood (WB), Dextran- (DF) gradients, to a novel microfluidic (MF) uire that isolates PMNs by capturing CD66b+

ods: WB from three healthy volunteers was ulated ex vivo with LPS for 2 hours as a model of toxemia. Following stimulation, PMNs were ed by either: A) DF gradient, B) MF, or C) DF ent followed by MF (Fig 1). RNA was extracted gene expression was inferred using Affymetrix 3A GeneChips™ with statistical analysis using up and BRB ArrayTools software.

ults: An unsupervised analysis (CoV 0.5) and rchal clustering revealed 2318 probes that divided amples into two broad categories based on the ence of DF processing. Thus, samples that were sed to DF had a similar gene expression pattern dless of whether they were further enriched by A supervised analysis (Fig 2) identified 239 probe significantly different among the three groups (F- p<0.001) while maintaining the same overarching or pattern into 2 distinct categories: groups A and ples clustered together while group B samples red separately.

ussion: These findings suggest that DF essing alters gene expression patterns and ers to suppress apparent in vivo gene expression. rough expression profiling is a powerful diagnostic he current findings suggest that the genomic results are highly dependent upon the tical methods used to isolate PMNs.
NS, INFLAMMATION, AND INTESTINAL INJURY: PROTECTIVE EFFECTS OF AN INFILMAMMATORY RESUSCITATION STRATEGY

Costantini, M.D. C.Y. Peterson, M.D. L.M. Kroll W.H. Loomis, BS J.G. Putnam, BS B.P iri, Ph.D. A. Baird, Ph.D. V. Bansal, M.D. R. Coimbra, M.D., Ph.D.

University of California, San Diego School of Medicine

enter: T.W. Costantini, M.D. Senior Sponsor: R. Coimbra, M.D., Ph.D.

ground: Intestinal barrier breakdown following severe burn can lead to intestinal inflammation which may act as the source of the systemic inflammatory response. In vitro cell studies have shown that mitogen-activated protein kinase (MAPK) signaling plays a role in regulating barrier function. Pentoxifylline (PTX), a non-specific phosphodiesterase inhibitor, has been shown to inhibit MAPK inflammatory signaling. We previously observed that PTX attenuates burn-induced intestinal permeability and junction breakdown. We hypothesize that PTX may prevent burn-induced intestinal barrier injury by preventing activation of p38 MAPK and extracellular-regulated kinase.

Methods: Male balb/c mice underwent 30% total body surface area (TBSA) full thickness burn. Immediately following burn, animals received an intraperitoneal injection of (12.5mg/kg) in normal saline (NS) or NS alone. Distal ileum was harvested at multiple points following burn. Intestinal injury was assessed by histology and by intestinal IL-6 using ELISA. Intestinal abstracts were obtained to analyze phosphorylated p38 K, p38 MAPK, phosphorylated ERK, and ERK by immunoblotting.

Results: Increased phosphorylation of intestinal p38 MAPK and ERK is seen at 2 hours following severe burn. Treatment with PTX attenuated the burn-induced phosphorylation of MAPK (12-fold vs. 3-fold increase over sham, p=0.01) and decreased phosphorylation of ERK (9-fold vs. 3-fold increase over sham, p<0.01) at 2 hours. Phosphorylation of p38 K and ERK remained lower in PTX treated animals at 24 hours. Animals given PTX had decreased histologic intestinal injury and decreased intestinal IL-6 levels (121.8 vs. 55.0 pg/ml, p<0.005) compared with animals given NS alone.

Conclusion: PTX prevents the burn-induced phosphorylation of p38 MAPK and ERK. This provides insight into the mechanism by which PTX modulates intestinal permeability and subsequent intestinal inflammation. Therefore, PTX may be a beneficial immunomodulatory adjunct to resuscitation fluid following severe injury.
Peripheral Leukocyte Apoptosis Levels Are Associated With Increased Risk of Infection in Trauma Patients With Hemorrhagic Shock

Graphon, A. Moran, M. Carrick

Department of Medicine

Senior Sponsor: Ernest A. Gonzalez

Objectives: Previous studies have been conflicting with regards to the effects of peripheral leukocyte apoptosis on clinical outcomes in hemorrhagic and septic shock. No studies have examined the correlation between peripheral leukocyte apoptosis and outcomes in trauma patients following resuscitation from hemorrhagic shock in vivo.

Methods: Pre-operative, post-operative, and 24-hour venous samples were drawn from trauma patients requiring emergent laparotomy or thoracotomy. All patients were in hemorrhagic shock and were resuscitated intra-operatively. Leukocyte apoptosis was assessed pre-operatively, post-operatively and at 24 hours via nucleosome ELISA, and clinical records were examined for 30-day mortality, organ failure, and infection rates.

Results: Patients who developed infection had significantly lower post-operative nucleosome levels than those who did not develop any infections (17.7 μg/mg protein vs 49.7 μg/mg protein, p<0.01). This trend persisted when analyzing by specific type of infection and by organ failure, although these differences did not reach statistical significance. There were no statistically significant correlations between nucleosome levels and survival.

Conclusions: In patients with hemorrhagic shock, post-operative leukocyte apoptosis is inversely correlated with development of subsequent infection. Previous research has shown that high levels of apoptosis in circulating neutrophils following shock may have a protective effect by preventing neutrophil migration and limiting release of harmful oxygen radicals in the tissues. Thus neutrophil apoptosis may render tissues less susceptible to infection and subsequent infection. Our findings support this hypothesis and suggest that decreased levels of apoptosis in the immediate post-operative period are associated with a reduced risk of infection, particularly with regards to infection.

<table>
<thead>
<tr>
<th>Condition</th>
<th>n</th>
<th>Mean Nucleosome Level (μg/mg protein)</th>
<th>SD</th>
<th>n</th>
<th>Mean Nucleosome Level (μg/mg protein)</th>
<th>SD</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>Infection</td>
<td>9</td>
<td>49.7</td>
<td>38.1</td>
<td>14</td>
<td>17.7</td>
<td>15.4</td>
<td>0.00</td>
</tr>
<tr>
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<td>13</td>
<td>37.3</td>
<td>36.8</td>
<td>10</td>
<td>21.1</td>
<td>16.9</td>
<td>0.21</td>
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<tr>
<td>Und Infection</td>
<td>18</td>
<td>30.8</td>
<td>33.6</td>
<td>5</td>
<td>28.2</td>
<td>16.7</td>
<td>0.86</td>
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<tr>
<td>Urinary Tract Infection</td>
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<td>33.0</td>
<td>32.3</td>
<td>4</td>
<td>17.1</td>
<td>14.6</td>
<td>0.39</td>
</tr>
<tr>
<td>Peritoneal Abscess</td>
<td>16</td>
<td>34.7</td>
<td>34.3</td>
<td>7</td>
<td>19.9</td>
<td>16.0</td>
<td>0.28</td>
</tr>
<tr>
<td>Lipsis</td>
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<td>34.5</td>
<td>32.6</td>
<td>5</td>
<td>14.7</td>
<td>13.0</td>
<td>0.23</td>
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<tr>
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<td>14</td>
<td>37.2</td>
<td>35.7</td>
<td>9</td>
<td>19.4</td>
<td>15.9</td>
<td>0.17</td>
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<tr>
<td>An Failure</td>
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<td>35.9</td>
<td>40.1</td>
<td>9</td>
<td>25.5</td>
<td>17.5</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Table 1: Post-operative nucleosome levels (μg/mg protein) in peripheral leukocytes, by condition.
TRAUMA OUTREACH PROGRAM PROVIDED BY A LEVEL ONE TRAUMA CENTER: AN EFFECTIVE WAY TO INITIATE PEER REVIEW AT REFERRING HOSPITALS FOSTER PROCESS IMPROVEMENTS

Byrnes, MD; E Irwin, MD; J Chipman, MD; G Beilman, MD; M Thorson, MS; Paulison, MD; K Croston, MD

1 Memorial Medical Center and University of Minnesota

Senior Sponsor: Paul Harrison, MD

Reduction: The initial care of critically injured patients has profound effects upon outcomes. The "golden hour" of trauma care is often provided by rural hospitals to definitive transfer. There are, however, no standardized methods for providing rational feedback to these hospitals for purposes of performance improvement.

Hypothesis: We hypothesized that an outreach program would stimulate peer review to identify systematic deficiencies in the care of injured patients.

Methods: We developed a quality improvement program aimed at providing educational feedback to hospitals that refer patients to our American College of Surgeons-verified level one hospital trauma center. We travelled to each referral center to provide feedback on the initial and ultimate outcome of patients that were transferred to us. These feedback sessions were presented in the format of case presentations and case discussions. Quantitative data was analyzed with t-tests and categorical data was analyzed with chi-square tests.

Results: The outreach program was presented at each hospital every three to six months. Nine hospitals were included in our program. We received 334 patients in transfer to these hospitals during the study period. The mortality rate of patients treated before and after institution of the program was similar (5.7% vs. 3.8%, p=0.41). Only 14% of hospitals had a formal peer review program that focused on trauma patients prior to institution of our program. This increased hospitals to 100% of hospitals after institution of program (p<0.05). 85% of hospitals felt the care of injured patients was improved as a result of the program. 85% of hospitals developed process improvement initiatives as a result of the program. Insertion of two large bore intravenous catheters was more common after the program was initiated. Additionally, formal radiologic reporting time was reduced 50%.

Conclusions: A formal outreach program can stimulate peer review at rural hospitals, foster continuing education in the care of injured patients, and foster process improvements at referring hospitals.
RATIVE INTERVENTION FOR COMPLETE PANCREATIC TRANSECTION AFTER NT ABDOMINAL TRAUMA IN CHILDREN: REVISITING AN ORGAN SALVAGE HNIQUE

Borkon M.D., S.E. Morrow M.D., E.A. Koehler M.S., Y. Shyr PH.D., M.A. Hilmes M.D., Miller M.D., W.W. Neblett M.D., H.N. Lovvorn III M.D.

Ierbilt Medical Center

enter: Matthew J. Borkon, M.D. Senior Sponsor: Richard S. Miller, M.D.

ground
plete pancreatic transection (CPT) in children is commonly managed with distal resection (DP), which may require concomitant splenectomy. Alternatively, sewing of the proximal pancreatic stump, with Roux-en-Y pancreaticojejunostomy (PJ) to drain internally the distal pancreas, may be performed to preserve glandular tissue and the spleen. The purpose of this study was to review our experience using either method in the management of children sustaining CPT.

hods
IRB approval, we reviewed retrospectively the records of all children who were treated to our institution during the last 15 years and were confirmed by computed tomography (CT) and operation to have CPT after blunt mechanisms. Summary statistics of demographic data were performed to describe children receiving either DP or RYPJ. Time to full enteral feeds were analyzed using the Kaplan-Meier method and log-rank test. A Cox proportional hazards model was used to control for demographical differences between study populations.

ults
occurred in 29 children: 15 had DP (6 splenectomy), 10 RYPJ (1 splenectomy), 3 jejunostomy, and 1 external drain only. RYPJ children, compared to DP, were younger (v. 12.2 years, p<0.001), had higher ISS (22.5 v. 19.8, p<0.001) and sustained more severe pancreatic injuries (70% v. 13%, p<0.009). Time to full enteral feeds was not statistically different between procedures (p=0.1022). However, when comparing children the same age, ISS, and pancreatic injury grade, DP children were 3.11 times more likely to reach full enteral feeds (p<0.034); nevertheless, procedure type did not affect h of stay or drain duration. Postoperative complications were not different between study groups (p=0.667). Pancreatic volumes distal to the transection measured 52% J and 57% DP (p<0.001).

lusions
a management of children sustaining CPT, DP affords a slightly earlier return to full enteral feeds. RYPJ appears otherwise equivalent to DP and may preserve significant pancreatic glandular tissue.
OTS AND LADDERS: A REVIEW OF HUNTING RELATED INJURIES.

Crockett, P Beery, Y Thomas, D Lindsey, S Stawicki, M Whitmill, S Steinberg, A Jarvis, C J, C Cook
Ohio State University and Grant Medical Centers

**enter:** Andrew Crockett  
**Senior Sponsor:** Charles Cook

**ODUCTION:** Hunting is a popular outdoor activity throughout the United States. Despite monetary advantage, hunters are at risk for a source of morbidity and mortality amongst outdoor enthusiasts. Although the prevailing type is that most hunting injuries are gunshot wounds inflicted by drunk hunting buddies (AKA “Cheney” type injuries), our experience led us to hypothesize that falls comprise a significant portion of hunting related injuries.

**ODS:** Trauma databases of two ACS Level 1 trauma centers in our city were queried for all related injuries from Jan. 98 – Dec. 07, and data were acquired from chart reviews.

**ILTS:** One hundred thirty patients were identified with hunting related injuries, 90% of whom were male (mean age 41.0 yrs, range 17-76). Median injury severity score was 9 (range 1-31). 50% of injuries were from falls, 92.8% of which were falls from tree-stands. Gunshot wounds accounted for 4%, ATV crashes represented 7.7% of injuries, and only 1.5% of injuries were considered to be self inflicted (1 bite, 1 goring). Of records including species hunted, 76.5% were hunting deer, 8.8%, and 8.8% mushrooms. Very few were hunting snakes (2.9%) or squirrels (2.9%). Alcohol was involved in only 6.2%, and drugs of abuse in 5.1%. Amongst gunshot victims with an identified user, 57.6% were self-inflicted (~17% of all injuries), while 42.4% were shot by another hunter (24% of all injuries). Of patients with fall injuries, 50.0% had spine fractures, 42.9% lower extremity fractures, 10.7% upper extremity fractures and 14.3% had closed head injuries. Operative intervention was required for 67.9% of these injuries, and 14.3% had permanent neurological deficits (paraplegic, 1 quadriplegic).Disposition for surviving patients was 85.8% discharged home, 6.3% facilities, 5.5% nursing homes, and 2.4% transferred to acute care hospitals. Overall mortality injuries was only 2.3%

**ULSIONS:** Counter to prevailing beliefs, in our geographic area falls are the most common anism of hunting related injury requiring admission to a Level 1 trauma center. The vast majority of these falls are sustained by deer-hunters using tree-stands. Significant numbers of those ing admission to trauma centers required surgical care including orthopedic and neurosurgical entions with rehabilitation follow-up. Gunshot wounds occurred far less frequently than falls, were nearly evenly split between self-inflicted injuries and those sustained from another hunter. Other trauma mechanisms, alcohol appears to play a much less frequent role in hunting related sa, and may relate to the early hour in which hunting typically occurs. While all hunters in our ioning, and firearm safety, with sparse coverage of situational dangers related with tree-stands. Broadening the scope of hunter’s education to include tree-stand safety all prevention might decrease the incidence of hunting related injuries in our area.
STEEL: CURE FOR WHAT AILS YOU STUDY AND PURSUIT OF THE STEELHEAD TROUT

Metzdorff, M. D.
vascular Surgical, PLLC

Co-ment: Mark T. Metzdorff, MD

Senior Sponsor: Mark T. Metzdorff, MD

Surgery can be a stressful practice, and surgeons find relief from stress in varying This presentation will describe one man’s journey toward serenity in pursuit of one West’s most magnificent species: *Onchorhynchus mykiss*, the steelhead trout, vise known simply as the steelhead. The incredible anadromous life cycle of the ead, like all salmonid species, involves time in both fresh and salt water and a tion of thousands of miles from their natal stream, to the ocean and back again. fish overcome tremendous obstacles, both natural and manmade, to fulfill their y to reproduce; a destiny which is ever more endangered as old threats persist andreats emerge. As an indicator species of ecosystem health, steelhead have drawn e scientific study which has shed light on their life cycle and on the factors which nce them at each stage of their existence. The urgent threat of fish farming as ced in the near-shore saltwater where salmonids migrate is the latest manmade rope of unforeseen consequences to affect the species. As the steelhead and runs decline in the states, provinces and communities where steelhead are found, ments have gained a new appreciation of the impact of recreational fishing on their mies. Although the challenges are many, there are opportunities for improvement yone who appreciates wild creatures and their habitats, even non-anglers, can pate in.

The appeal of angling for these fish ("steelheading") will be apparent from the ation. Steelhead are found in the wildest, most beautiful areas of the Pacific Northwest, along with other rare, beautiful and endangered species. Steelheading is a solitary activity which requires skill, patience, persistence, and tolerance for adverse conditions. The sport has a rich literary tradition that nurtures its practitioners in the off-season. The rewards of the pursuit go far beyond the mere act of catching, and releasing, a trophy. The act of angling for these fish gives ample opportunity for reflection, for appreciation of the profoundly beautiful environment in which it is practiced, and for camaraderie with anglers both contemporary and long gone. Like many avocations favored by individuals in stressful occupations, steelheading allows one the opportunity to lose himself in the pursuit, to meet and hopefully overcome the challenges inherent in the sport, to recharge his batteries and return to the daily grind a rested,
Paint the Ceiling Lecture

Dr. Gregory "Jerry" Jurkovich delivered his Presidential Address entitled "The Ceiling: Reflections on Illness". This was a personal account of his battle with non-Hodgkin’s lymphoma. His deep insights were shared from a patient's perspective, even that of a stained ceiling that he observed while lying on his back. He proposed that future WTA Scientific Programs have some time “dedicated to our patients and to the Art of Medicine”.

“The Journey is the Destination”

Dr. Sylvia Campbell
OXAMER 188 PROLONGS SURVIVAL OF HYPOTENSIVE RESUSCITATION AND REASES VITAL TISSUE EDEMA AFTER FULL RESUSCITATION

Zhang, MD, PhD, R. Hunter MD, PhD, E Gonzalez MD, FA Moore MD. Methodist Hospital and University of Texas Houston Medical School

enter: Frederick A. Moore  Senior Sponsor: Frederick A. Moore

Introduction: Damage control resuscitation (DCR) prolongs survival so that patients with severe bleeding live long enough to undergo hemorrhage control. Hypotensive resuscitation is a DCR dict to limit ongoing bleeding but may result in deleterious gut ischemia/reperfusion (IR) with full reperfusion which sets the stage for acute lung injury (ALI) and the abdominal compartment syndrome (ACS). In our gut IR ALI model, Poloxamer (P) 188 (a nonionic, block copolymer stant) was quite protective. We, therefore, hypothesized that P188 would likewise be protective model of hypotensive resuscitation of lethal hemorrhagic shock.

Methods: Previously instrumented, unanesthetized rats (n=8 per group) were observed (sham) or l (6 groups) over 15 minutes to a mean arterial pressure (MAP) of 30 mmHg and this was maintained for 30 min. Two bleed groups had hypotensive resuscitation with Hextend (Hex) or Hex + g/ml P188 to maintain a MAP of 60 mm Hg and observed until death. The remaining four bleed groups had the same hypotensive resuscitation (2 Hex and 2 Hex-P188) maintained for 40 min, then full resuscitation with lactated Ringers (LR) or LR + 20 mg/ml P188 respectively to a MAP of 80 g. One treatment group each was then observed for survival to 24 hr. The remaining two groups injected with Evan’s Blue dye and then sacrificed at 5 hrs. Tissues were harvested for mination % H2O content (wet - dry weight/wet weight) and Evan’s Blue extravasation (quantitated ectroscopic absorption). Data are expressed as mean ± SEM. Differences were compared by n-Breslow, P<0.05 was considered significant.

Results: The hypotensive resuscitation alone Hex group compared to hypotensive alone Hex + P188 required more fluid to maintain MAP till death (11.17 ± 1.37 vs 4.72 ±0.81 ml/kg/hr, p<0.05) and much sooner (288 ± 37 vs 598 ± 100 min, p<0.05). One (12.5%) full resuscitation Hex/LR rats died 24 hours compared to 4 (50%) full resuscitation Hex/LR + P188 (p<0.05) rats. Full resuscitation Hex/LR rats compared to full resuscitation Hex/LR + P188 rats who were sacrificed at 5 hrs required more fluid during full resuscitation (35.5± 6.6 vs 13.8 ± 3.32 ml/kg/hr, p<0.05), had increased vascular permeability as quantitated by Evan Blue extravasation into the lung ( sham = 89.7 1 vs Hex/LR = 261.5 ± 49.5 vs Hex/LR + P188 = 133.6 ± 28.0 ug Evans Blue/100 g tissue, p< and ileum (58.8 ±9.6 vs 122.5 ± 26.0 vs 60.5 ± 15.2, p<0.05 ) which corresponded to decreased tissue water in the lung ( sham = 78.16 ± 0.22 % vs Hex/LR = 80.78 ± 0.77 % vs Hex/LR + = 78.85 ± 0.32,p<0.05 ) , and ileum (74.88± 0.48% vs 77.82 ± 0.84% vs 75.14 ± 1.02%, p<0.05).

Conclusion: Poloxamer 188 prolonged survival and decreased fluid requirements in a model of hypotensive resuscitation of lethal hemorrhagic shock. With full resuscitation, more Poloxamer 188 ad rats survived and they had less tissue edema in the lungs and the gut. Poloxamer 188 may be important adjunct in DCR of patients with severe bleeding by prolonging survival of hypotensive resuscitation and decreasing the incidence of ALI and ACS in those who survive long enough to go effective hemorrhage control followed by successful full resuscitation.
CREASED PLATELET:RBC RATIOS ARE ASSOCIATED WITH IMPROVED SURVIVAL AFTER MASSIVE TRANSFUSION

omb JB*, Zarzabal LA, Michalek JE, Kozar RA*, Gonzalez EA, Spinella PC, Ins JG, Wade CE
iversity of Texas Health Science Center-Houston

enter: John B Holcomb Senior Sponsor: John B Holcomb

roduction: Several recent military and civilian trauma studies demonstrate improved outcomes are associated with early and increased use of plasma and resuscitation strategies. However, outcomes associated with platelet transfusions are poorly characterized. We hypothesized that increased platelet:RBC ratios would decrease hemorrhagic death and improve survival after massive transfusion.

ethods: A transfusion database of patients transported from the scene to 22 Trauma Centers over 12 months in 2005-2006 was reviewed. Two patients within 30 minutes of arrival and were excluded from analysis. Massive transfusion (MT) was defined as receiving \( \geq 10 \) RBC units within 24 hours of admission. Admission and outcome data associated with average low (1:20), median (1:2.5) and high (1:1) platelet:RBC ratios were examined.

results: Six hundred forty five patients received MT. Admission vital signs, INR, temperature, pH, GCS, ISS and age were similar between groups. Patients were more injured, with a mean (± SD) ISS of 33 ± 16 and received 22 ± 15 RBC units. Increased platelet ratios were associated with improved survival at 6 hours, 30 days (p<0.001). Median time to death increased (Low: 7 days, 30 days, p<0.001), while truncal hemorrhage as a cause of death decreased (Low: 67%, High: 47%, p<0.001). Although MOF mortality increased (Low: 7%, 27%, p<0.05), 30 day survival improved (Low: 53%, High: 75%, p<0.001).

clusion: Similar to recently presented military data, transfusion of platelet:RBC in a ratio of 1:1 is associated with improved early and late survival, eased hemorrhagic death and a concomitant increase in MOF related mortality. Based on this large retrospective study, increased and early use of platelets may be justified.
LOVED SURVIVAL AFTER HEMOSTATIC RESUSCITATION: DOES THE ERROR HAVE NO CLOTHES?

Magnotti, M.D., B.L. Zarzaur, M.D., MPH, M.A. Croce, M.D., P.E. Fischer, M.D., MS, R. Lums, M.D., T.C. Fabian, M.D.

University of Tennessee Health Science Center

Senior Sponsor: Ben L. Zarzaur, M.D., MPH

In light of recently published and presented data, controversy surrounds the apparent 30-day survival benefit of patients achieving a fresh frozen plasma (FFP):red cell (PRBC) ratio of at least 1:2 in the face of massive transfusions (MT) (≥10 units of PRBC within 24 hours of admission). We hypothesized that initial studies suffer from survival bias since they do not consider early deaths secondary to uncontrolled exsanguinating hemorrhage. To help resolve this controversy, we evaluated the temporal relationship (at 6 hour intervals) between blood product administration and mortality in civilian trauma patients receiving MT.

**Study Design:** Patients requiring MT over a 22-month period were identified from the electronic registry of a level I trauma center. Shock severity at admission as well as during shock-trauma admission, blood product administration and death were recorded. Patients were divided into high and low ratio groups (≥1:2 and <1:2 FFP:PRBC, respectively) and compared. Kaplan-Meier analysis and log-rank test was used to examine survival.

**Results:** 103 patients (63% blunt) were identified (66 hi, 37 lo). Those patients who achieved a high ratio in 24 hours had improved survival (Fig 1). However, severity of shock at the time of initial MT was less in the hi group (BE: -8.0 vs. -11.2, p=0.028; LA: 6.3 vs. 8.4, p=0.03). 75 patients received MT within 6 hours of admission. Of these, 29 received a high ratio in 6 hours. Again, severity of shock at the time of initial MT was less in the hi group (BE: -7.6 vs. -12.7, p=0.008; LA: 6.7 vs. 9.4, p=0.02). Among patients receiving MT within 6 hours, 6 hour mortality was less in the hi group (10% vs. 48%, p<0.002). After controlling for early deaths, groups were similar from 6 to 24 hours (Fig 2).

**Conclusions:** Improved survival was observed in patients receiving a higher plasma ratio of at least 1:2 in the first 24 hours. However, temporal analysis of mortality using shorter time periods (6 hours) revealed those who achieve early high ratio are in less shock and less likely to die from uncontrolled hemorrhage compared to those who never achieve a hi ratio. Thus, the proposed survival advantage of hi ratio may be due to selection of those not likely to live in the first place; that is, patients die with a low ratio not because of a low ratio.
ER AGE AND BLOOD TRANSFUSION ARE CO-CONSPIRATORS IN THE DEVELOPMENT OF POSTINJURY MULTIPLE ORGAN FAILURE AND SUBSEQUENT TH

JL Johnson, E Moore, C Cothren, J Kashuk, A Banerjee, A Sauraia er Health Medical Center

enter: Walter L Biffl Senior Sponsor: Walter L Biffl

is an independent predictor of postinjury morbidity and mortality. Blood dfusion is a critical risk factor for postinjury multiple organ failure (MOF), the r cause of late mortality following trauma. The age/transfusion interaction as it es to MOF has not been examined. The purpose of this study was to aceritize the relationship between age, transfusion, and postinjury MOF.

ods: 1415 high-risk patients, excluding isolated head injured patients, were lled in a Level I Trauma Center's prospective database over a 13-year period. ple logistic regression evaluated the association between age, other risk rs, and MOF.

ults: 346 (24%) patients developed MOF; 98 (28%) died. The incidence of began to rise at age 45 (35% for age >45, vs 20% for age <45, p<.0001) and ality increased after age 55 (44% for age >55, vs 23% for age <55, p=.0005). timing (early vs. late), pattern of organ dysfunction, and incidence of tious and non-infectious complications were no different across age strata. effect of injury severity on MOF was independent of age (left figure). However, isk conferred by early blood transfusion was exacerbated by age (p=0.01) t figure; age >55, squares; <55, diamonds)

 Adjusted odds ratios of developing MOF by ISS for the groups with ages <=55 and >55 years

 Adjusted odds ratios of developing MOF by PRBC transfused in the first 12 hours, ages <=55 vs >55

ulusions: Age becomes a risk factor for postinjury MOF at 45 years. Blood transfusion profound adverse effect among older (age >55) patients. These data support current mendations for a restrictive transfusion strategy (eg, target hemoglobin >7 g/dL) ig all trauma patients, irrespective of age and medical comorbidities.
Founders’ Basic Science Lectureship

Throughout the years, the Western Trauma Association has matured as an mic society while maintaining the cherished elements of friendship, collegiality and . In honor of this unique spirit, a founding member has generously provided the idea host of the financial support for an annual Founders’ Basic Science Lectureship. The se of this Lecture is to further enhance the educational value of our Scientific Meeting e to the area of basic science research. This Lecture reflects the vision and ation of our founding members and will hold a prominent place in all future programs.

“Wound and Intestinal Barrier Dysfunction: Past, Present, and Future”

Raul Coimbra, MD, PhD
RANDOMIZED PROSPECTIVE TRIAL OF AIRWAY PRESSURE RELEASE VENTILATION AND LUNG PROTECTIVE VENTILATION IN ADULT TRAUMA PATIENTS WITH ACUTE RESPIRATORY FAILURE

Maxwell MD, J Waldrop MD, JM Green MD, BW Dart MD, PW Smith MD, PL Lewis RN, Books RT, DE Barker MD

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Principal Investigator: Robert A. Maxwell
Senior Sponsor: Robert A. Maxwell

Purpose: Airway Pressure Release Ventilation (APRV) is a relatively new form of mechanical ventilation which has demonstrated potential benefits in trauma patients. We therefore sought to compare relevant safety outcomes of this modality to the recommendations of the ARDS Network.

Methods: Patients admitted following traumatic injury requiring mechanical ventilation were randomized under a 72 hr waiver of consent to a respiratory protocol for APRV or lung protective ventilation (CONVEN). Data were collected regarding demographics, ISS, oxygenation, ventilation, airway pressure, failure of aliy, tracheostomy (Trach), pneumonia (VAPS), vent days, length of LOS, pneumothorax (PTX) and mortality (Mort).

Results: 63 patients were enrolled during the 16 month study period beginning in 2004 with 31 being assigned to APRV and 32 being assigned to CONVEN. 74 were males, 56% smoked, 98% had a blunt mechanism, with a mean age of 15.0 yrs, ISS 29.5±8.2, GCS 6.3±4.6, Lung Injury Score 1.73±1.22 without differences between groups. Mean APACHE2 was worse for APRV patients (5.35) than CONVEN (6.9±7.17) with a p-value = .027. Outcome variables are shown as means ± SD or rates per group in the following table:

<table>
<thead>
<tr>
<th></th>
<th>Vent Days</th>
<th>ICU LOS</th>
<th>PTX</th>
<th>VAPS</th>
<th>Trach</th>
<th>Failure</th>
<th>Mort</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>10.49±7.23</td>
<td>16.47±12.83</td>
<td>0</td>
<td>1.00±.86</td>
<td>61.3%</td>
<td>12.9%</td>
<td>6.45%</td>
</tr>
<tr>
<td>VEN</td>
<td>8.00±4.01</td>
<td>14.18±13.26</td>
<td>3.1%</td>
<td>.56±.67</td>
<td>65.6%</td>
<td>15.6%</td>
<td>6.25%</td>
</tr>
</tbody>
</table>

There were no statistical differences between groups.

Conclusion: For patients sustaining significant trauma requiring mechanical ventilation for greater than 72 hrs, APRV appears to have a similar safety profile as lung protective strategy put forward by the ARDS Network. Slight trends for V patients to have increased vent days, ICU LOS and VAPS may be explained by initial worse physiologic derangement demonstrated by higher APACHE2 scores.
PULMONARY HYPERTENSION AFTER INJURY IS ASSOCIATED WITH LEFT HEART FUNCTION

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enter: A. Driggs  Senior Sponsor: K. Bullard

Background: Pulmonary hypertension can manifest acutely in injured patients. Hypoxia has been implicated as the cause of pulmonary vasoconstriction, however not all hypoxic events have increased pulmonary artery pressures. The purpose of this study is to examine the association between pulmonary hypertension, hypoxia, and left heart function in critically injured patients.

thesis: Pulmonary hypertension after injury is secondary to left heart dysfunction not to hypoxia.

ods: Over 24 months, 113 patients admitted to the surgical intensive care unit of an urban trauma center underwent transthoracic echocardiograms with color flow doppler to determine endpoints of resuscitation. Pulmonary hypertension was estimated from E flow measurements by a board certified cardiologist. Moderate pulmonary hypertension was defined as a pulmonary artery pressure 45-75 mmHg and severe pulmonary hypertension was defined as > 75 mmHg. Degree of hypoxemia at time of echocardiogram and left ventricular dysfunction was recorded for each patient.

nts: 41 out of 113 patients were found to have severe pulmonary hypertension, 83% of patients had left heart dysfunction, in the form of left ventricular hypertrophy (diastolic function), wall motion abnormality, decreased ejection fraction (systolic dysfunction), or aortic stenosis (outflow obstruction). Only 25% of patients with mild to normal pulmonary hypertension showed signs of left ventricular function. Median PaO2 for the two groups at time of echocardiography, were not significantly different.

ussion: Patients with left heart dysfunction are at an increased risk for pulmonary hypertension that may contribute to prolonged ventilation following injury. Cardiography can identify patients at risk for pulmonary hypertension and these patients can then be targeted with cardioprotective strategies such as prudent fluid resuscitation and inotropic support. Selective pulmonary vasodilators may offer additional benefits for patients with severe pulmonary hypertension. Serial echocardiograms can be used to monitor progress with resuscitation strategies in these complex patients.
LESTEROL REPLACEMENT CORRECTS EFFETE NEUTROPHIL SIGNALING AFTER OR TRAUMA VIA LIPID RAFT TRAFFICKING

Israel Deaconess Medical Center and Harvard Medical School

Senior Sponsor: C Hauser

PATIENTS: PMN are dysfunctional in the post-injury period, predisposing to sepsis. Underlying mechanisms are poorly understood, but Ca^{2+} influx in response to G-protein coupled receptor (GPCR) activation is critical for PMN function. GPCR mobilize Ca^{2+} via phosphatid (LyL) second messengers. Lipid rafts are composed of LyL and cholesterol (LyL) but plasma CHO levels are suppressed in trauma and critical illness.

METHODS: We prospectively, serially studied PMN Ca^{2+} mobilization in major trauma patients (ISS>25) and their matched controls to the LyL sphingosine 1-phosphate (S1P), triglycerol phospholipid (SPPC) and lysophospholipidic acid (LPA) using Fura-2AM. The dependence of signaling on raft trafficking was assessed by response to MβCD. All assays were assessed with and without CHOLL supplementation.

RESULTS: PMN Ca^{2+} entry responses to all the LyL are profoundly suppressed by injury. Depression begins on Day 1, peaks on Day 3 and returns toward normal at Day 7. CHOLL lematization restored normal and even supra-normal Ca^{2+} influx. Destruction of rafts by MβCD abolished all Ca^{2+} responses to the LyL.

PMN responses (n=8) to LPA are suppressed immediately after trauma. Right: Patients show suppression (>50%) of response to 5 μM S1P on Day 3. MβCD shes Ca^{2+} entry response to S1P but CHOLL restores it to above normal.

CONCLUSIONS: LyL as a class are potent PMN activators that probably function by asing Ca^{2+} entry through channels that traffic to forming lipid rafts. PMN become edly refractory to LyL in the week after trauma but their responses can be restored by L. These findings suggest micro-nutrient dependent alterations in lipid raft composition signaling function contribute to PMN dysfunction after injury. The same principles might be in modulating PMN function after injury and in critical illness.
PANEL OF EXPERTS

Moderator: Margaret "Peggy" Knudson
Roxie Albrecht, MD
Frederick A. Moore, MD
David Livingston, MD
IS THE RTTDC® (RURAL TRAUMA TEAM DEVELOPMENT COURSE®) BETTER THAN THE INTERVAL FROM TRAUMA PATIENT ARRIVAL TO DECISION TRANSFER?

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Presenter: Daniel C. Rossi, DO  Senior Sponsor: David A. Kappel, MD

BACKGROUND: The Rural Trauma Team Development Course® (RTTDC®) was developed by the ad hoc Rural Trauma Committee of the American College of Surgeons Committee on Trauma to address the increased mortality of the rural trauma patient. In the course, multiple potential delays are identified and stressed including delay in the decision to transfer to an appropriate level of care. Effectiveness of the RTTDC® in shortening the interval from patient arrival to decision to transfer and the effect on the transfer process of communication emphasizing team building is the focus of this study.

METHOD: Rural Level III and Level IV trauma centers (N = 18), participating in the trauma registry were enrolled in a multi-institutional three month longitudinal study of transferred trauma patients. Time of arrival, time of decision to transfer, transporting ambulance arrival time, number of receiving facilities contacted, time acceptance by receiving facility, and number of transporting units contacted were data points collected. Results were compared for institutions having hosted DC® versus those institutions not yet exposed to the course. Eighteen ties submitted data. Three facilities were excluded for incomplete data. Facilities without RTTDC® experience submitted 191 patients. RTTDC® trained facilities provided data on 117 patients and of those, two facilities had experienced communication training in the RTTDC® and submitted 36 of the 117 patients.

RESULTS: One-Way Analyses Of Variance (ANOVA’s) were conducted. Results indicated that RTTDC® training including communication training, resulted statistically significantly shorter (p < .05) time for decision to transfer. Referring squad arrival time was also significantly reduced (p < .01). The number of transferring squads contacted was also reduced (p = .01). No differences were observed among the trauma facilities and the number of receiving facilities contacted, (p = .69) or in the time required to find an accepting facility (p =

CONCLUSION: The RTTDC® with the embedded communication module significantly reduces delays in the transfer process of the rural trauma patient.
SAFETY OF HYPERTONIC SALINE SOLUTION FOR RESUSCITATION IN UMA

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Enter: R. Stephen Smith  Senior Sponsor: R. Stephen Smith

ground: The optimal fluid for resuscitation of injured remains controversial. The standard fluid resuscitation remains isotonic crystalloid solution. Mounting experimental and clinical evidence ports the use of hypertonic saline solutions (HTS) in resuscitation. However, there continues to be a need regarding the efficacy and safety of HTS. Herein, we report our initial experience with HTS citation in the trauma setting.

geds: After obtaining IRB approval, a retrospective review of seriously injured (ISS>15) patients led to an ACS verified Level 1 trauma center between 01/2006 and 01/2008 was performed. The HTS received either HTS, normal saline (NS) or Ringers lactate (RL) during initial resuscitation. The choice of initial resuscitation fluid was determined by the attending trauma surgeon. The severity was determined by ISS, initial Glasgow Coma Scale score (GCS), and the calculated survival probability. The safety of HTS was determined by evidence of adverse outcomes (coagulopathy,logic dysfunction, cardiac dysfunction, renal failure, phlebitis) associated with HTS administration. The efficacy of HTS was determined by comparing the primary outcome of all-cause mortality between the two groups. Secondary outcomes included CHF, respiratory failure, ion, ICU length of stay (LOS), and overall hospital LOS. A subgroup analysis (n=105) was performed in patients with traumatic brain injury (TBI).

its: A total of 324 patients met study criteria. Of these, 183 received HTS. Patients that red HTS were more severely injured. The mean ISS of the HTS group was higher than for the tic resuscitation group (29.2 vs. 28.0; p = 0.02). The initial GCS was significantly lower in the group than in the standard group (5.3 vs. 7.0; p = 0.0008). The calculated survival probability was higher in the HTS group (45.4% vs. 52.2%; p = 0.12). Patients with HTS required longer periods of anical ventilation and ICU care and were more likely to develop nosocomial infections. There was no difference in the number of transfusions given to the HTS and standard groups (7.2 vs. 6.6; p = 4). There was no significant difference in the INR, PTT, or fresh frozen plasma (FFP) determinations of the two groups (1.3 vs. 1.5 with p = 0.94, 35.0 vs. 47.5 with p = 0.67, and 5.1 vs. 4.3, 821). There were 2 episodes each of paralysis and paraparesis and 1 episode of dysarthria, all standard therapy group. The incidence of arrhythmias (6.0% vs. 11.4%; p = 0.11) and renal (9.3% vs. 10.6%; p = 0.71) were lower in the HTS group. The 30-day all-cause mortality was in the HTS group (33.3% vs. 36.8%; p = 0.56). In patients with TBI, 61 patients with TBIred HTS and 44 patients received isotonic fluids. The initial GCS was lower (3.9 vs. 5.0, p = 5), the ISS was higher (29.3 vs. 28.0, p = 0.28), and the survival probability was lower (36.3%, p = 0.32) in the HTS group. However, the 30-day mortality was lower in the HTS group (%) vs. 40.9%, p = 0.21). There was no increase in adverse outcomes in the HTS group when cated to the standard group.

usions: The administration of HTS during resuscitation is safe. There were no adverse events associated with HTS resuscitation. There was a trend towards a lower incidence of coagulopathy, arrhythmias, and renal failure in the HTS group, although, this did not reach statistical significance. The group was more severely injured, as indicated by the ISS, initial GCS, and calculated survival probability. Table 3 shows the mortality was higher in the HTS group, although not statistically significant. In 31 subgroup analysis, patients who received HTS were more severely injured, but showed a towards improved survival.
SPECTIVE STUDY OF CONTINUOUS NON-INVASIVE TISSUE OXIMETRY IN THE LY EVALUATION OF THE COMBAT CASUALTY

Eklley, M Martin, T Nelson, K Grathwohl, M Griffith, G Beilman, J Holcomb
Jan Army Medical Center

enter: Alec C. Beekley Senior Sponsor: Matthew J. Martin

duction: Near-Infrared Spectroscopy (NIRS) has been previously evaluated in intensive trauma patients and found useful for predicting MODS and death. We hypothesized that (NIRS)-derived tissue oxygenation (StO2) could assist in identifying perfusion in combat casualties arriving to a combat support hospital and predict need for saving interventions (LSI) and blood transfusion.

ods: We performed an IRB-approved, prospective observational trial at a single U.S. combat support hospital in Iraq from August to December 2007. Arriving casualties (StO2 (Inspectra 650TM, Hutchinson Technology, Inc) recorded for a 43 second to 54 minute period on arrival, using a sensor applied to the thenar eminence or a pre-designated native site if both hands were injured. Minimum (StO2 min) over the entire monitoring period and 2 minute averaged StO2 and Tissue Hemoglobin Index (THI) readings at the time of the file were used as endpoints. Outcomes measured were requirement for saving interventions (LSI), any blood transfusion, massive transfusion (≥10 units in 24 hours), and early mortality. Univariate and multivariate logistic regression modeling was used to estimate the area under the receiver operating characteristic curve (AUC) for dual or combinations of variables using a stepwise backward elimination technique.

lts: We enrolled 147 combat casualties. 72 (49%) required an LSI, 42 (29%) a blood transfusion, and 10 (7%) a massive transfusion. On multivariate logistic regression analysis of the whole study group, SBP, INR, Tissue Hemoglobin Index (THI), and hematocrit were primary predictors of blood transfusion with an AUC of 0.90 (0.84, 0.96). When just the group with SBP (n = 133, mean SBP 131) were analyzed, independent predictors of patients requiring transfusion on logistic regression analysis were StO2 min (OR 1.35) and hematocrit 2.66.

lusions: Previous studies demonstrated that StO2 differentiates patients with severe perfusion from normal patients and predicted the development of MODS and death in intensive trauma patients. We demonstrated that NIRS-derived StO2 obtained on arrival assists the need for blood transfusion in combat casualties who initially appear to be dynamically stable (SBP > 90). Further study of this technology for use in the triage of trauma patients is warranted.
PULSELESS ELECTRICAL ACTIVITY, THE FOCUSED ABDOMINAL SONOGRAM FOR UMA, AND CARDIAC CONTRACTILE ACTIVITY AS PREDICTORS OF SURVIVAL ER TRAUMA

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Enter: Kevin M. Schuster, MDSenior Sponsor: Kimberly A. Davis MD

Duction: Pulseless electrical activity (PEA) secondary to both blunt and penetrating ta is associated with minimal survival. There may however be a difference in survival een patients who maintain organized cardiac contractile activity and those who do not. pericardial view of the focused abdominal sonography for trauma (p-FAST) has the y to differentiate between these two groups of patients and may assist in the decision minute ongoing resuscitation.

ODS: A retrospective chart review was performed for all patients presenting to an level I trauma center from 1/2006 through 8/2008 who had no pulse or were severely tensive. The charts were reviewed for the presence of PEA on arrival or the lopment of PEA while in the emergency department. Additional data abstracted led the patient outcome, the p-FAST findings, and mechanism of injury. All available ded FAST exams were also re-reviewed by a blinded ultrasound trained physician to rm documented findings.

ILTS: Over the study period 22 patients presented with PEA and 2 developed PEA g initial resuscitation. All patients had cardiac ultrasound evaluation. Contractile ac activity was present in 6 patients with PEA on presentation and immediately after ioration to PEA in the 2 patients developing PEA in the emergency department. Four nts had a penetrating mechanism and 20 were due to a blunt mechanism. Two ions were present on exam, one after blunt trauma and one after penetrating cardiac treated with emergency department thoracotomy. All but one patient died in the gency department (96% early mortality). The sole survivor had presented in PEA with sized cardiac contractile activity on ultrasound and had a tension pneumothorax ad with tube thoracostomy. This patient was admitted to the ICU before dying on ital day 6 as a result of severe closed head injury.

lusion: The presence of PEA at any time during initial resuscitation is a grave nostic indicator. p-FAST is a useful test to identify contractile cardiac activity. P-FAST iden those patients with some potential for survival who may benefit from ongoing citative efforts.
OSTATIC FOAM FOR FIRST RESPONDERS IN THE TREATMENT OF SEVERE A CAVITY NON-COMPRESSIBLE HEMORRHAGE

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Reed Army Medical Center R Adams Cowley Shock Trauma Center

Senior Sponsor: Grant Bochicchio MD, MPH

KGROUND: Severe intracavitary hemorrhage is the cause of most early traumas. The objective of this study was to evaluate the ability of a novel hemostatic foam (Foam®) to control bleeding from lethal intraabdominal vascular injuries when delivered closed cavity rodent model.

HODS: Anesthetized rats (250-300 g) underwent femoral vein and arterial ligation, followed by midline laparotomy. After gaining proximal and distal control of infrarenal aorta with vascular clamps, the aorta was pierced twice with a 25 gauge needle on both sides of the vessel. A 16 gauge needle was inserted intraperitoneally in the lower quadrant remote from the aortic injury. At time 0, the vascular clamps were released, free bleeding ensued for 4 seconds. Animals were randomized into five groups receive either ClotFoam® (CF) formula 1, CF formula 2, CF formula 3, standard chitosan sealant (CLS), or no treatment. Animals were infused with lactated Ringer's to maintain mean arterial pressure at about 70-80% of initial MAP (if possible). Animals were treated for 30 minutes. In one subset of animals, the abdomen was fully closed with suture during free bleeding. Animals in this subset underwent closed cavity application of the hemostatic agent. Total blood loss (TBL), mean arterial pressure (MAP), and survival were recorded. A second subset of animals underwent open cavity agent application after bleeding. In this subset, bleeding time (BT) was recorded.

JLTS: None of the non-treated animals survived for the 30 minute duration of the experiment (mean survival time 13 ± 3 min). Only 20% of the animals in the CLS group survived with a survival time 22 ± 4 min). All animals in the three CF groups survived the entire duration of the study.

<table>
<thead>
<tr>
<th></th>
<th>CF 1</th>
<th>CF 2</th>
<th>CF 3</th>
<th>CLS</th>
<th>No Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total blood loss</td>
<td>5.2 ± 0.5*</td>
<td>5.7 ± 1.4*</td>
<td>3.8 ± 1.2**</td>
<td>7.9 ± 0.9</td>
<td>10.3 ± 0.3</td>
</tr>
<tr>
<td>Resuscitation P (mmHg)</td>
<td>73 ± 22**</td>
<td>70 ± 8**</td>
<td>81 ± 6**</td>
<td>48 ± 5</td>
<td>27 ± 3</td>
</tr>
<tr>
<td>Hemostasis time (s)</td>
<td>12.2 ± 6**</td>
<td>16.0 ± 2.0*</td>
<td>10.8 ± 4.1**</td>
<td>21 ± 2.9</td>
<td>48.7 ± 4.9</td>
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* p < 0.01; ** p < 0.05 (all p values relative to CLS)

CONCLUSION: Hemostatic ClotFoam® demonstrates the ability to effectively stop hemorrhage from a lethal intraabdominal aortic injury in a rodent model, even when applied non-directed closed cavity manner. This hemostatic agent has the potential use for responders in the field to treat non-compressible severe intracavitary hemorrhage.
Barriers to Obtaining Family Consent for Potential Organ Donors

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Abstract: Our country suffers from a chronic shortage of organ donors, and the list of duals in desperate need of a life-saving organ transplants is growing every year. Specific consent represents the most important limiting factor for successful donation. We hypothesize that specific barriers to obtaining family consent can be identified and used upon in order to increase organ donation consent rates. The specific purpose of our study was to compare families who declined organ donation to those who granted consent in an attempt to identify barriers to family consent for successful donation.

Methods: We performed a four-year (2004-2007) retrospective study of potential organ donors covered by our regional organ procurement organization (OPO). Variables collected included age, gender, race, cause of brain death (trauma vs. medical) of the potential organ donor and elapsed time from declaration of brain death to family approach by OPO. Potential organ donors whose family declined organ donation (DECLINE group) were compared to potential organ donors whose family consented to organ donation (CONSENT group). Groups were compared using univariate and multivariate analysis.

Results: There were a total of 827 potential organ donors during the four-year period within our OPO region. Overall, 471 (57%) families consented to organ donation, while 356 (43%) declined. While there was no difference in male gender between the DECLINE and CONSENT groups (59% vs. 53%, p = 0.12), the DECLINE group had more medical brain deaths (73% vs. 58%, p < 0.001), more potential donors > 50 years of age (43% vs. 34%, p = 0.01), as well as more potential organ donors of Hispanic (67% vs. 43%, p < 0.001) and non-American (10% vs. 4%, p < 0.001) descent. In addition, time from declaration of death to family approach by OPO was longer for the DECLINE group (350 minutes and 59 minutes, p = 0.03). Logistic regression identified three independent risk factors for a lack of consent for organ donation:

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>p-value</th>
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<tbody>
<tr>
<td>African-American Potential Donor</td>
<td>1.8</td>
<td>.041</td>
</tr>
<tr>
<td>Medical Brain Death</td>
<td>1.6</td>
<td>.004</td>
</tr>
<tr>
<td>Potential Donor &gt; 50 years old</td>
<td>1.4</td>
<td>.050</td>
</tr>
</tbody>
</table>

Discussion: Several barriers exist to family consent for successful organ donation. Family members of minority populations, medical brain deaths, and older potential donors more often decline consent for organ donation. Family education and resource utilization towards specific populations of potential organ donors may help to improve organ donation consent rates. Additionally, delayed family approach by OPO appears to be associated with decreased consent rates. System improvements to expedite family approach by OPO may lead to improved consent rates.
IER AND SON: SAME MISSION, DIFFERENT PATHS

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Senior Sponsor: D. V. Feliciano, M.D.

In February, 2008, I received an email from Air Force Major Raymond Fang was on the General and Trauma Surgery Service at the U. S. Army Landstuhlional Medical Center near Frankfurt, Germany. He commented that he had an American Red Cross volunteer helping out in the intensive care unit. The volunteer’s name tag had my surname. After discussion with my son Douglas who that volunteer, Dr. Fang’s email said “your son made it over here, when are coming?”

Doug is a former Lieutenant in the U.S. Navy (Special Warfare) who has steered at Landstuhl, at Brooke Army Medical Center, and has accompanied pled young veterans on skiing vacations. He is a veteran, a patriot, and red me to join the AAST/ACS Senior Visiting Trauma Surgeon Program based Landstuhl Regional Medical Center.

The experiences at Landstuhl have been well-described by numerous surgeons. The “wounded warrior network”, despite the distances involved, is tive in moving soldiers from Iraq or Afghanistan to Landstuhl for secondary IED’s create devastating wounds outside of the soldier’s body armor, and of the patients I helped care for had severely injured or amputated mities. Operative debridements took hours because of the need to remove laminated fragments of the IED and burned muscle and to repair and covered bones, joints, and tendons.

While Doug and I took different paths to Landstuhl to help the wounded, we returned with similar impressions - our soldiers are heroes, they receive state art care for their devastating wounds, and it was a privilege to participate as unter at Landstuhl Regional Medical Center.
DECISIONS: CONFLICTS BETWEEN MEDICAL ETHICS AND MEDICAL RULES ENGAGEMENT IN CURRENT COMBAT OPERATIONS

Telian, MD; A. Beekley, MD; M. Martin, MD. Army Medical Center

Center: Simon Telian, MD. Senior Sponsor: Matthew Martin, MD

<GROUND: Surgeries are on the forefront of dealing with casualties from the many actions that comprise the Global War on Terrorism (GWOT). In select cases, medical surgical decisions may be impacted by operational conditions and local policies, known as the medical rules of engagement (MROE). Many of these policies and judgments are made by non-clinical personnel without the input of surgeons, and can result in the creation of significant ethical dilemmas.

<ODS: The authors have the perspective of being deployed for a collective 60 months in and Afghanistan, being assigned to 8 Combat Support Hospitals and 6 Forward Surgical Teams under 6 different Medical Brigades. Case reports of conflicts between medical ethics and MROE were collected and analyzed for common themes. Select cases were analyzed and potential resolutions will be presented.

<ULTS: Conflicts between medical ethics and MROE were classified into four categories: 1) denying access to needed care due to operational or logistic concerns, 2) rationing aggressive care due to real or expected limitations of personnel/supplies, 3) transport provided to patients with survivable injuries or illness (dual standards of care), and 4) transfer of patients to local facilities without ability to provide care. Examples of cases highlighting each category will be presented and the impact of these conflicts on patient outcomes will be discussed.

<CLUSIONS: Medical care in combat operations must take into account multiple additional factors, limitations, and policies which can come into conflict with medical principles. It is imperative that clinicians take an active role in the formation and representation of the MROE to ensure the ethical decisions regarding patient care are made with operational goals.
B TO THE HEART AND WHO'S TO BLAME: YOU GIVE EYEGlasses A BAD

Berkseth, MD1; NY Patel, MD2; TH Cogbill, MD2
artment of Medical Education, Gundersen Lutheran Medical Foundation and
artment of General & Vascular Surgery, Gundersen Lutheran Health System
enter: Timothy J. Berkseth, MD Senior Sponsor: Nirav Y. Patel, MD

ackground: A 55-year-old man reportedly rolled out of bed and fell onto the
le of his eyeglasses, which impaled him in the anterior chest. He experienced
associated hemodynamic or respiratory compromise, and he had a sinus
m without ectopy. He was alert and oriented, GCS 15. A thin metallic object
protruding from his anterior chest just left of midline and cephalad to the
id. Breath sounds were clear bilaterally, and cardiovascular examination
ings were normal. No JVD was appreciated. There was no external
orrhage. Lateral chest radiograph demonstrated a linear metallic structure
ough the sternum and into the cardiac silhouette. CT scan confirmed penetration
e right ventricle to a depth of 15-16 mm, with associated moderate pericardial
ion. He was taken to the operating room, where a subxiphoid pericardial
ow was performed with evacuation of approximately 100 cc of bloody fluid.
penetrating object was removed under direct vision with no resultant
orrhage, and a 24-French Blake drain was placed into the pericardial cavity.
patient's postoperative course was unremarkable. The drain was removed and
atient discharged on POD#2.
Bed in the Aorta: Fixing It from the Inside Out

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Davis Medical Center

Senior Sponsor: Christine Cocanour

Intervention: Jeffrey Lodermeier

A 22-year-old man was transferred to our Level 1 Trauma center for management of a stab wound to the back. He arrived lying face down on the gurney with the knife still protruding from his back and imaging that confirmed the knife tip in the thoracic aorta just above the inferior diaphragm. He was hemodynamically stable throughout his initial hospitalization and during transfer. The patient had a prior left thoracotomy and exploratory laparotomy both for previous penetrating trauma. Given his hemodynamic stability and the relatively low risk associated with an open approach to the aorta at this level, particularly given his past surgical history, an endovascular approach was chosen.

After placing the patient supine, he was positioned on two angiography tables placed adjacent to each other, with the knife between them. The trauma surgeons were scrubbed and draped to provide immediate open control of the injury if the patient developed hypovolemic shock.

A coaxial arteriogram confirmed blush from the distal thoracic aorta at the level of the left subclavian artery. A right groin approach, an aortic endograft was positioned at the site of the injury. Just prior to deployment of the endograft, the knife was removed and the aorta was crossed with the endograft. Completion arteriogram confirmed resolution of the blush from the aorta and follow-up CT angiography confirmed no leak and a small hematoma at the site of the spine fracture (where the knife had lodged). The patient tolerated the procedure well and was discharged home on post-operative day four. He has undergone a CT scan confirming excellent endograft position and absence of endoleak.

Discussion:

In endograft use in trauma has been largely limited to blunt thoracic aortic injury. More recently, reports of endograft repair for penetrating trauma have become available. Most of these reports have involved the treatment of pseudoaneurysms. This is the first case report of an endograft repair of penetrating injuries, especially the aorta, is a feasible alternative to open repair presented with complex exposure and a stable patient.

This case demonstrates an alternative to open repair for penetrating vascular injury to the aorta: fixing it from the “inside out”.

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INVASIVE SURFACE REWARMING OF SEVERE HYPOTHERMIA IS SAFE AND PRACTICAL

J. Offner MD MPH
Central Hospital

Senior Sponsor: Patrick J. Offner MD MPH

Background: Hypothermia remains a significant problem in severely injured patients and contributes to excess mortality. Recent unavailability of tubing and devices for temperature management, as well as the introduction of newer devices for temperature management, led us to more frequent use of external rewarming. The purpose of this study was to critically evaluate our experience with the Arctic Sun for active external rewarming of severely hypothermic patients.

Methods: Patients with moderate to severe hypothermia recently admitted to our level I trauma center were rewarmed with the Arctic Sun. The Arctic Sun is a water-based device that uses unique energy transfer pads to allow efficient, non-invasive rewarming. The pads are placed on the patient's torso, arms and legs to provide adequate contact surface area for efficient rewarming. Adjunctive measures included maintenance of a warm ambient temperature, infusion of warmed IV fluids, use of warm, humidified oxygen for mechanically-ventilated patients. Patients were closely monitored for cardiac dysrhythmias and for core temperature drop during the rewarming process. Time required to reach safe core body temperature was recorded.

Results: During the winter of 2007, four patients presented with moderate to severe hypothermia and were rewarmed with the Arctic Sun. The ages ranged from 21 to 48 years, with a mean of 34 years. Three patients were male and one was female. Three were severely intoxicated while the remaining had been using methamphetamine and benzodiazepines. The initial core body temperatures were 25.5, 30, 29, and 26°C. Three of the patients were hemodynamically stable whereas one had atrial fibrillation and mild hypotension. This responded to volume nitrroglycerin and low-dose dopamine. All were rewarmed with the Arctic Sun and reached 35°C within 4 hours. There were no instances of cardiac disturbance or temperature afterdrop noted during the rewarming process.

Conclusions: Active external rewarming of severely hypothermic patients is feasible and safe using the Arctic Sun. Advantages include lack of invasiveness and ease of use. Further study is warranted to confirm these findings.
SUCCESSFUL RESUSCITATION AND RECOVERY OF A YOUNG COLLEGE STUDENT
SUSTAINED CARDIAC ARREST, HYPOTHERMIC AND HEMORRHAGIC SHOCK
MULTIPLE INJURIES FOLLOWING IMPACT FROM A 400 POUND BOULDER ON
MT ADAMS

lill, MD, J Wang, MD, J Chen, MD, J Krieg, MD, R Bracis, MD, R Petrillo, MD, J Long,
V B Long, MD
by Emanuel Trauma Program, Portland, Oregon

enter: Julia Long
Senior Sponsor: William Long MD

vors of cardiac arrest from blunt trauma are rare. Most survivors are injured in urban
onments where the resources of a level 1 trauma center are immediately available.
vors of cardiac arrest from extreme environmental hypothermia are well documented.
vors of cardiac arrest from blunt trauma occurring in wilderness areas are extremely

year old college sophomore was glissading down Mt. Adams when a tumbling 400
d boulder struck her on the back and left pelvis, propelling her 40 feet down the
ain to land face down in snow.

aeromedical helicopters are not equipped to do high mountain rescues. The lengthy
use for a military medical helicopter to deploy and pick up this patient with an ISS 66
.002) took over 4 hours. By the time she arrived at a level 1 trauma center, she had no
 of life, no EKG tracing, no CO2 production.

rauma surgeon on call that day was a cardiac surgeon familiar with rewarming and
ring the heart techniques from experience with profoundly hypothermic patients from
acif NW wilderness areas. Direct to operating room resuscitation, median
otomy, open heart massage, chest and abdominal cavity irrigations with warm saline,
te transfusion, correction of acid base imbalances and coagulopathies, epicardial
 led to a successful reanimation of the patient’s circulatory, respiratory and renal

ensuing multiple organ failures (6) led to a 3-month ICU stay, multiple operations
ng drainage of abscesses and debridement of confused/ infarcted left gluteus
les and hemodialysis. The patient regained mobility, cognitive, renal, and enteral
ion, allowing us to repatriate her to another level 1 trauma center close to her home for
urgery and rehabilitation.

patient subsequently graduated from college and resumed winter sports activities.

case raises the question once again; does hypothermia reduce the impact of
orrhagic shock.
MOR METROPOLITAN “FIELD AMPUTATION” TEAM: A CALL TO ARMS...AND 3

Mangram M.D., C.F. Sharp M.D., S.A. Clark M.D., M.V. Hegar-Gonzalez M.D., M.
uzo M.D. MBA, E.L. Dunn M.D.

Center: Alicia Mangram M.D.  Senior Sponsor: Alicia Mangram M.D.

Background: As early as 1979, suggestions were made to establish amputation teams and protocols in major metropolitan areas. It was recognized that preplanning on such calls would be valuable to carrying out rescues of that type. Since then, questionnaires and collegial conversations reveal the increasing occurrence of such teams remains the exception in our nation’s cities.

Methods: Our team was formed in 1984 after an EMS request for a surgeon to perform an amputation on a person who had become entrapped with both arms in an industrial candy press was made. In its current form, the team consists of an on-call trauma surgeon, a resident surgeon, a registered nurse, and a pilot, all of whom are hospital based. Equipment is limited to medications for sedation and pain control, units of un-crossmatched blood, and a pre-bundled duffle bag of bandages, a Pavel, various saws, and hemostats. Transportation to the scene is provided by helicopter based at our Level II Trauma Center.

Results: Since its inception, the team has been activated three to four times per year, resulting in nine amputation rescues. Three of these cases, presented here, are from an unusually busy five weeks during the spring of 2008. The first involves a tree shredding device, the second an industrial auger, and the third, a forklift and a steel toed boot. In these cases the utilization of the amputation team resulted in successful patient rescues and outcomes.

Conclusion: A field amputation team can be an integral part of any EMS system, filling an infrequently used but helpful adjunct to emergency care.
BYLAWS OF THE
WESTERN TRAUMA ASSOCIATION

ARTICLE I
Name, Objectives, Organization, and Jurisdiction

ION 1: Name
Name of this organization is the Western Trauma Association, henceforth referred to as the Association.

ION 2: Objectives, Core Value and Mission Statement
Objectives to promote the exchange of educational and scientific information and principles, at the state level, in the diagnosis and management of traumatic conditions and to advance the science of medicine.

Core Value:
Using education by participation in a diverse, multi-disciplinary scientific program with the goal of improving the care of injured patients.

Mission Statement:
Western Trauma Association is committed to the improvement of trauma care through research, education, sharing of clinical experiences and the development of physicians of all specialties involved in the care of trauma patients.

ION 3: Organization
A non-profit membership corporation entity, duly incorporated on the 25th day of January 1971, and by virtue of, the provisions of the laws of the State of Colorado. The Association received determination of its 501(c)(3) status in October 2002.

ION 4: Jurisdiction and Territory
Jurisdiction in which this Association shall act will be the United States of America. It shall not be confined, however, from holding its annual meetings at any designated site.

ION 5: Governing Board
Affairs of the Association shall be conducted by the Board of Directors.

ARTICLE II
Membership

ION 1: Membership Limitation
Membership shall be limited 125 active members. No single specialty shall comprise more than 40% of the total membership of 125.

ION 2: Membership and Qualifications
Active members shall be limited to Doctors of Medicine or Doctors of Osteopathy who are Board Certified in their particular medical specialty and are under the age of 55 years. The Board of Directors is hereby given discretionary powers to interpret if foreign physicians who apply for membership have credentials comparable to Board Certification. Active status is conferred by a two-thirds vote of the Board of Directors. Active members have the right to vote on any business presented to the organization during the business meeting, serve on, or chair any committee and be elected to any elected position within the organization.
B. Associate members include qualified members of other (non-M.D.) health care discipline, with a special interest or expertise in trauma. Approval of a majority of the Board of Directors is required. Associate members must satisfy the same requirements for election to and retention of membership as active members. Associate members may not vote, serve on committees or hold office.

C. Senior membership is automatically conferred on all members in good standing upon reaching the age of 55, assuming the member is in good standing. A senior member retains all voting privileges and rights of active members, and must pay dues annually but is exempt from attendance requirements. The senior member is not counted as part of a given specialty's membership quota or membership total.

D. Retired membership: Members in good standing who retire from practice are, upon notification of the Secretary and/or Treasurer, entitled to continued membership, but exempt from all membership requirements, including the payment of dues. They shall have the right to vote and their membership shall not be counted towards specialty or membership quotas. The change to "retired status" is voluntary.

E. Emeritus membership: Senior members of the Association who have made a significant contribution to the organization may be awarded Emeritus membership by a majority of the Board of Directors.

F. Candidates for membership must submit a completed application and a letter of support (sponsorship) from a member of the Association. They must also submit an abstract for possible consideration by the Program Committee. A prospective member must attend a meeting of the Association within three (3) years prior to the meeting in which he/she is voted on for membership.

SECTION 3: Membership Retention
To retain membership in the Association, each member must comply with the following:

A) Be a physician in good standing before his or her professional specialty board.

B) Attend at least one out of every three consecutive meetings of the Association.

C) Agree to be responsible for annual membership dues and any assessments as set by the Board of Directors at a special meeting or the annual meeting. He/she must remain in the payment of dues and assessments.

D) Maintain behavior befitting a physician by adhering to the code of ethical and moral standards as described by either the American College of Surgeons or the American Medical Association.

SECTION 4: Termination of Membership
A) Membership can be terminated for a violation of one or more of the items set forth in II, Section 3 of the Bylaws of the Association by a vote of two-thirds of the Board of Directors.

B) Any member may resign by filing a written resignation with the Secretary; however, the resignation shall not relieve the member so resigning of the obligation to pay any dues or other charges accrued and unpaid.
ARTICLE III

Meetings

ION 1: Annual Meetings
shall be an annual meeting of the membership of the Association held in some suitable location
by the President-elect and approved by a majority vote of the Board of Directors and the
ership. Funds shall be made available for the conduct of the scientific program at the annual

ION 2: Special Meetings
al meetings of the Association may be called by the Board of Directors or two-thirds of the
ers in good standing, entitled to vote. The location for a special meeting of the Association
be chosen by the Board of Directors.

ION 3: Notice
of the time and place of the annual or special meetings of the Association shall be mailed by
cretary of the Association to each and every member at his address as it last appears on the
ls of the Association with postage thereon prepaid. Notice shall be deemed delivered when
ited in the United States Mail, so addressed to the respective member. Notification by electronic
-mail) may be substituted for regular mail.

ION 4: Quorum
ct to provisions of Article VI, Section 3, one-fourth of the membership present at any meeting of
sociation shall constitute a quorum.
ARTICLE IV
Board of Directors, Meetings, and Responsibilities

SECTION 1: Composition
A. The President, President-elect, Vice-President, Secretary, Treasurer, immediate Past President, program committee chairman and six members-at-large shall constitute the Board of Directors.

B. The President of the Association shall serve as Chairman of the Board of Directors. Chair of the Multicenter Trials Committee, the Historian and the President of the Wes Trauma Foundation for Education and Research shall serve as ex-officio members of the Board of Directors. The ex-officio members shall not have any vote on matters before the board.

C. At each annual meeting, two members of the Association in good standing named by Nominating Committee and elected by the membership, shall replace the two outgoing members-at-large of the Board unless the membership should, by majority vote, elect the then existing at-large Directors.

D. The tenure of elected members of the Board of Directors shall be for no more than three years unless such member shall be elected to a position as an officer in the Association.

Section 2: Annual Meetings
A. The annual meeting of the Board of Directors shall be held during and in the same geographic location as the annual meeting of the Association, but at least one day in advance of the general business meeting. The agenda will be determined by the President of the Association who will preside at the meeting. Additional agenda items may be proposed for discussion and/or vote by any Board member.

B. Unless otherwise determined by a majority vote of the Directors, all meetings of the Executive Directors shall be considered executive sessions and, thus, closed to all but Board Members and invited guests.

SECTION 3: Special Meetings
A. Special meetings of the Board of Directors may be held at any time and place upon the call of the President, or a majority of the Board providing ten days prior written notice shall be given to each Director, stating the time, place and purpose of the special meeting. Notice of special meetings shall be mailed to the Directors by the Secretary of the Association in the same form and manner as provided above for mailing notices of meetings for the membership of the Association.

B. In lieu of special meetings, the Board of Directors may conduct business by conference telephone call including a quorum of Members of the Board. The same rules for notice of special meetings shall apply to conference calls.

SECTION 4: Quorum
A majority of the Board of Directors shall constitute a quorum. (No member of the Board may proxy.)
ION 5: Powers
Not only to the limitations of the provisions of the Colorado Nonprofit Corporation Act, all
other powers shall be exercised by or under the authority of, and the affairs and activities of the
Association shall be controlled by, or under the authority of, the Board of Directors.

ION 6: Ex-officio Members of Board of Directors
The President of the Western Trauma Foundation for Education and Research, Chairman of the
Board Committee, Chair of the Multicenter Trials Committee and the Historian shall be ex-officio
members of the Board of Directors and may participate in any meeting of the Board of Directors.

ARTICLE V
Registration, Fees, Dues, and Assessments

ION 1: Registration Fees
Registration fees for annual meetings shall be paid and used to defray the cost of the functions of the
board meeting. The amount of the registration fee shall be determined by the President, in
consultation with the Treasurer, and notice thereof shall be sent to the membership along with the
notice of the annual meeting.

ION 2: Dues
The dues of the Association shall be set by the Board of Directors. Each member shall pay dues to the
Association for each fiscal year, beginning with the first new fiscal year after election membership. The Treasurer shall notify each member of his/her dues obligation during the first
month of the fiscal year by regular or electronic mail. This notification shall follow the rules for
notification of the annual meeting. Associate members shall be required to pay the same dues as
members of active members. Failure to pay dues for three (3) years shall be considered cause for
dismissal of membership.

ION 3: Assessments
One-third majority vote of the Board of Directors of the Association can institute a special
assessment of the general membership. Special assessments can be voted by the Board of
Directors only for the promotion of scientific programs at the annual meetings, research papers or
purposes designed to achieve the exchange of ideas and principles pertaining to the diagnosis
management of traumatic injuries and conditions. Notice of any special assessment of the
membership so voted by the Board of Directors shall be sent, by either regular or electronic mail, to
evive and senior members at the last address on record with the Association, postage pre-paid.

ION 4: Waiver of Dues and Responsibilities
Requirements for retention of membership including payment of dues and attendance at meetings
are waived by a vote of the majority of the Board of Directors upon petition. Eligibility for such
waiver shall include induction into the Armed Forces of the United States on a temporary basis,
physical disability, or other reasons that would place unreasonable hardship, physical disability, or
reason upon the petitioner.

ARTICLE VI
Voting

ION 1: Voting Rights
Active member or senior member in good standing shall be entitled to one vote on each matter
to a vote of the membership.

ION 2: Majority
A majority of the votes entitled to be cast on a matter at a meeting at which a quorum is present shall be deemed necessary for the adoption of such matters unless otherwise noted in the Bylaws.

SECTION 3: Manner of Voting
Each member of the Association is entitled to vote in one of three following manners:

1) In person.

2) With respect to matters described in any notice of meeting, by written instruction or ballot, delivered by United States Mail, postage pre-paid, addressed to the secretary of the Association at the Association's registered office or such other address as specified in any notice of meeting, postmarked and received on or before the date of the meeting of the membership where the vote is to be taken. A member who has voted by such written instruction or ballot shall be counted for purposes of determining whether quorum of members is present at a meeting, but only with respect to the matter voted upon by such Member.

3) By proxy duly executed in writing by the member or his authorized attorney-in-fact. No voting member in attendance at a meeting shall hold or vote more than one duly executed proxy for the members.

SECTION 4: Amendments
As to the Articles of Incorporation, consolidation or dissolution of the Association shall be passed in the event of a two-thirds vote of the members in good standing.

SECTION 5: Elections
Elections and all other matters raised to a vote of the membership cannot be held unless a quorum of three-fifths of the membership is present and shall be by majority vote.

ARTICLE VII
Officers

SECTION 1: Officers
The officers of the Association shall consist of the President, President-Elect, Vice-President, Secretary, Treasurer, Historian, and such other officers as from time to time may be appointed by the Board of Directors. The President, President-Elect, Vice-President, Secretary, Historian, and Treasurer shall be elected at the annual meeting of the members by simple majority of a quorum.

SECTION 2: Terms and Vacancies
The President, President-Elect, and Vice-President shall hold office for one (1) year. The Secretary and Treasurer shall each hold office for the term of three years. All elected officers, except the Treasurer, shall be automatically inaugurated at the close of the annual meeting at which they were elected. The newly elected Treasurer shall assume the responsibilities of his/her office at the beginning of the next fiscal year following his/her election. The Historian shall serve until his/her death, resignation or inability to perform the duties subsequently described in Article VIII. Sect an officer cannot complete his/her term, his/her successor shall be chosen by the Board of Directors by special meeting to fill the vacancy for the unexpired term of the office. No officer shall serve for more than one term.

SECTION 3: Removal
Any officer may be removed, with or without cause, by a vote of a majority of the members of the Board of Directors present at any meeting for that purpose.
ARTICLE VIII
Duties and Authority of Officers

ION 1: President
Resident shall preside at all meetings of the members and shall serve as ex-officio member of committees. The president shall be Chairman of the Board of Directors and shall serve as the 1 to the American Association for the Surgery of Trauma.

ION 2: President-Elect
Resident-elect shall plan and organize the next annual meeting and assume whatever responsibilities the president or Board of Directors shall assign.

ION 3: Vice President
Vice president shall preside at all business meetings in the absence of the president. The Vice-president shall serve as Chair of the Website Committee and perform such other duties as requested assigned by the President or the Board of Directors.

ION 4: Secretary
Secretary shall keep the minutes of all meetings of the association and the Board of Directors; be responsible for applications for membership, elections and terminations of members and communications to the membership, especially those whose membership is in jeopardy because of omissions of the bylaws. Maintain the Membership database, with the help of the Treasurer.
Record the reports from the other officers and committees and any bylaw changes. Maintain copies of all corporate documents, including contracts, except for those that specifically to financial matters. Prepare a report for the membership at the annual business meeting and for the Board of Officers at each of their annual meetings.

ION 5: Treasurer
Treasurer shall:
Keep the books of account of the Association. Have custody of, and be responsible for all funds, securities, financial documents, and other properties of the Association and shall deposit all such funds in the name of the Association in such banks or other depositories as shall be approved by the Board of Directors. Assist the Secretary in keeping the roster of the membership that is current and accurate. Engage a certified public accountant, approved by the President, to prepare such tax documents as are required by law and file said documents in a timely manner. He/she will require said certified public accountant to audit the books of the Association upon the request of the Board of Directors and present the report of that audit to the Board. Manage all accounts receivable and payable, including such expenses as may be incurred in the name of the Association. Send to all active and associate members a statement of dues in the first quarter of the fiscal year, and make all necessary efforts to collect those dues. Serve on the Website Committee and prepare the website annually for the meeting registration process.
8) Prepare registration packets, including name badges, and other items, for all those attending the annual meeting.

9) Organize, with assistance from the other Officers and Board Members, the registration process at the annual meeting.

SECTION 6: Historian
The Historian shall maintain and safeguard the archives of the Association. The Historian is an ex-officio member of the Board of Directors. In case of a vacancy by reason of death, resignation, or inability to fulfill the responsibilities of the office, the vacancy may be filled by the Board of Directors until the next annual meeting of the members. The historian shall keep a continuous account of the history of the Association for the use of the membership. This shall include significant information concerning each annual meeting, including the site of the meeting, recipients of honors, names of speakers, highlights of the scientific program, and important actions arising from the Business Meeting. The historian shall also record significant action of the Board of Directors at its meetings. Each five years the historian shall prepare the history of the Association from the time of the last recorded history to be part of the archives of the Association. Memorabilia of the Association retained by the Historian.

ARTICLE IX
Committees

SECTION 1: Nominating Committee
The Nominating Committee shall be composed of three (3) members of the Association appointed by the President. These individuals should represent General Surgery, Orthopaedic Surgery, and specialty. The Chairman of this Committee shall be the immediate Past President. This committee shall submit a slate of nominees for the various offices of the Association to the annual meeting of the members.

SECTION 2: Program Committee
The Program Committee shall consist of a Chairman, appointed by the President, and a Committee including at least one General Surgeon, one Orthopaedic Surgeon, another specialist (if available), and as many other members as the Program Chairman and President deem necessary to a maximum of ten (10) members. The Chair and the President will appoint the committee members. The President and the Chairman of the Publications Committee shall serve as ex-officio members. The Chair will serve a two-year term and is an ex-officio member of the Board of Directors. This Committee will be responsible for the organization and conduct of the program at the annual meeting.

SECTION 3: Membership Committee
The Secretary of the Association shall serve as Chairman of the Membership Committee. The Secretary shall present to the Board of Directors at its annual meeting, a list of candidates who have satisfied the requirements for membership. Upon approval of the Board of Directors, this group of candidates shall be then presented to the membership for its approval, as previously outlined.

SECTION 4: Publications Committee
The Publications Committee will consist of a Chairman and a Committee including at least one General Surgeon, one Orthopaedic Surgeon, one Plastic Surgeon and another specialist (if available), and as many other members as the Chairman and President deem necessary and appropriate. The Chairman of the Program Committee shall serve as an ex-officio member of the committee. The Chairman of the Publications Committee will be appointed by the President and serve a two (2) year term. The other members, selected from the membership, will be appointed by the President in consultation with the Chairman, annually. This committee will be responsible for reviewing all manuscripts submitted in association with presentations at the annual meeting and for choosing...
will be submitted to The Journal of Trauma. The Chairman will serve as the liaison to The
Journal of Trauma. Should the Chairman not be an Editorial Consultant to The Journal of Trauma, the
Chairman will consult with a member of the Editorial Board of The Journal of Trauma designated
President.

n 5: Multicenter Trials Committee
Multicenter trial committee shall consist of a Chairman and other interested members of the
association. This committee will be responsible for coordinating and reviewing all the multicenter trials
conducted under the aegis of the association. The Chairman will be appointed by the President to a
3 year term. The Chairman will report to the President and board of directors, and at the annual
meeting and serve as an ex-officio member of the Board of Directors.

n 6: Website Committee
Website Committee shall consist of a Chairman and four (4) members. The Vice President shall
serve as the Chairman of the Committee. The Treasurer will serve as a member. The two other
members, selected from among the Association membership, will be appointed by the Vice President
under a 2 year term. The Committee shall be responsible for development and maintenance of the
Association’s Website.

n 7: Other Committees
Ad hoc committees may be established by the Board of Directors. The creation of additional
committees, proposed by the Board of Directors, requires the approval of a majority of
members in good standing.

ARTICLE X
Conduct and Order of Business

ION 1: Business Sessions of the Members
shall be an annual business meeting of the members during the annual meeting. It shall be
called by a meeting of the Board of Directors also held during the annual meeting of the
association.

ION 2: Order of Business
The President shall set the agenda and where possible should follow Robert’s Rules of Order.

ARTICLE XI
Indemnification

n 1. Definitions. For purposes of this Article:

The terms “director or officer” shall include a person who, while serving as a director or
officer of the Association, is or was serving at the request of the Association as a director,
officer, partner, member, manager, trustee, employee, fiduciary or agent of another foreign
or domestic Association. The term “director or officer” shall also include the estate or
personal representative of a director or officer, unless the context otherwise requires.

The term “proceeding” shall mean any threatened, pending, or completed action, suit, or
proceeding, whether civil, criminal, administrative, or investigative, whether formal or
informal, any appeal in such an action, suit, or proceeding, and any inquiry or investigation
that could lead to such an action, suit, or proceeding.
C. The term "party" includes an individual who is, was, or is threatened to be made a defendant or respondent in a proceeding.

D. The term "liability" shall mean any obligation to pay a judgment, settlement, penalty, or reasonable expense incurred with respect to a proceeding.

E. When used with respect to a director, the phrase "official capacity" shall mean the officer in the Association, and, when used with respect to a person other than a director, shall mean the office in the Association held by the officer or the employment, fiduciary relationship undertaken by the employee or agent on behalf of the Association in neither case shall include service for any foreign or domestic Association or for any person.

Section 2 General Provisions.
The Association shall indemnify any person who is or was a party or is threatened to be made to any proceeding by reason of the fact that such person is or was a director or officer of the Association, against expenses (including attorneys, fees), liability, judgments, fines, and amounts paid in settlement actually and reasonably incurred by such person in connection with such proceeding if such person:

(i) acted in good faith;
(ii) reasonably believed, in the case of conduct in an official capacity with the Association, the conduct was in the best interests of the Association, and, in all other cases, that the conduct was at least not opposed to the best interests of the Association; and
(iii) with respect to any criminal proceeding, had no reasonable cause to believe that the conduct was unlawful.

However, no person shall be entitled to indemnification under this Section 2 either:

(i) in connection with a proceeding brought by or in the right of the Association in which the director or officer was adjudged liable to the Association; or
(ii) in connection with any other proceeding charging improper personal benefit to the director, officer, whether or not involving action in that person's official capacity, in which the officer or director is ultimately adjudged liable on the basis that the director or officer improperly received personal benefit.

Indemnification under this Section 2 in connection with a proceeding brought by or in the right of the Association shall be limited to reasonable expenses incurred in connection with the proceeding. The termination of any action, suit, or proceeding by judgment, order, settlement, or conviction or plea of solo contender or its equivalent shall not of itself be determinative that the person did not meet the standard of conduct set forth in this Section 2.

Section 3 Successful Defense on the Merits; Expenses.
To the extent that a director or officer of the Association has been wholly successful on the merits of defense of any proceeding to which he was a party, such person shall be indemnified against reasonable expenses (including attorneys' fees) actually and reasonably incurred in connection with such proceeding.

Section 4 Determination of Right to Indemnification.
Any indemnification under Section 2 of this Article (unless ordered by a court) shall be made by the Association only as authorized in each specific case upon a determination that indemnification
or officer is permissible under the circumstances because such person met the applicable standard of conduct set forth in Section 2. Such determination shall be made:

(i) by the Board of Directors by a majority vote of a quorum of disinterested directors who at the time of the vote are not, were not, and are not threatened to be made parties to the proceeding; or

(ii) if such a quorum of the Board of Directors cannot be obtained, or even if such a quorum is obtained, but such quorum so directs, then by independent legal counsel selected by the Board of Directors in accordance with the preceding procedures, or by the voting members (other than the voting members who are directors and are, at the time, seeking indemnification). Authorization of indemnification and evaluation as to the reasonableness of expenses shall be made in the same manner as the determination that indemnification is permissible, except that, if the determination that indemnification is permissible is made by independent legal counsel, authorization of indemnification and evaluation of legal expenses shall be made by the body that selected such counsel.

n 5. Advance Payment of Expenses; Undertaking to Repay.

An association may pay or reimburse the reasonable expenses (including attorneys, fees) incurred by a director or officer who is a party to a proceeding in advance of the final disposition of the proceeding if:

(i) the director or officer furnishes the Association a written affirmation of the director's or officer's good faith belief that the person has met the standard of conduct set forth in Section 2;

(ii) the director or officer furnishes the Association with a written undertaking, executed personally or on the director's or officer's behalf, to repay the advance if it is determined that the person did not meet the standard of conduct set forth in Section 2, which undertaking shall be an unlimited general obligation of the director or officer but which need not be secured and which may be accepted without reference to financial ability to make repayment; and

(iii) a determination is made by the body authorizing indemnification that the facts then known to such body would not preclude indemnification.

n 6. Reports to Members.

An event that the Association indemnifies, or advances the expenses of, a director or officer in accordance with this Article in connection with a proceeding by or on behalf of the Association, a copy of that fact shall be made in writing to the member with or before the delivery of the notice of next meeting of the members.

n 7. Other Employees and Agents.

An association shall indemnify such other employees and agents of the Association to the same extent and in the same manner as is provided above in Section 2 with respect to directors and officers, by adopting a resolution by a majority of the members of the Board of Directors specifically naming by name or by position the employees or agents entitled to indemnification.

n 8. Insurance.

The board of Directors may exercise the Association's power to purchase and maintain insurance on behalf of any person who is or was a director, officer, employee, or agent of the Association to the full extent permitted by law, against any claim, proceeding, or lawsuit) on behalf of any person who is or was a director, officer, employee, or agent of another domestic or foreign corporation, nonprofit corporation against any liability incurred by the person in any such capacity or arising out of the discharge of the person's duties as a director, officer, employee, or agent of the Association.

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person's status as such, whether or not the Association would have the power to indemnify the person against such liability under the provisions of this Article.

Section 9. Nonexclusivity of Article.
The indemnification provided by this Article shall not be deemed exclusive of any other rights and procedures to which one indemnified may be entitled under the Articles of Incorporation, any agreement, resolution of disinterested directors, or otherwise, both as to action in such person's official capacity and as to action in another capacity while holding such office, and shall continue a person who has ceased to be a director or officer, and shall inure to the benefit of such person's heirs, executors, and administrators.

Section 10. Notice to Voting Members of Indemnification.
If the Association indemnifies or advances expenses to a director or an officer, the Association shall give written notice of the indemnification in advance to the voting members with or before the next voting members' meeting. If the next voting member action is taken without a meeting, such notice shall be given to the voting members at or before the time the first voting member writing consenting to such action.

ARTICLE XII
Conflicts Of Interest, Loans And Private Inurement

Section 1. Conflicts of Interest.
If any person who is a director or officer of the Association is aware that the Association may enter into any business transaction directly or indirectly with himself, any member of person's family, or any entity in which he has any legal, equitable or fiduciary interest or position, including without limitation as a director, officer, shareholder, partner, beneficiary or trustee, such person shall:

(a) immediately inform those charged with approving the transaction on behalf of the Association of such person's interest or position;

(b) aid the persons charged with making the decision by disclosing any material facts with such person's knowledge that bear on the advisability of such transaction from the standpoint of the Association; and

(c) not be entitled to vote on the decision to enter into such transaction.

Voting on such transaction shall be conducted as follows:

(i) Discussion of the matter, with the interested officer or director, shall be held by the board with such person present to provide information and answer any questions.

(ii) The interested officer or director shall withdraw from the meeting.

(iii) Discussion of the matter outside of the presence of the interested officer or director shall be held by the Board.

(iv) The remaining members of the Board shall vote. Such voting shall be by written ballot. Such ballots shall not reflect the name or identity of the person voting.

Section 2. Loans to Directors and Officers Prohibited.
ins shall be made by the Association to any of its directors or officers. Any director or officer
assents to or participates in the making of any such loan shall be liable to the Association for the
nt of such loan until it is repaid.

association is not organized for profit and is to be operated exclusively for the promotion of social
in accordance with the purposes stated in the Association's articles of incorporation. The net
of the Association shall be devoted exclusively to charitable and educational purposes and
not inure to the benefit of any private individual. No director or person from whom the
ration may receive any property or funds shall receive or shall be entitled to receive any
ary profit from the operation thereof, and in no event shall any part of the funds or assets of the
ation be paid as salary or compensation to, or distributed to, or inure to the benefit of any
er of the board of directors; provided, however, that:

reasonable compensation may be paid to any director while acting as an agent, contractor,
loyee of the Association for services rendered in effecting one or more of the purposes of the
ation;

any director may, from time to time, be reimbursed for such director’s actual and reasonable
ses incurred in connection with the administration of the affairs of the Association; and

the Association may, by resolution of the board of directors, make distributions to persons
whom the Association has received contributions previously made to support its activities to the
such distributions represent no more than a return of all or a part of the contributor's
utions.

ARTICLE XIII
Amendments

Bylaws may be amended at any annual meeting of the Association provided that a notice
the purpose of each proposed amendment and the reason therefore, and a copy of the
ed amendment is sent to every member in good standing not less than thirty (30) days prior to
the meeting at which the proposed amendment is to be voted upon. It shall require a two-
vote of a quorum of the membership present at the meeting to amend a Bylaw.
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