THIRTY-SIXTH ANNUAL MEETING

Big Sky 2006

Western Trauma Association

February 26 – March 3, 2006

Big Sky, Montana
Johnson & Johnson
Wound Management salutes the Western Trauma Association.

Best wishes for a successful 36th Annual Meeting!

Johnson & Johnson
Wound Management
WESTERN TRAUMA ASSOCIATION

36th Annual Meeting
Big Sky, Montana
February 26 – March 3, 2006

THE WESTERN TRAUMA ASSOCIATION GRATEFULLY ACKNOWLEDGE UNRESTRICTED EDUCATIONAL GRANTS IN SUPPORT OF THIS PROGRAM FROM:

ASTRO-ZENECA

JOHNSON AND JOHNSON

HUTCHINSON TECHNOLOGY

KCI

LIFECCELL

NOVO NORDISK
This 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 Western Trauma Association. The Gundersen Lutheran Medical Foundation is accredited by the Wisconsin Medical Society to provide continuing medical education for physicians.

The Gundersen Lutheran Medical Foundation designates this educational activity for a maximum of 18.5 category I credits towards the AMA Physician’s Recognition Award. Each physician should claim only those credits that he/she actually spent in the activity.
OFFICERS:
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R. Christie Wray, MD
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President-Elect
Vice President
Secretary
Treasurer
Historian

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David V. Shatz, M.D.
Thomas M Scalea, MD
Carol R. Schermer, M.D.
TERM ENDS:
2006
2006
2007
2007
2008
2008

PROGRAM COMMITTEE:
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Martin Schreiber, MD
Dennis W. Vane, MD
John R. Zelko, MD

NOMINATING COMMITTEE:
Scott R. Peterson, MD, Chairman
Dennis W. Vane, MD
Herbert J. Thomas III, M.D.
<table>
<thead>
<tr>
<th>President</th>
<th>Year</th>
<th>Location</th>
</tr>
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<tbody>
<tr>
<td>Robert G. Volz, M.D.</td>
<td>1971</td>
<td>Vail</td>
</tr>
<tr>
<td>Robert G. Volz, M.</td>
<td>1972</td>
<td>Vail</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>
</tr>
<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>
</tr>
<tr>
<td>Glen D. Nelson, M.D.</td>
<td>1978</td>
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<tr>
<td>Gerald D. Nelson, M.D.</td>
<td>1979</td>
<td>Snowbird</td>
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<tr>
<td>Kevin G. Ryan, M.D.</td>
<td>1980</td>
<td>Snowbird</td>
</tr>
<tr>
<td>David S. Bradford, M.D.</td>
<td>1981</td>
<td>Jackson Hole</td>
</tr>
<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>
</tr>
<tr>
<td>Robert B. Rutherford, M.D.</td>
<td>1985</td>
<td>Snowbird</td>
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<tr>
<td>Rudolph A. Klassen, M.D.</td>
<td>1986</td>
<td>Sun Valley</td>
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<td>Robert J. Neviiaser, M.D.</td>
<td>1987</td>
<td>Jackson Hole</td>
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<tr>
<td>Robert C. Edmondson, M.D.</td>
<td>1988</td>
<td>Steamboat</td>
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<tr>
<td>Ernest E. Moore, M.D.</td>
<td>1989</td>
<td>Snowbird</td>
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<tr>
<td>Stephen W. Carveth, M.D.</td>
<td>1990</td>
<td>Crested Butte</td>
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<tr>
<td>George E. Pierce, M.D.</td>
<td>1991</td>
<td>Jackson Hole</td>
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<tr>
<td>Peter Mucha, Jr., M.D.</td>
<td>1992</td>
<td>Steamboat</td>
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<tr>
<td>David V. Feliciano, M.D.</td>
<td>1993</td>
<td>Snowbird</td>
</tr>
<tr>
<td>R. Chris Wray, M.D.</td>
<td>1994</td>
<td>Crested Butte</td>
</tr>
<tr>
<td>David Kappel, M.D.</td>
<td>1995</td>
<td>Big Sky</td>
</tr>
<tr>
<td>Thomas H. Cogbill, M.D.</td>
<td>1996</td>
<td>Grand Targhee</td>
</tr>
<tr>
<td>G. Jerry Jurkovich, M.D.</td>
<td>1997</td>
<td>Snowbird</td>
</tr>
<tr>
<td>James B. Benjamin, M.D.</td>
<td>1998</td>
<td>Lake Louise</td>
</tr>
<tr>
<td>Herbert J. Thomas III, M.D.</td>
<td>1999</td>
<td>Crested Butte</td>
</tr>
<tr>
<td>Barry C. Esgig, 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>
<td>Big Sky</td>
</tr>
<tr>
<td>James A. Edney, M.D.</td>
<td>2002</td>
<td>Whistler-Blackcomb</td>
</tr>
<tr>
<td>J. Scott Millikan, M.D.</td>
<td>2003</td>
<td>Snowbird</td>
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<tr>
<td>Harvey J. Sugerman, M.D.</td>
<td>2004</td>
<td>Steamboat</td>
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<tr>
<td>Scott R. Petersen, M.D.</td>
<td>2005</td>
<td>Jackson Hole</td>
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<tr>
<td>Harold F. Sherman</td>
<td>2006</td>
<td>Big Sky</td>
</tr>
</tbody>
</table>

The 2007 WESTERN TRAUMA ASSOCIATION Meeting will be at:

Steamboat Springs, Colorado
Sheraton Steamboat Springs Resort & Conference Center
February 25 – March 2, 2007
WESTERN TRAUMA FOUNDATION DONORS
(Current Lifetime Accumulation Status)

Double Black Diamond

David Livingston
Steven Ross

Black Diamond Circle

Roxie Albrecht
Andrew Michaels
Tom Scalea
Chris Coconaur
Scott Millikan
Steven Shackelford
Thomas Cogbill
E.E. Moore
Harold Sherma
James Davis
Robert Neviaser
Harvey Sugarman
Herbert (Tom) Thomas
Barry Esrig
Robert Osborn
David Feliciano
Scott Petersen
Dennis Vane
John Hall
Laurens Pichard
Chris Wray
Jerry Jurkovich
R. Lawrence Reed
Scott Zietlow
Robert MacKersie
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Ted McAuley
Grace Rozycki

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Kimberly Davis
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Marilu Bintz
Carl Hauser
Steven Wald
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Alain Corcos
Mark Metzdorf

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Enrique Ginsberg
Gage Ochsner
Michael West
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Dean Gubler
Ash Mansour
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Jody DiGiacamo
David Hoyt
Leon Pachter
Sounitra Eachenpati
Jay Johannigman
Basil Pruitt
Warren Gall
Krista Kaups
Gary Gentilello
William Long
Earl G. Young, M.D.  
(1928-1989)

RESIDENT PAPER COMPETITION

Earl G. Young of Minneapolis was a founding member of the Western Trauma Association and its 14th president. He died of a myocardial infarction, Monday, February 27, 1989, while skiing at Snowbird during the 19th annual Meeting of the Association.

Young received his medical degree from the University of Rochester, N.Y. and Ph.D. in surgery from the University of Minnesota. He completed advanced training in cancer research at Harvard, a fellowship in vascular surgery at Baylor University in Houston and studied microvascular surgery at the University of Minnesota-San Diego.

as a clinical professor of surgery at the University of Minnesota Medical School, and a practicing general and vascular surgeon at the Park-Nicollet Clinic in Minneapolis from 1980. He was nationally known and was actively involved in research and education throughout his career. In 1988, one year before his untimely death, he received the Owen H. Wangensteen Award for Academic Excellence from the University of Minnesota Health Science Center. It was awarded by an unprecedented unanimous vote of all 72 surgical residents.

Residents Paper competition was begun in 1991 as a tribute to Dr. Young's memory and his "spirit of inquiry, of learning ... and commitment in service to mankind."* The award is given to the best resident paper presented at the Annual Meeting.

- Dr. John Najarian characterizing Earl at a memorial service in his honor at the University of Minnesota.
<table>
<thead>
<tr>
<th>Resident</th>
<th>Institution</th>
<th>Year</th>
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<tbody>
<tr>
<td>Joseph Schmoker, M.D.</td>
<td>University of Vermont</td>
<td>1991</td>
</tr>
<tr>
<td>Joseph Schmoker, M.D.</td>
<td>University of Vermont</td>
<td>1992</td>
</tr>
<tr>
<td>Charles Mock, M.D.</td>
<td>University of Washington</td>
<td>1993</td>
</tr>
<tr>
<td>Gino Travisani, M.D.</td>
<td>University of Vermont</td>
<td>1994</td>
</tr>
<tr>
<td>Phillip C. Ridings, M.D.</td>
<td>Medical College of Virginia</td>
<td>1995</td>
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<tr>
<td>David Han, M.D.</td>
<td>Emory University</td>
<td>1996</td>
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<tr>
<td>Preston R. Miller, M.D.</td>
<td>Wake Forest University</td>
<td>1997</td>
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<tr>
<td>Geoffrey Manley, M.D., PhD.</td>
<td>UC – San Francisco</td>
<td>1998</td>
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<tr>
<td>James M. Doty, M.D.</td>
<td>Medical College of Virginia</td>
<td>1999</td>
</tr>
<tr>
<td>D.J. Ciesla, M.D.</td>
<td>Denver Health Medical Center</td>
<td>2000</td>
</tr>
<tr>
<td>Ricardo J. Gonzales, M.D.</td>
<td>Denver Health Medical Center</td>
<td>2001</td>
</tr>
<tr>
<td>Scott C. Brakenridge</td>
<td>Cook County Hospital</td>
<td>2002</td>
</tr>
<tr>
<td>Adena J, Osband, M.D.</td>
<td>UMDNJ-New Jersey Medical School</td>
<td>2003</td>
</tr>
<tr>
<td>Cindy Lee, M.D.</td>
<td>UMDNJ-New Jersey Medical School</td>
<td>2004</td>
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<tr>
<td>Earnest A. Gonzalez, M.D.</td>
<td>University of Texas at Houston</td>
<td>2005</td>
</tr>
<tr>
<td>Jennifer M. Watters, M.D.</td>
<td>Oregon Health &amp; Science University</td>
<td>2005</td>
</tr>
</tbody>
</table>
WESTERN TRAUMA ASSOCIATION

IN MEMORIUM

Earl G. Young, MD
February 27, 1989

Gerald S. Gussack
August 25, 1997
"Paint the Ceiling" Lectureship

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Location</th>
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<tbody>
<tr>
<td>G. Jerry Jurkovich, M.D.</td>
<td>1997</td>
<td>Snowbird, Utah</td>
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<tr>
<td>John W. McGill, M.D.</td>
<td>1998</td>
<td>Chateau Lake Louise, Alberta</td>
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<td>William T. Close, M.D.</td>
<td>1999</td>
<td>Crested Butte, Colorado</td>
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<tr>
<td>Jimmy Cornell</td>
<td>2000</td>
<td>Squaw Valley, California</td>
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<tr>
<td>Geoff Tabin, M.D.</td>
<td>2001</td>
<td>Big Sky, Montana</td>
</tr>
<tr>
<td>James H. &quot;Red&quot; Duke, M.D.</td>
<td>2002</td>
<td>Chateau Whistler, British Columbia</td>
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<tr>
<td>David V. Shatz, M.D.</td>
<td>2003</td>
<td>Snowbird, Utah</td>
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<tr>
<td>Susan and Tim Baker</td>
<td>2004</td>
<td>Steamboat Springs, Colorado</td>
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<tr>
<td>Alex Habel, M.D.</td>
<td>2005</td>
<td>Jackson Hole, Wyoming</td>
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<tr>
<td>Andrew Schneider</td>
<td>2006</td>
<td>Big Sky, Montana</td>
</tr>
<tr>
<td>Day</td>
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<td>Event</td>
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<tr>
<td>Lazy</td>
<td>5:00pm</td>
<td>WTA Office</td>
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<tr>
<td></td>
<td>7:30pm</td>
<td>Nominating Committee</td>
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<tr>
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<td>7:00pm</td>
<td>Registration</td>
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<td>7:00pm</td>
<td>Welcome Reception</td>
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<td>7:00pm</td>
<td>Children's Reception</td>
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<td>7:00pm</td>
<td>Past President's Meeting</td>
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<td>7:00pm</td>
<td>WTA Foundation Board Meeting</td>
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<td>Friday</td>
<td>8:00am</td>
<td>WTA Office</td>
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<td>9:00am</td>
<td>Attendee Breakfast</td>
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<td></td>
<td>9:00am</td>
<td>Scientific Sessions</td>
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<td></td>
<td>9:00am</td>
<td>Friends &amp; Family Breakfast</td>
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<td>6:00pm</td>
<td>Scientific Sessions</td>
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<td>Day</td>
<td>7:00pm</td>
<td>Board of Directors Meeting</td>
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<td>Day</td>
<td>12:00pm</td>
<td>BBQ Race</td>
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<td>1:30pm</td>
<td>BBQ Outside</td>
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<td>WTA Multi-Center Trial Meeting</td>
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<td>Thursday</td>
<td>6:00pm</td>
<td>Business Meeting</td>
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<td>6:00pm</td>
<td>Book Club</td>
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<td>Saturday</td>
<td>7:30pm</td>
<td>Cocktails outside Dinner</td>
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<td>10:30pm</td>
<td>Children's Party</td>
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<td></td>
<td>10:30pm</td>
<td>Adult Banquet &amp; Dance</td>
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PROGRAM
<table>
<thead>
<tr>
<th>Paper</th>
<th>Time</th>
<th>Title/Authors</th>
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<tbody>
<tr>
<td>1</td>
<td>7:20 AM</td>
<td>Testing Of Modified Hemostats In A Swine Model Of Lethal Groin Injury N. Ahuja, MD, T.A. Ostomel, MS, G.A. Stucky, PhD, E. Gonzales, MD, Z. Chen, MD, PhD, P. Rhee, MD, G. Velmahos, MD, M. deMoya, MD, H.B. Alam, MD</td>
</tr>
<tr>
<td>2</td>
<td>7:40 AM</td>
<td>The Effect Of An Institutional Pathway On TBI Resuscitation With 7.5% Hypertonic Saline J.L. Pascual MD, PhD, E. Maloney CRNP, P.M. Reilly MD, M.K. Keutmann BA, S. Stein MD, P.D. Leroux, MD, V.H. Gracias MD</td>
</tr>
<tr>
<td>3</td>
<td>8:00 AM</td>
<td>Mental Illness Increases The Risk Of Unintentional Injury And Recidivism JJ, Wan M.D.; L, Khaw M.S.; DJ, Morabito R.N., M.P.H; MM, Knudson M.D.; RA, Dicker M.D.</td>
</tr>
<tr>
<td>4</td>
<td>8:20 AM</td>
<td>Waiting For The Patient To &quot;Sober Up&quot;: Effect Of Alcohol Intoxication On Glasgow Coma Scale In Brain Injured Patients J. Sperry, M.D., L. Gentilello, M.D., J. Minei, M.D., R. Diaz-Arrastia M.D., S. Shafi, M.D.</td>
</tr>
<tr>
<td>5</td>
<td>8:40 AM</td>
<td>The Anterolateral Thigh Flap (ALT) Is A Highly Effective Technique In Complex Lower Extremity Trauma J Park MD, E Rodriguez MD, G Bochicchio MD, MPH, R Bluebond-Langer MD, and T Scalea MD.</td>
</tr>
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</table>

† Earl Young Competition
<table>
<thead>
<tr>
<th>Time</th>
<th>Title/Authors</th>
</tr>
</thead>
</table>
| 4:00 PM | Intentional Burning: In The Heat Of The Argument  
B Tibbs MD, WL Ingram MD, DV Feliciano MD, CJ Dente MD |
| 4:20 PM | Acute Lower Extremity Compartment Syndrome (ALECS) Screening In Critically Ill Trauma Patients  
R. Kosir, S. Todd, J. Selby, C. Cocanour, R. Kozar, G. Vercriuyse, E. Gonzalez, N. Ware, F. Moore |
| 4:40 PM | Definitive Establishment Of Airway Control Is Critical For Optimal Outcome In Lower Cervical Spinal Cord Injury  
V.J. Hassid, M.A. Schinco, J.J. Tepas, A.J. Kerwin, M.M. Griffen, S. Khetarpal, T.L. Murphy, E.R. Frykberg, |
| 5:00 PM | Strategies For Recruitment Into A Comprehensive Fall Prevention Program: If We Build It, Will They Really Come?  
J.Shandro MD MPH; DA,Spain MD; E,Corman MRA; RA,Dicker MD |
| 5:20 PM | Fighting Ali: The Effects Of Hypertonic Saline And Pentoxifylline In An Animal Model Of Hemorrhagic Shock  
J. Dere MD, J.O. Martins PharmD, J. Putnam BS, A. Leedom BS, B. Lamon BS, T. deCampos MD, D.B. Hoyt MD, R. Coimbra MD, PhD |
| 5:40 PM | Increased Insulin Requirements Are Associated With Pneumonia After Severe Injury  
R Martin, J Smith, J Hoth, P Miller, J Meredith, M Chang |

6:00 PM | Board of Directors Meeting |

Carl Young Competition
### Scientific Session 3
#### Tuesday AM, February 28, 2006
**Moderator:** Andy Michaels, MD  
**Location:** Jefferson Ballroom (Conference Ctr)

<table>
<thead>
<tr>
<th>Paper</th>
<th>Time</th>
<th>Title/Authors</th>
<th>Page</th>
</tr>
</thead>
</table>
| 12    | 7:00 AM| Occult Pneumothorax: To Treat Or Not To Treat  
M. deMoya, M.D.  
C. Seaver, M.D.  
K. Inaba, M.D.  
D. Shatz, M.D.  
L. Pizano, M.D. | 48   |
| 13    | 7:20 AM| Muscle Microdialysis In Acute Trauma Patients:  
Visualization Of Multi-Dimensional Complex  
Metabolic States Using Bioinformatic Cluster  
Analysis;  
MJ Cohen, MD, GT Manley, MD, PhD,  
JJ Wan, MD, D Ikossi, MD, M Sorani, MS, D  
Morabito, RN, MPH, D Yan, PhD, C Stewart, BA,  
L Khaw, MS, MM Knudson, MD | 50   |
| 14    | 7:40 AM| Complications Associated With Small Bowel Resections: Concurrent Injuries Are More Relevant  
To Morbidity Than Method Of Gastrointestinal Anastomosis;  
S. Brundage, MD, MPH, N.  
Kirilcuk, MD, D. Livingston, MD, S. Brakenridge,  
MD, K. Nagy, MD, K. Davis, MD, R. Friese, MD,  
C. Cothren, MD, Z. Sifri, MD, S. Ross, MD, R.  
Albrecht, MD, J. Murray, MD, D. Spain, MD | 52   |
| 15    | 8:00 AM| Free Peritoneal Fluid (FF) Without Solid Organ Injury On Computerized Tomography (CT)  
Following Blunt Trauma: Predictors Of Therapeutic Laparotomy (TL)  
E. Toschlog, MD, C. Goettler, MD, M. Bard, MD,  
M. Newell, MD, S. Sagraves, MD, P. Schenarts  
MD, and M. Rotondo, MD | 54   |
| 16    | 8:20 AM| Isolated Thoracolumbar Transverse Process Fractures: Call Physical Therapy, Not Spine  
A Hornnick PA-C, R Lavery MS, MICP, DH  
Livingston MD, CJ Hauser MD | 56   |
| 17    | 8:40 AM| 100% Fascial Approximation With Sequential Abdominal Closure In The Open Abdomen  
CC Cothren, EE Moore, JL Johnson, JB Moore, DJ  
Ciesla, JM Burch | 58   |

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\*Earl Young Competition*
<table>
<thead>
<tr>
<th>Time</th>
<th>Title/Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4:00 PM</td>
<td>Etomidate Use In Trauma Patients: Useful Adjunct Or Dangerous Drug? K.L. Kaups, M.D</td>
<td>60</td>
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<tr>
<td>4:20 PM</td>
<td>Trauma Center Financial Crisis Precipitated By Repeal Of No Fault Auto Insurance C. Mains, MD; P. Offner, MD; R. Madayag, MD; G. Pinson, MD; F. Seale, MD; E. Pulido, MD</td>
<td>62</td>
</tr>
<tr>
<td>4:40 PM</td>
<td>Prone Ventilation In Trauma/Surgical Patients With ALI/ARDS - Is It Beneficial? J Davis MD, E Moore MD, D Lemaster MSN, J Bilello MD, R Townsend MD</td>
<td>64</td>
</tr>
<tr>
<td>5:00 PM</td>
<td><strong>Presidential Address</strong> “No More Mr. Knife Guy” Harold F. Sherman, MD</td>
<td></td>
</tr>
<tr>
<td>6:00 PM</td>
<td>Multi-Institutional Trials Committee</td>
<td></td>
</tr>
<tr>
<td>Paper</td>
<td>Time</td>
<td>Title/Authors</td>
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<tr>
<td>21</td>
<td>7:00 AM</td>
<td>Development And Testing Of Portable Pump For The Induction Of Profound Hypothermia In A Swine Model Of Lethal Vascular Injuries H.B. Alam, MD, F. Casas, PhD, Z. Chen, MD, PhD, W.A. Smith, PhD, A. Reeves, PhD, G. Velmahos, MD, M. deMoya, MD, P. Rhee, MD, MPH</td>
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<tr>
<td>22</td>
<td>7:20 AM</td>
<td>Whole Blood Leukocyte MAPK Activation Differentiates ICU Patients With SIRS And Sepsis M.A. West, MD, PhD, A. Koons, BS, M. Crandall, MD, MPH, R. Skinner, MD, M.B. Shapiro, MD</td>
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<td>8:00 AM</td>
<td>Invited Lecture – “Endovascular Surgery: A Top Priority in the Development of Acute Care Surgery” Timothy C. Fabian, MD Professor and Chairman of Surgery University of Tennessee Center for the Health Sciences, Memphis, Tennessee</td>
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<td>Time</td>
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<tr>
<td>4:00 PM</td>
<td>An Unexpected Effect Of Enhance Border Security; Falls Frrom The International Border Fence B Potenza, K Hodgekiss-Harlow, D Hoyt, R Coimbra, P. Friedlund and D Fortlage</td>
<td>74</td>
</tr>
<tr>
<td>4:20 PM</td>
<td>Our Bloody Devices: Incidence Of Instrument Contamination M. deMoya, M.D. K. Inaba, M.D. D. Shatz, M.D.</td>
<td>76</td>
</tr>
<tr>
<td>4:40 PM</td>
<td>The Impact Of The Consolidation And Corporatization Of Gang Activity On Gun Violence R Lavery, MA, A Mohr, MD, M Passannante, PhD, D Livingston, MD</td>
<td>78</td>
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<tr>
<td>5:00 PM</td>
<td>Business Meeting</td>
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<td>5:00 PM</td>
<td>Ladies Book Club – Location TBA</td>
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| 27    | 8:00 AM| Invited Lecture - "The Nation's Medical Preparedness: will you know what to do?"
<p>|       |        | Jeffrey W. Runge, MD FACEP                                                  |
|       |        | Chief Medical Officer                                                        |
|       |        | United States Department of Homeland Security                                |
| 28    | 8:20 AM| Pre-Hospital Tourniquet Use In Operation Iraqi Freedom: Effect On Hemorrhage Control And Outcomes |
|       |        | A Beekley, J Sebesta, L Blackbourne, J Holcomb                              |
| 29    | 8:40 AM| The Usage And Availability Of Blood Products In Multiple Casualty Incidents: The Experience Of A Level 1 Trauma Center In Israel |
|       |        | D.Soffer MD, J.Klausner MD, D. Bar-Zohar MD, O.Szold MD, C.I. Schulman MD, MSPH, P.Halpern MD, A.Shimonov RN, M.Hareuveni PhD, O.Bental MD. |
|       |        | Fresh Frozen Plasma Should Be Given Earlier To Patients Who Require Massive Transfusion |
|       |        | E, Gonzalez, F, Moore, J, Holcomb, C, Miller, R, Kozar, S, Todd, C, Cocanour, B, McKinley |</p>
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<tr>
<th>Time</th>
<th>Title/Authors</th>
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<tr>
<td>4:00 PM</td>
<td><strong>Panel of Experts</strong></td>
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<tr>
<td></td>
<td>Jerry Jurkovich, MD</td>
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<td>Fred Moore, MD</td>
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<td>Jim Davis, MD</td>
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<td>5:00 PM</td>
<td><strong>Paint the Ceiling Lecture</strong></td>
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<td></td>
<td>&quot;The doctor made me do it.&quot;</td>
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<td>Andrew Schneider</td>
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<td>Author and Investigative Reporter</td>
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<tr>
<td>Paper</td>
<td>Time</td>
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<td>31</td>
<td>7:20 AM</td>
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<td>35</td>
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<tr>
<td>4:00 PM</td>
<td>Spores Of Wrath: A Case Of Disseminated Mucormycosis Post-Trauma</td>
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<tr>
<td></td>
<td>A Raghunathan, BS, DB Williams, MD, NN</td>
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<td>Kirilcuk, MD, MS, SI. Brundage, MD, MPH</td>
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<td>4:20 PM</td>
<td>Right Upper Quadrant Exenteration For Crush Injury: A Case Report</td>
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<td>C. J. Thomas, D.O., M. McCunn, M.D., L. Campos, M.D., G. York, M.D., T. M. Scalea, M.D</td>
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<tr>
<td>4:40 PM</td>
<td>Crotalidae Bite To The Face (Why You Don't Let The Snake Kiss First)</td>
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<td>5:00 PM</td>
<td>Captive Tiger Attack: Case Report And Review Of The Literature</td>
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<td>H.J. Schiller M.D., DC Cullinane M.D., Y. Baerga-Varela M.D., M.P. Bannon M.D., S.F. Donnelly M.D., L.R. Mathews M.D., S.P. Zietlow M.D., L.J. Oyen Ph.D., M.D. Sawyer M.D.</td>
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<td>5:20 PM</td>
<td>Pneumothorax By Catfish</td>
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<td>R.C. Adams, M.D., W.J. Bromberg, M.D., M.G. Ochsner, M.D.</td>
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</table>
ABSTRACTS
TING OF MODIFIED HEMOSTATS IN A SWINE MODEL OF LETHAL GROIN JURY

Huja, MD, T.A. Ostomel, MS, G.A. Stucky, PhD, E. Gonzalez, MD, Z. Chen, MD, PhD, P. MD, G. Velmahos, MD, M. deMoya, MD, H.B. Alam, MD.

Summary

We have previously identified a granular zeolite hemostat (ZH) as an effective agent for control of hemorrhagic bleeding, and it is currently being used by the US troops in the battlefield. ZH causes an exothermic reaction on application, which theoretically can be decreased by altering its chemical composition or changing its physical properties. However, the effect of these on the hemostatic activity is unknown. We tested modified zeolites and a chitosan hemostat against controls in a swine model of battlefield injury.

Methods: A complex groin injury was created in 60 swine (40-55 kg). This included semi-excision of the proximal thigh, and complete division of the femoral artery and vein. After 30 minutes, the animals were assigned to: 1) no dressing (ND), 2) standard dressing (SD), 3-5) SD+ chemically modified ZHs, where Ca was substituted with Na, Ba, or Ag respectively, 6) SD+ chemically modified ZH, where “beads” were packaged in a fabric bag, 7) SD+ chitosan based hemostat (HemCon). Resuscitation was started 15 minutes after application of dressing (500 ml of lactate solution over 30 min). Survival for 180 minutes was the primary endpoint for this study. Inflammation, blood loss, wound temperatures, and histological tissue damage were recorded. (Data presented as means ± SEM, *p<0.05 vs. ND).

Results: Application of bagged ZH decreased the mortality from 100-10% (p<0.05), whereas the Ba and Ag substituted zeolites, and HemCon were associated with a mortality rate of 25%. Ionic titration of zeolite decreased the in-vivo temperature peak by 5-10°C. In contrast to our previous study, no histological tissue damage was noted in this experiment.

Conclusions: The use of zeolite hemostat can control hemorrhage and dramatically reduce mortality in a lethal groin wound. Modifications of zeolite hemostat can decrease the exothermic reaction to prevent tissue damage.

* p<0.05
EFFECT OF AN INSTITUTIONAL PATHWAY ON TBI RESUSCITATION WITH HYPERTONIC SALINE

Pascual MD, PhD, E. Maloney CRNP, P.M. Reilly MD, M.K. Keutmann BA, S. Stein MD, P.D.ux, MD, V.H. Gracias MD
University of Pennsylvania, Philadelphia, PA

Senior Sponsor: Vicente H. Gracias

INTRODUCTION: Resuscitation of traumatic shock with hypertonic saline (HTS) is known to benefit hemodynamic and immunomodulatory effects. Recently, HTS resuscitation has been shown to decrease intracranial pressure (ICP) in some head injury studies. Scant animal data exists which has evaluated brain tissue oxygenation (PbtO₂) following HTS administration. To date, no human studies have evaluated direct PbtO₂ in head injury victims following HTS administration and no correlation with changes in intracranial pressure (ICP) and cerebral perfusion pressure (CPP) have been demonstrated.

HYPOTHESIS: We postulated that administration of HTS in hypotensive head injured patients would lower ICP and increase CPP while raising PbtO₂ above hypoxic levels (>20mmHg).

METHODS: 8 consecutive head injured patients were administered 250cc of 7.5% NaCl solution over 30 minutes if they fulfilled strict institutional clinical pathway criteria including: a mean arterial pressure (MAP) ≤ 80mmHg, a GCS ≤ 8, an ICP ≥ 20 and serum [Na⁺] < 155 mEq/L. All patients deemed eligible underwent placement of a Licooxy intracerebral monitor as well as a pulmonary artery catheter if not already in place. Repeated administrations were not performed within 6 hours of initial infusion. At the start of infusion as well as at its completion and hourly for 6 hours, the following data was collected: MAP, cardiac index, CPP, ICP, and PbtO₂. Vasopressor requirements, serum [Na⁺] and GCS were also recorded. ANOVA with Bonferroni correction was used for statistical analysis. IRB approval was obtained for this review.

RESULTS: Figure 1: data presented as percent change (%Δ) from the start of HTS infusion (t=0) over time for a measured parameter (ICP [n=8], CPP [n=8]) ‘End’=end of infusion. Figure 2: patients 4, 5, 6 had a pre-infusion PbtO₂ < 20mmHg, and all their post-infusion PbtO₂ rose above hypoxic levels. *p<0.01 vs. start ICP, †p<0.05 vs. start CPP.

DISCUSSION: HTS infusion in brain injured patients results in a significant and sustained reduction of ICP, and CPP elevation is similarly durable. Tissue oxygenation tends to improve with HTS infusion in patients with hypoxic brain tissue.
Hypoxia & Hypertension
NTAL ILLNESS INCREASES THE RISK OF UNINTENTIONAL INJURY AND RECIDIVISM


enter: Jennifer J. Wan, M.D. Senior Sponsor: Rochelle A. Dicker, M.D.

ickground: 12% of Americans are diagnosed and treated for mental illness annually. Relationships between mental illness and intentional injury have been well identified. Pre-existing mental illness increases the risk of developing post-traumatic stress disorder. Previous studies have identified potential high-risk features for injury in the mentally ill such as decreased focus, attention, and pain sensitivity. However, unintentional injury among mentally ill adults has not been well characterized. The purpose of this study was to identify relationships between Axis I and II psychiatric diagnoses and unintentional injury. We hypothesized that the mentally ill have distinct patterns of injury mechanisms, and that psychiatric illness is a risk factor for increased rates of intentional injury and injury recidivism.

hods: In this retrospective review, trauma registry data and medical records were used to identify patients admitted with blunt injuries at a Level I trauma center in 2004. Data collected included mechanism of injury, mental health diagnoses, substance abuse history, and number of at injury events. The proportion of mentally ill patients hospitalized for unintentional injury was compared to local and national data. Chi square analysis was used to compare rates of individual diagnoses between the mentally ill and other patients with unintentional injury. Specific mental illness diagnoses and their relationship to mechanism of injury were also examined. Odds ratios for injury recidivism and mental illness were calculated.

results: Of the 965 patients admitted for blunt injury, there were 810 unintentional injuries, 17% of whom were mentally ill. 58% of this population also abused substances. The mentally ill were significantly more likely to fall and to be hit by cars and less likely to be in a motor vehicle crash (p<0.001), even when controlling for substance abuse. Specific mental illnesses were closely related to specific mechanisms of injury. For example, among schizophrenics, 63% fell and 31% were hit by cars compared to 32% and 23% respectively among those who were not mentally ill. The mentally ill are nearly 8 times more likely to have more than one hospital visit for injury (p<0.001) (see figure).

nclusions: The mentally ill had a different pattern of intentional injury from those without mental illness and they were more likely to be injury divists. This increased risk of unintentional injury has implications for establishing and maintaining appropriate mental health treatment as a modality of injury prevention. Future public health and public health funding agendas should consider the burden of injury in this population in budgeting for mental health care.
31% have characteristics
12% carry dex
TREATING FOR THE PATIENT TO "SOBER UP": EFFECT OF ALCOHOL TOXICITY ON GLASGOW COMA SCALE IN BRAIN INJURED PATIENTS

perry, M.D., L. Gentilello, M.D., J. Minei, M.D., R. Diaz-Arrastia M.D., S. Shafi, M.D.

Objective: Between 35%-50% of traumatic brain injury (TBI) patients are under the influence of alcohol. Level of consciousness may be reduced by alcohol intoxication, limiting the ability of the Glasgow Coma Scale (GCS) to accurately assess severity of TBI in intoxicated patients. We hypothesized that alcohol intoxication significantly depresses GCS in TBI patients, and should be taken into account in order to avoid overly aggressive monitoring and therapeutic interventions.

Methods: Retrospective analysis of a large, urban level I trauma center registry (1995-2004) was undertaken. The study population consisted of all blunt injured TBI patients tested for blood alcohol concentration (BAC) upon presentation (n=1203). Patients were divided into two groups: Intoxicated (an BAC 180±92 mg/dl, n=629) and Non-intoxicated (BAC=0, n=574). TBI was classified using ICD-9 codes as concussion alone (ICD-9 850, n=89) and intracranial injury (ICI, ICD-9 851-854, 114). Severity of ICI was further classified using the Abbreviated Injury Score (AIS). Mean S was compared between the Intoxicated and the Non-intoxicated groups for each type of TBI. In addition, subgroups of patients who were either endotracheally intubated or hypotensive upon arrival (systolic blood pressure < 90 mm Hg) were analyzed separately to rule out their potential confounding effects on GCS. Finally, to assess for a threshold effect, severely intoxicated patients (BAC > 250 mg/dl, mean±SD 310±54, n=117) were compared to non-intoxicated patients for each type of TBI.

Results: Intoxicated and Non-intoxicated TBI patients were clinically similar in age (34±12 vs. 38±18 years), systolic blood pressure (131±29 vs. 132±33 mm Hg), and overall injury severity (ISS: 11 vs. 22±12). Alcohol intoxication had little effect on GCS, with less than a single point difference in all types of TBI, except the most severely injured (AIS 5 injuries, GCS difference points). These results were not altered by endotracheal intubation, systemic hypotension or cerebrospinal fluid (CSF) pressure.

Conclusion: Alcohol intoxication does not result in clinically significant changes in GCS in blunt TBI patients. Hence, alterations in GCS in TBI should not be attributed to alcohol intoxication, as these might result in inappropriate delays in monitoring and therapeutic interventions.
ANTEROLATERAL THIGH FLAP (ALT) IS A HIGHLY EFFECTIVE TECHNIQUE FOR COMPLEX LOWER EXTREMITY TRAUMA

J. Rodriguez MD, G Bochicchio MD, MPH, R Bluebond-Langer MD, and T Scalea MD. Johns Hopkins University and University of Maryland Schools of Medicine, Baltimore, MD

Researcher: Julie Park, MD  Senior Sponsor: Thomas Scalea, MD

Background: Complex soft tissue/extremity injury often requires the recruitment of fresh tissues for microsurgery for reconstruction. The anterolateral thigh (ALT) flap's long pedicle and stability in supporting a variety of tissues (muscle, fascia, soft tissue) make it a valuable tool for reconstructive reconstruction in these challenging patients. There are few reports evaluating the efficacy of the ALT flap in trauma patients. Our objective was to evaluate the utility of the ALT flap reconstruction in the traumatically injured patient.

Methods: Prospective data were collected on all patients who underwent ALT harvest with harvest over a 3½ year period at a Level I trauma center. Demographics including age, gender, Injury Severity Score (ISS), mechanism of injury, and size of reconstruction (length x width) were collected. ALT flap success was graded as successful, partially successful, or failure as per clinical guidelines.

Results: Sixty-six patients underwent 70 ALT flap harvests over the study period. The majority of patients were male (77%) and were admitted due to blunt mechanism of injury (75%). The mean age was 37 ± 13 years with a mean ISS of 17.9 ± 8. Recipient areas of reconstruction were predominantly lower extremity (80%) (n=56). Others sites included were head and neck (11%), upper extremity (6%), and abdominal wall (3%). The overall mean flap size was 20.8 x 8.5 cm. In the case of lower extremity limb salvage, 66% of the flaps were harvested from the ipsilateral side of injury. Most common type of fractures in the study population were tibia (n=36) followed by fibula (n=15), calcaneus (n=5), metatarsal (n=3) and femur (n=2). Total flap success rate was 91.4%, with 4 flap failures (5.7%) and 2 partial flap failures (2.9%).

Conclusion: Trauma patients pose complex reconstructive challenges. The ALT is an effective flap for trauma reconstruction, particularly in lower extremity salvage. We have shown that the ALT can be performed successfully in the traumatically injured patient even when harvested from the ipsilateral lower extremity.
ENTIONAL BURNING: IN THE HEAT OF THE ARGUMENT

bbs MD, WL Ingram MD, DV Feliciano MD, CJ Dente MD
Bry University, Grady Memorial Hospital, Atlanta, GA
Senior Sponsor: David V Feliciano MD

bjectives: Assault by burning is a relatively underreported cause of thermal injury among all age
ps. We attempted to categorize the epidemiologic factors and outcome of victims of intentional
ning not associated with child abuse.

thods: Retrospective review of 2882 consecutive patients admitted to an urban tertiary burn
er between April, 1997, and August, 2005. Data collected included age, gender, Total Body
ace Area (%TBSA) burned, depth and type of burn, patient relationship to assailant, associated
ies, Injury Severity Score (ISS), length of stay (LOS) and patient outcome.
results: Of 2882 admissions, 80 (2.8%) patients (70% male, mean age 36.6 ± 15.1 years)
tined intentional burns. Mean %TBSA burn of all intentionally burned patients was 17.9%
ge 1-100%). Etiology was flame in 38 patients, scald in 28 patients, contact in 7 patients,
ical in 6 patients and electrical in one patient. Mean %TBSA burned in those patients was
0.5%, 5.2%, 6% and 3%, respectively. Assailant was known to the victim in 44 cases (55%),
24 of 80 (30%) cases, the assailant was an intimate partner. In 7 (8.7%) other cases the
ant was a family member, while one patient sustained his injury as a result of terrorism. 44
ents had 2nd degree burns, 33 had 3rd degree and 3 had 4th degree. Additional injuries were
ined in 17 patients (21.3%) and were generally minor. Overall ISS was 10.4 with non-burn ISS
aging 4.2. Outcome data are listed in the table. All patients who died sustained flame burns of
er than 50%.

ient Outcome Data

<table>
<thead>
<tr>
<th></th>
<th>Male (n)</th>
<th>Female (n)</th>
<th>Age (Mean)</th>
<th>LOS (Days)</th>
<th>%TBSA Burned</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>56</td>
<td>24</td>
<td>36.6</td>
<td>14</td>
<td>17.9%</td>
<td>7 of 80 (8.7%)</td>
</tr>
<tr>
<td>Associated Injuries</td>
<td>12</td>
<td>5</td>
<td>39.1*</td>
<td>13*</td>
<td>21.2%*</td>
<td>3 of 17 (17.6%)*</td>
</tr>
<tr>
<td>Without Associated Injuries</td>
<td>44</td>
<td>19</td>
<td>36*</td>
<td>15*</td>
<td>17%*</td>
<td>4 of 63 (6.3%)*</td>
</tr>
</tbody>
</table>

not significant

clusions: (1) Intentional burn injuries are not only a result of child abuse. (2) Flame burn is the
mest common type of intentional thermal injury and accounted for the largest burns and all
ilalties. (3) Associated injuries occur in a minority of patients and are generally minor.
ULTERIOR EXTREMITY COMPARTMENT SYNDROME (ALECS) SCREENING IN CRITICALLY ILL TRAUMA PATIENTS

Kosir, S. Todd, J. Selby, C. Cocanour, R. Kozar, G. Vercruysse, E. Gonzalez, N. Ware, F. Moore
University of Texas Medical School at Houston, Houston, TX

Researcher: Roman Kosir, MD Senior Sponsor: Christine S. Cocanour, MD

LECS is a devastating complication that often presents silently in critically ill trauma patients. The physical exam (PE) is unreliable. Therefore, we developed a protocol to screen high-risk patients.

Methods: This prospective observational study included all shock trauma intensive care unit (ICU) patients who met specific high-risk criteria including: pulmonary artery catheter (PAC)-directed shock resuscitation, open or closed tibial shaft fracture, major vascular injury below the knee bifurcation, abdominal compartment syndrome, or pelvic/lower extremity crush injury. Patients were screened upon admission and every 4 hours thereafter for the first 48 hours of admission. Screening included PE and anterior/deep posterior calf compartment pressure measurements when PE was concerning or not reliable. A positive screening, defined as a delta P < 15 mmHg (where delta P is the difference between the diastolic blood pressure and the compartment pressure), mandated a four-compartment fasciotomy. Data are presented as mean ± standard deviation.

Results: Over 6 months ending July 2005, there were 2,582 admissions to our Level I Trauma Center. Four hundred and twenty-eight of these were admitted to the STICU, of which 45 (11%) one or more of our inclusion criteria. Patient age was 38.0 ± 16.6 years, 76% were male and the average severity score was 29.0 ± 12.0. Eighty-seven percent of those that met inclusion criteria had a known mechanism of injury, with the most common cause being motor vehicle collision (51%). Only six (58%) patients had one inclusion criterion, 11 (24%) two, 6 (13%) three, and 2 (4%) four.

ALECS occurred in 9 patients (20% of screened patients and 2% of STICU admits). The mean delta P was 20.6 ± 3.7 mmHg. The time from STICU admission to the development of ALECS was 8.9 ± 5.0 hours (range 3-18 hours). The findings at fasciotomy were all consistent with the diagnosis of compartment syndrome (muscle bulging without necrosis).

The most frequent inclusion criterion was PAC-directed shock resuscitation in 27 (60%) patients. (22%) of these patients developed ALECS. This subset of patients was in severe shock with a base deficit of 14.7 ± 5.1 and a lactate of 14.7 ± 4.3. The total fluid requirements in these patients for the first 24 hours of admission were 42.2 ± 21.8 L (crystalloids: 23.0 ± 12.9 L and blood products: 19 ± 13.4 L). A total of 11 (24%) screened patients died, including 6 (67%) who developed ALECS. In PAC-directed shock resuscitation patients, the mortality rate was 83%. None of the non-enrolled patients developed ALECS and 6% died.

Conclusions: We developed a sensitive screening protocol for the early detection of ALECS. Based on these results we have shortened the screening period to 24 hours. Future plans include evaluating the modified protocol and identifying better predictors for the development of ALECS.
FINITIVE ESTABLISHMENT OF AIRWAY CONTROL IS CRITICAL FOR OPTIMAL OUTCOME IN LOWER CERVICAL SPINAL CORD INJURY

Hassid, M.D., M.A. Schinco, M.D., J.J. Tepas, M.D., A.J. Kerwin, M.D., M.M. Griffen, M.D., Hetarpal, M.D., T.L. Murphy RN/BSN, E.R. Frykberg, M.D.

University of Florida, Health Science Center, Jacksonville, FL

Senior Sponsor: Kimberly Davis, M.D.

Background: Respiratory complications can inevitably undermine outcome from low cervical spinal cord injury (LSCI). Most devastating of these is catastrophic loss of airway control (CLA). This study sought to determine the incidence and effect of catastrophic airway loss and to define thresholds for elective intubation with subsequent tracheostomy (TRACH) to prevent potentially fatal outcomes.

Methods: A database of 54,838 consecutive patients (pts) treated in a Level I trauma center between January 1988 and December 2004 was queried to identify pts with LSCI (C5-T1) without associated head injury. Pts were then stratified as complete (CSCI) or incomplete (ISCI) groups. Age, severity, need for airway intervention, and mortality were analyzed for each group using Fisher's exact test, accepting p<0.05 as significant.

Results: One hundred and eighty six pts met inclusion criteria. The majority of LSCI were complete (58%). Overall, 127 (68%) LSCI pts required intubation, 88 (69%) required TRACH and died (15% of study population). Within each group there was no difference in age or injury severity as measured by ISS.

<table>
<thead>
<tr>
<th></th>
<th>Intubation No. (%)</th>
<th>Trach No. (%)</th>
<th>Mortality No. (%)</th>
<th>CLA No. (%)</th>
</tr>
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<tbody>
<tr>
<td>CSCI (n=108)</td>
<td>Y 97(91)*</td>
<td>73 (75)</td>
<td>16 (17)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>N 11 (9)*</td>
<td>0</td>
<td>10 (91)</td>
<td>6</td>
</tr>
<tr>
<td>ISCI (n=78)</td>
<td>Y 30 (38)</td>
<td>15 (50)</td>
<td>1 (1.3)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>N 48 (62)</td>
<td>0</td>
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<td>0</td>
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0.0001, CLA in CSCI intubated vs non-intubated

11 CSCI pts for whom intubation was not considered, 4 were at family's request for withdrawal of care. Six of the remaining 7 resulted in fatal catastrophic airway loss. One patient survived to charge to rehabilitation. Pts with ISCI required intubation less frequently (38%), however 50% of ISCI required TRACH for intractable pulmonary failure.

Conclusions: These data indicate that regardless of completeness of LSCI, immediate, thorough evaluation for respiratory failure is necessary. Early definitive airway management and long term TRACH for CSCI is critical for survival. For pts with ISCI, respiratory failure should prompt timely intubation.
ATEGIES FOR RECRUITMENT INTO A COMPREHENSIVE FALL PREVENTION PROGRAM: IF WE BUILD IT, WILL THEY REALLY COME?

andro MD MPH; DA,Spain MD; E,Corman MRA; RA,Dicker MD
ford University, Stanford, CA
enter: Jamie Shandro, MD Senior Sponsor: Rochelle A. Dicker, MD

ackground: More than 1/3 of adults >65 suffer a fall each year and half of those are expected to again within a year, facing significant morbidity and mortality. Studies have identified risk factors for falls, and there is evidence that prevention is effective. However, specific recruitment strategies for prevention programs in Level I trauma centers have not been evaluated. The purpose of this study is to evaluate recruitment strategies and outline implementation challenges and solutions. We hypothesize that we have developed effective recruitment strategies for our multilevel fall prevention program.

ods: Participants were recruited into "Farewell to Falls" from 12/04 - 8/05 at our Level I trauma center. Eligibility criteria included: >65 years, independent living, and a fall not resulting in hospitalization. Recruitment modalities included: 1) EMS dispatched 911 calls for "falling ED transport; 2) ED referrals via nurses and web-based pager notification system for falls; 3) awareness campaign targeting a primary care center (PCC); 4) exposure in media leading to self-referral. Data were collected on demographics of referrals and enrolled patients, and source of referral. X² and T-tests were performed.

Results: Through the ED notification system, 142 enrollment criteria, but only 21 (15%) were met. Of the 68 total patients referred, 47 were enrolled (69%). Enrollment rates differed significantly by referral source (Table 1). There was no significant difference in gender or age between referrals that were enrolled and referrals that were not enrolled. Overall reasons for not enrolling in the program included inappropriate referral (38%), response after many calls to home (24%), or patients and families feeling they do not need home visits from our Occupational Therapists (38%). 75% of those enrolled had multiple falls within the prior year. The attrition rate was 6%.

clusions: Level I trauma centers are dedicated to injury prevention programs. Pivotal to the success of prevention programs is access to and willingness participation of the target population. Our recruitment strategies were successful in enrolling referred patients but should be modified to capture more potential participants. Source of referral had a significant effect on rate of enrollment; referral after media coverage was very effective given the inherent motivation to participate. Referral and enrollment rates were low. Future strategies should include a dedicated responder to capture the large eligible populations seen in the ED and by EMS. Methods should include more packets eligible patients after ED discharge. The high rate of enrollment from PCC referrals can be attributed to trust of the participants in their providers. Preliminary, the program is using a high risk population of fall recidivists and has a favorable rate of retention.

<table>
<thead>
<tr>
<th>Referral source</th>
<th># ref</th>
<th># enrolled (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS</td>
<td>13</td>
<td>9 (69%)</td>
</tr>
<tr>
<td>ED</td>
<td>21</td>
<td>9 (43%)*</td>
</tr>
<tr>
<td>PCC</td>
<td>21</td>
<td>18 (86%)</td>
</tr>
<tr>
<td>Self-referred</td>
<td>13</td>
<td>13 (100%)*</td>
</tr>
</tbody>
</table>

Table 1. Patients referred and enrolled by source. *X² significantly different from expected result, p=0.015
THE EFFECTS OF HYPERTONIC SALINE AND PENTOXIFYLLINE IN
ANIMAL MODEL OF HEMORRHAGIC SHOCK

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Dereee M.D.  Senior Sponsor: Raul Coimbra M.D., Ph.D.

he relationship between hemorrhagic shock, the duration of ischemia, and the development of
lung injury (ALI) has been well established. Strong evidence suggests that the current shock
resuscitation regimen with Ringer's lactate (RL) potentiates neutrophil activation and is associated
with increased inflammation and acute lung injury (ALI). We have recently shown that HSPTX, a
ewel resuscitation strategy that combines low volume hypertonic saline (HS) with pentoxifylline
(X), both carrying significant anti-inflammatory properties, attenuates hemorrhagic shock-
induced acute lung injury when compared to conventional RL resuscitation. Because the neutrophil
is a major role in the post-shock inflammatory response and tissue injury, we investigated the
effects of HSPTX on neutrophil functions that participate in the development of ALI.

A rat model of controlled hemorrhagic shock was used. By withdrawing blood from the femoral
cy, the mean arterial pressure was maintained at 35 mmHg for one hour. Animals were then
resuscitated with RL (32 ml/kg, equal salt load) or HSPTX (4 ml/kg 7.5% NaCl + PTX 25 mg/kg). A
control group (no shock, no resuscitation) was also used as control. At 24 h after resuscitation animals
were sacrificed and bronchoalveolar lavage fluid (BALF) and lungs were obtained. IL-8 was
measured in BALF by ELISA. MMP-2 and MMP-9, proteolytic enzymes involved in the
elopement of ALI and considered markers of neutrophil activation and degranulation were
determined by zymography in BALF and lung tissue. Expression of HO-1, an inducible enzyme
activated in conditions of oxidative stress was assessed by western blot and immune staining of lung
sections.

SPTX resuscitation led to a 62% decrease in IL-8 levels compared to RL (p<0.001). BALF
IP-2 expression was attenuated by 23% in HSPTX-treated animals (p<0.05) compared to their
counterparts. Similarly, MMP-2 and MMP-9 expression in the lung tissue were attenuated by
67 and 76% respectively (p<0.001), in HSPTX-treated animals. Lung HO-1 expression was
reduced by 34% in HSPTX-treated animals when compared to RL (p<0.01), indicating attenuated
inflammatory injury in that treatment group. Lung HO-1 immune staining localized the expression of
HO-1 mainly to neutrophils and alveolar macrophages.

Collectively, we demonstrated that HSPTX, a novel resuscitation strategy, attenuated acute lung
injury when compared to RL by downregulating neutrophil activation, pro-inflammatory mediator
production, and HO-1 expression.
REASED INSULIN REQUIREMENTS ARE ASSOCIATED WITH PNEUMONIA \nER SEVERE INJURY

artin, J Smith, J Hoth, P Miller, J Meredith, M Chang
: Forest University School of Medicine, Winston-Salem, NC

enter: Robert S. Martin, MD Senior Sponsor: Michael C. Chang, MD

duction: Hyperglycemia after severe injury has been associated with an increased risk of
:tion and death. The merits of strict glycemic control in the ICU have recently been recognized.
:ing amounts of insulin by infusion are required to maintain blood glucose levels within normal
:es. Little is known about how insulin requirements are affected by the presence of infection,
fore, the purpose of this study was to characterize this relationship.

ods: Medical records of all intubated, injured patients admitted to the ICU over a one year
od of time were reviewed. Patients were included if they were managed with an insulin infusion
they had a single bronchoalveolar lavage (BAL) culture performed for presumed pneumonia
seen 48 hours and 6 days. Mean hourly and 24-hour insulin requirements were compared before
after BAL and related to the presence or absence of pneumonia.

ts with pneumonia (50) demonstrated a significant increase in hourly and 24-hour insulin
ements from before to after BAL (p<0.0001) which was not seen in patients without
monia (12) (See Figures). The
ence between pre- and post-BAL 24-
 insulin requirements was 36.7 units in
nts with pneumonia versus -5.3 units
ose without (p=0.035). A 2 unit
ase in 24-hour insulin requirement
he pre-BAL level demonstrated an
itive predictive value for
monia.

clusions: Increased insulin requirements are associated with the presence of pneumonia and
represent a valuable tool for earlier recognition.
CULT PNEUMOTHORAX: TO TREAT OR NOT TO TREAT

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University of Miami and Massachusetts General Hospital

Center: C. Seaver, MD Senior Sponsor: Dave Shatz, MD

Objectives: The Optx is defined as a pneumothorax not identified on plain chest x-ray but detected on a CT-scan. The overall reported incidence is about 5-8% of all trauma patients. We conducted a chart review of our Optx incidence and asked if an objective score could guide the practitioner with decision to place a thoracostomy tube (TT) or observe these patients.

Methods: This is a retrospective review of all trauma patients in a level 1 university trauma center for the period of 5 years. The patients were identified by a query of all pneumothoraces in our trauma registry. Those x-ray results were then reviewed to identify those who had Optxs. We then retrospectively scored 50 of the Optx by taking the largest perpendicular distance in mm from the sternal wall of the largest air pocket. We then added 10 or 20 to this if the Optx was either anterior/posterior or lateral, respectively.

Results: A total number of 21,193 trauma patients were evaluated with 1295 patients with pneumothoraces (6.1%) were identified. Of the 1295 patients with pneumothoraces there were 379 Optxs identified (29.5%). The overall incidence of Optx was 1.8%. 95.7% occurred after blunt trauma. 222 (59%) of the Optx had TT and of the remaining 157 without TT, 27 (17%) were on positive pressure ventilation. The average score was 28.5 overall. The average score for those with TT’s was 34. The average score for those without TT’s was 21. PPV for need of CT if score > 30 is 78% and NPV if score < 20 needing a TT was 70%. Area under ROC curve was 0.72 which was significant with p < .007

Conclusions: The management of these Optx is not standardized and further study leading to an objective classification may assist the surgeon’s decision-making. The application of a scoring system may also decrease unnecessary insertion of TT and is currently being prospectively validated.
ISCLE MICRODIALYSIS IN ACUTE TRAUMA PATIENTS: VISUALIZATION OF ULTI-DIMENSIONAL COMPLEX METABOLIC STATES USING BIOINFORMATIC USTER ANALYSIS

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Presenter: Mitchell Jay Cohen MD  Senior Sponsor: M. Margaret Knudson MD

INTRODUCTION: Tissue microdialysis measures levels of glucose, lactate, and pyruvate in the acellular fluid of specific organ beds. Microdialysis has been used extensively in exercise physiology and traumatic brain injury to reflect both global and local metabolic states. Analysis of throughput data in the ICU is increasingly difficult due to the large size and complexity of data. Self-organizing cluster analysis is a bioinformatics tool for mapping associations within high dimensional data that would otherwise be too complex to visualize.

OBJECTIVES: We hypothesized that microdialysis of the deltoid muscle in critically injured patients would provide insight into cellular metabolism during differing states of resuscitation. This study was designed to examine the relationship between muscle metabolites (lactate, pyruvate, glucose) and both standard (MAP, BD, HR, serum lactate), and a new physiologic measure of resuscitation (PmO2).

METHODS: In this prospective observational study, microdialysis probes were inserted into the deltoid muscle of critically injured intubated patients upon admission to the ICU. Dialysate samples were collected at 1 hour intervals and analyzed the following day. Physiologic data were collected continuously using a multimodal bioinformatics system. Resuscitation was defined as MAP ≥ 70 Hg and heart rate ≤ 110 bpm. A lactate pyruvate ratio of < 15 was considered nl.

RESULTS: 865 microdialysis samples were analyzed from 19 critically injured patients.

Sclere lactate measurements were positively related with HR (p<0.0001) and inversely related with MAP, BD and PmO2 (p<0.05). Using a hierarchical cluster analysis, we ived the dendrogram seen in Figure 1. Sclere tissue LP ratio, lactate and pyruvate were found to cluster with resuscitation state. Surprisingly, at a higher order, this cluster was also associated with increased muscle mass. HR and MAP formed another cluster which was associated at the highest order with muscle metabolic measures.

CONCLUSION: We have shown, for the first time, the feasibility and potential utility of muscle microdialysis in acute trauma patients. We have identified a significant correlation between muscle metabolites and standard measures of resuscitation. We also demonstrate that cluster analysis is a powerful tool for visualizing high density physiologic and microdialysis data that may provide new insight into these complex relationships during various states of resuscitation.
COMPLICATIONS ASSOCIATED WITH SMALL BOWEL RESECTIONS: CONCURRENCE INJURIES ARE MORE RELEVANT TO MORBIDITY THAN METHOD OF GASTROINTESTINAL ANASTOMOSIS

Brundage, MD, MPH, N. Kirilcuk, MD, D. Livingston, MD, S. Brakenridge, MD, K. Nagy, MD, Davis, MD, R. Friese, MD, C. Cothren, MD, Z. Sifiri, MD, S. Ross, MD, R. Albrecht, MD, J. Ray, MD, D. Spain, MD; Stanford Univ and the WTA Multicenter Trial Committee

Background: The preferred method of bowel anastomosis; sutured versus stapled, is at the discretion of the operating surgeon. Retrospective studies have called into question the appropriateness of this method of constructing gastrointestinal anastomoses in trauma patients. The purpose of this study was to prospectively collect data and analyze clinical outcomes associated with repairs of small bowel in the trauma patient. We hypothesized that stapled repairs would have a higher rate of intra-abdominal complications compared to sutured anastomoses.

Methods: Nine Level I trauma centers participated in this prospective multicenter study to ascertain complication rates associated with the two cohorts, stapled versus sutured anastomoses. Inclusion criteria were: a documented small bowel anastomosis, survival > 48 hours post injury, and > 15. Enterotomies repaired without formal resection and anastomosis were excluded. Data was collected including demographics, intra-abdominal abscess formation, anastomotic leak, enterocutaneous fistula, associated injuries, and mortality. IRB approval was obtained from all institutions. Restrictions regarding IRB safety concerns and consent issues prohibited accomplishing randomized controlled trial. Data was analyzed by STATA software.

Results: Over a 4 year period, 136 patients were enrolled in the study. The mean age was 30±11 years, the majority were male (90%), and sustained penetrating rather than blunt trauma (77% vs. 23%). Ninety-seven patients had isolated small bowel anastomoses, 39 patients had concomitant resections. The intra-abdominal complication rate associated with isolated small bowel injury was 12/97(12.4%). The complication rate with concurrent small and large bowel resection was 39(41%). (p=0.007) Complications by stapled vs. sutured cohorts follow:

<table>
<thead>
<tr>
<th>Small Bowel Resections (n=97)</th>
<th>Small Bowel &amp; Colon Resections (n=39)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Complications</strong></td>
<td><strong>Complications</strong></td>
</tr>
<tr>
<td><strong>Stapled</strong></td>
<td><strong>Sutured</strong></td>
</tr>
<tr>
<td>Leaks</td>
<td>1 (1.4%)</td>
</tr>
<tr>
<td>Abscesses</td>
<td>5 (6.8%)</td>
</tr>
<tr>
<td>Fistulas</td>
<td>1 (1.3%)</td>
</tr>
<tr>
<td><strong>Stapled</strong></td>
<td>3 (11%)</td>
</tr>
<tr>
<td><strong>Sutured</strong></td>
<td>4 (17%)</td>
</tr>
<tr>
<td>1 (4%)</td>
<td>3 (8%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>12 (97)</td>
<td>39 (41%)</td>
</tr>
</tbody>
</table>

Intra-abdominal complications were not significantly associated with either method of anastomotic closure. Complications associated with isolated small bowel resection were due to other injuries, hypotension. The mortality rate was 2% (3 deaths; mean age 48±10) one attributed to abdominal sepsis in a patient with four stapled anastomoses. The two other deaths were secondary to brain injury and multiple organ dysfunction not associated with bowel injury.

Conclusion: To date, no other prospective study has examined the appropriateness of using a stapled versus a sutured method of small bowel anastomosis in the trauma population. We found that related deaths rather than anastomotic construction were responsible for most complications. Although relatively morbid with high intra-abdominal complication rates, deaths are rarely attributed to bowel injury. Surgeons should be comfortable choosing their preferred type of repair.
EE PERITONEAL FLUID (FF) WITHOUT SOLID ORGAN INJURY ON COMPUTERIZED TOMOGRAPHY (CT) FOLLOWING BLUNT TRAUMA: EFFECTORS OF THERAPEUTIC LAPAROTOMY (TL)

Toschlog, MD, C. Goettler, MD, M. Bard, MD, M. Newell, MD, S. Sagraves, MD, P. Schenarts, and M. Rotondo, MD
Carolina University, Greenville, NC

Presenter: Eric Toschlog, MD
Senior Sponsor: Carol Schermer, MD

Management of blunt trauma patients with FF without solid organ injury on abdominopelvic CT is controversial. The study purpose was to identify variables predictive of TL.

Adult blunt trauma patients with unexplained FF on CT underwent laparotomy (2001-5). Retrospectively collected variables and operative reports were reviewed. Operations were deemed TL by consensus of 7 trauma surgeons. A single radiologist retrospectively reviewed CTs, grading FF region (pelvis, gut, Morrison’s), Hounsfield units (HIFU) and volume (minimal/moderate).

TL cohort was compared to non-therapeutic (NTL) using ANOVA, Chi square, and uni- and multivariate regression (significance p<0.05).

Laparotomy was performed on 102 consecutive patients. Abdominal injuries (158) were noted in 76 (11%). Injuries were primarily gastrointestinal (GI) (50%), mesenteric (33%), or occult solid organ (11%). The TL rate was 53% (n=54). TL was comprised primarily of GI (57%), mesenteric 29%, solid organ (13%), and bladder or diaphragm (9%) repair/resection. ANOVA and Chi square revealed 9 variables significantly associated with TL (Table 1).

<table>
<thead>
<tr>
<th></th>
<th>HFU Pelvis</th>
<th>HFU Mean</th>
<th>TND</th>
<th>Shock</th>
<th>Min. Fluid</th>
<th>HFU &lt;20</th>
<th>1/3</th>
<th>3/3</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL</td>
<td>37±12</td>
<td>38±10</td>
<td>61%</td>
<td>20%</td>
<td>38%</td>
<td>4%</td>
<td>15%</td>
<td>67%</td>
<td>31%</td>
</tr>
<tr>
<td>NTL</td>
<td>20±13</td>
<td>23±15</td>
<td>29%</td>
<td>6%</td>
<td>83%</td>
<td>48%</td>
<td>48%</td>
<td>20%</td>
<td>12%</td>
</tr>
</tbody>
</table>

\(\text{ans±SD, TND=tender, Shock=hypotension + tachycardic in ED, Min=minimal} \)
\(\text{1 of 3 regions with fluid, 3/3=all 3 regions with fluid, SS=seatbelt sign.} \)

Multivariate regression panned significant variables to 4 (Table 2).

<table>
<thead>
<tr>
<th>Volume=moderate</th>
<th>Tenderness</th>
<th>Fluid in region &gt;1</th>
<th>HFU Pelvis</th>
</tr>
</thead>
<tbody>
<tr>
<td>p value</td>
<td>0.006</td>
<td>0.007</td>
<td>0.04</td>
</tr>
<tr>
<td>OR</td>
<td>6.9</td>
<td>7.0</td>
<td>5.1</td>
</tr>
</tbody>
</table>

Unsualized laparotomy in this population leads to a high NTL rate, and patients must be visualized. Predictors of TL include increasing pelvic HFU, FF in more than one region, tenuous, and increasing FF volume. Retrospective application of the regression model reduced TL to 18%. The model predicts a 96% TL rate for patients with pelvic HFU > 30, moderate fluid in one region, and tenderness on examination.
PREDICATED THORACOLUMBAR TRANSVERSE PROCESS FRACTURES: CALL PHYSICAL THERAPY, NOT SPINE

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Senior Sponsor: Carl J. Hauser MD

Background: As CT scanning of the chest, abdomen and pelvis (CT-CAP) has become more routine in evaluating high-energy blunt torso trauma, thoracolumbar spine transverse processes (TVPFx) have been diagnosed with increased frequency. It is widely believed that TVPFx are often associated with mechanically significant structural lesions of the vertebral column, necessitating formal spine consultation and maintenance of patients on log-roll precautions pending clearance. With recent increases in the frequency of diagnosis however, our perception has been that although TVPFx are painful markers of significant torso trauma, they are intrinsically benign and seldom associated with major spine trauma. We therefore reviewed our experience in diagnosis and management of TVPFx.

Methods: We performed a retrospective review of the trauma registry of a large Level I trauma center over 4 years from 2001-2004. We identified 360 patients with TVPFx. Patients were aged 16-74: male and 26% female. Patients who died in the first 48 hours (3%) were excluded from the study. Of the remaining patients, another 15% were noted to have had associated, potentially mechanically significant thoracolumbar spine injuries seen on initial screening CT-CAP. These patients were also excluded from further study.

Results: The remaining 82% of patients were found to have sustained 2.1 ± 0.2 (Mean ± SE) TVPFx. These patients spent 27 ± 4 hours on log-roll and waited 3.5 ± 0.6 days to be started on physical therapy. Nonetheless, no patient with an isolated TVPFx on the initial CT-CAP was found to have a significant spine injury that required specific therapy. Optional corsets and braces were generally recommended “for comfort.”

Conclusions: TVPFx are common injuries that are diagnosed with increased frequency when CT-CAP is used to evaluate torso trauma. More than 50% of patients have multiple TVPFx. Isolated TVPFx require aggressive pain management and benefit by early mobilization. Also, TVPFx are common markers for major torso trauma, and about 15% will be associated with mechanically significant spine injuries. Nonetheless, in the vast majority of patients where no associated structural lesions of the vertebral column are seen on an adequate screening CT-CAP, no further study of the TVPFx is needed. Under these conditions, dedicated consultation with a ‘spine service’ may waste time and valuable resources. Moreover, unnecessarily detailed investigation of the spine will often lead to prolonged periods on log-roll precautions and to delays in patient mobilization by physical therapy. This will be a special concern in the large subgroup of these patients who have associated chest and orthopedic injuries, and in whom delays in mobilization due to concerns for the spine may be frankly deleterious to overall management of the patient.
NOTES
% FASCIAL APPROXIMATION WITH SEQUENTIAL ABDOMINAL CLOSURE IN THE OPEN ABDOMEN

Cothren, EE Moore, JL Johnson, JB Moore, DJ Ciesla, JM Burch
The University of Colorado, Denver, CO

Presenter: C. Clay Cothren, MD  Senior Sponsor: C. Clay Cothren, MD

Background: Multiple techniques have been introduced to obtain fascial closure for the open abdomen. Vacuum-assisted closure has reduced but not eliminated the use of either split-thickness skin grafts to cover the exposed bowel or mesh (prosthetic or biologic) approximation of the fascia. It was hypothesized that a modification of the vacuum-assisted technique that provided constant fascial tension would achieve a higher rate of primary fascial closure, hence obviating the morbidity of the open abdomen and cost of either complex abdominal reconstruction or biologic mesh insertion.

Methods: The technique proposed by Miller et al. was modified to employ the VAC white sponges over the bowel. The fascia is placed under moderate tension over the white sponges with #1-0 Dexon sutures, and the black sponge is placed on top of this with an occlusive dressing in the standard fashion. Patients are returned to the operating room for sequential fascial closure and replacement of sponge sandwich every two days, with a resulting decrease in the fascial defect. Patients undergoing this technique for persistent open abdomens since its introduction in 1/05 at our level 1 trauma center were reviewed.

Results: Eleven patients underwent sequential abdominal closure during the study period: 7 due to trauma control surgery (6 trauma and 1 general surgery) and 4 due to secondary abdominal apartment syndrome (2 trauma, 1 pancreatitis, 1 ruptured AAA). The majority were men (73%) with a mean age of 41.6 ± 5.8 years. Average time to closure was 7 days (range 4-12) and average number of laparotomies to closure was 4.5 (range 3-8). Patients undergoing post-injury DCS had an average of 3 (range 1-5) intraabdominal injuries and 2.6 (range 1-5) additional injuries. All patients achieved primary fascial closure.

Conclusions: We propose a modification of the previously described vacuum-assisted closure technique that achieves 100% fascial approximation in our limited experience. Further application and refinement of this technique may abolish the need for delayed, complex reconstructive abdominal wall procedures for the open abdomen.
OMIDATE USE IN TRAUMA PATIENTS: USEFUL ADJUNCT OR DANGEROUS UG?

K. Kaups, M.D.
University Medical Center, Fresno, CA

Presenter: Krista L. Kaups, M.D.  Senior Sponsor: Krista L. Kaups, M.D.

Purpose: Etomidate (ETOM) is frequently used to facilitate intubation for trauma patients. ETOM is also known to cause adrenal suppression (AS), lasting up to 24 hours after administration. We hypothesized that AS has prolonged deleterious effects and may worsen outcomes in critically injured patients.

Methods: Critically injured patients, admitted to a Level I Trauma Center, from 8/04 to 6/05, with random cortisol (CORT) levels drawn within 48 hrs of admission were included. Data collected included age, sex, mechanism of injury (MOI), AIS and ISS, P, ETOM use, CORT level, hypotension (HYPO), pressor use (PRESS) and outcomes were recorded. Patients who died within 72 hrs were excluded.

Results: 102 patients were included; mean age was 40 yrs and ISS was 30. Most patients were male (69%) and had blunt injury (86%). Patients who received ETOM (ETOM+) were not different for MOI, age, AIS-head or chest, or ISS from those who did not (ETOM-). CORT was less in the OM+ group (16.1 vs. 20.2, p < .02). P was greater in the ETOM+ group (0.71 vs. 0.56, t-test, p < .15), yet this group had more complications and worse outcomes (death or discharge to ECF).

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>HYPO</th>
<th>PRESS</th>
<th>ECF/DEATH</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETOM-</td>
<td>33</td>
<td>8</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>ETOM+</td>
<td>69</td>
<td>33</td>
<td>30</td>
<td>19</td>
</tr>
<tr>
<td>P &lt; .02, χ²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conclusions: ETOM use is associated with continued complications and may contribute to poor outcomes in critically injured patients. Although the AS due to ETOM is believed to last only 24 hrs, the effects persisted throughout the hospitalization.
AUMA CENTER FINANCIAL CRISIS PRECIPITATED BY REPEAL OF NO FAULT TO INSURANCE

Mains, MD; P. Offner, MD; R. Madayag, MD; G. Pinson, MD; F. Seale, MD; E. Pulido, MD
Anthony Central Hospital, Denver, CO

Speaker: Charles W. Mains, MD  Senior Sponsor: Charles W. Mains, MD

Background: In 2003 the Colorado State Legislature repealed a 30 year old no fault insurance resulting in loss of a mandatory $50,000 acute care, $50,000 rehabilitation and $30,000 lost wages benefit for drivers ($130,000 total). Loss of revenue to providers potentially threatens the financial stability of Trauma Centers, EMS services and physicians.

Objective: Evaluate the financial impact of the change from No Fault to Tort Auto Insurance on times, hospitals, pre-hospital providers and physicians.

Methods: In 2005, the Trauma Care Preservation Coalition assisted by the Colorado Hospital Association conducted surveys of 63 hospitals and 23 pre-hospital providers. A detailed financial analysis was conducted on 20,650 inpatients (2001-3rd quarter 2004). A separate survey of 14 trauma centers examined trending analysis for 121,616 hospital visits (2002-2004). The Regional AUMA Advisory Council commissioned studies from an insurance consultant who analyzed the impact to motorists and from an economist who analyzed the impact to the State Trauma system. Physicians and consumers were also surveyed.

Results: 2001-2004 trend analyses of cost shifts and revenue losses showed a 42% reduction in no insurance reimbursement. Medicaid increased 124.7%, Medicare increased 171.9%, no pay ceased 400.4%. Auto insurance reimbursement schedules cover the cost of care. No pay, Medicaid and Medicare covers only a fraction or none of the cost of care. Projected Colorado AUMA Center reduction in revenue is $80,000,000 for 2005. Pre-hospital services average time to correction increased from 50 days for 2001-2003 to 108 days for 2004. Physicians surveyed experienced similar reduction in overall revenue and increased accounts receivable aging. One third victims, those injured in single car crashes, are not entitled to benefits. Legally at fault drivers have no benefit. Those who are injured by the average at fault driver may recover no more than $1,000 and the time to recovery may be years. Public opinion favors auto insurance coverage for medical expenses.

Conclusion: With the shift to Tort Auto Insurance, Colorado consumers lost $130,000 in personal protection benefits, with little or no reduction in premiums. The State Trauma System lost a major source of funding creating unprecedented declines in reimbursement for the providers of care. This has a fundamental question: Should auto insurance pay the cost of medical care to the victims of tort vehicle crashes?
ONE VENTILATION IN TRAUMA/SURGICAL PATIENTS WITH ALI/ARDS - IS IT NEFICIAL?

avis MD, E Moore MD, D Lemaster MSN, J Bilello MD, R Townsend MD
iversity Medical Center, Fresno, CA

enter: J Davis MD Senior Sponsor: J Davis MD

pose: to compare the effectiveness of supine versus prone kinetic therapy in mechanically ventilated trauma/surgical patients with acute lung injury (ALI) and adult respiratory distress drome (ARDS).

ethods: Retrospective review of all patients with ALI/ARDS that were placed on either a supine (to-rest) or a prone (roto-rone) oscillating bed. Data obtained includes age, CVP, chest_AIS, ISS, \( \text{O2/FiO2} \) ratio, FiO2 requirement, days on bed, ventilator days, mortality, and pulmonary related mortality. Data are expressed as mean ± SEM, with significance at \( p < 0.05 \).

ults: From 03/01/2004 through 08/31/2005, 2715 trauma patients were admitted and 37 met inclusion criteria with 26 supine and 11 prone.

<table>
<thead>
<tr>
<th>Category (n)</th>
<th>( \text{PaO}_2/\text{FiO}_2 ) entry</th>
<th>( \text{FiO}_2 ) entry</th>
<th>( \text{PaO}_2/\text{FiO}_2 ) day 5</th>
<th>( \text{FiO}_2 ) day 5</th>
<th>Bed Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>supine (26)</td>
<td>166 ± 18</td>
<td>.63 ± .05</td>
<td>185 ± 17</td>
<td>.44 ± .02</td>
<td>6.9 ± 1</td>
</tr>
<tr>
<td>prone (11)</td>
<td>163 ± 10</td>
<td>.57 ± .03</td>
<td>238 ± 13</td>
<td>.40 ± .01</td>
<td>5.6 ± .5</td>
</tr>
<tr>
<td>value</td>
<td>.92</td>
<td>.48</td>
<td>.03</td>
<td>.16</td>
<td>.43</td>
</tr>
</tbody>
</table>

ere was no difference between the groups for age, CVP, ISS, chest_AIS, ventilator days or length of stay. There were 9 deaths (4 pulmonary related) in the supine group and no deaths in the prone up (\( p < 0.04, X^2 \)).

clusions: ALI/ARDS patients that were prone positioned had greater improvement in \( \text{O2/FiO2} \) ratio, lower mortality and less pulmonary related mortality than supine positioned patients. The use of a prone-oscillating bed is advantageous for trauma and surgery patients with ALI/ARDS.
DEVELOPMENT AND TESTING OF PORTABLE PUMP FOR THE INDUCTION OF PROFOUND HYPOTHERMIA IN A SWINE MODEL OF LETHAL VASCULAR INJURIES

B. Alam, MD, F. Casas, PhD, Z. Chen, MD, PhD, W.A. Smith, PhD, A. Reeves, PhD, G. Imaahos, MD, M. deMoya, MD, P. Rhee, MD, MPH
Uniformed Services University, Bethesda, MD. Cleveland Clinic, Cleveland, OH. Massachusetts General Hospital Center/Harvard Medical School, Boston, MA.

Presenter: Hasan B. Alam, MD

Senior Sponsor: Hasan B. Alam, MD

Percutaneous induction of a profound hypothermic state (suspended animation) can maintain viability of organs during repair of lethal injuries. Conventional cardiopulmonary bypass equipment (roller pump) used to induce and reverse hypothermia is bulky, requires standard electricity, and is not transportable. Development of small, portable, battery operated, disposable, rotary pump can facilitate induction and maintenance of hypothermia (during transport). In this experiment, a prototype pump was tested and its performance was compared with the regular roller pump as a model of lethal vascular injuries.

Methods: Uncontrolled lethal hemorrhage was induced in 16 swine (80-120 lbs) by creating an iliac and vein injury. After 30 minutes of pulseless shock, descending thoracic aorta was lacerated. An emergency thoracotomy approach, a catheter was placed in the aorta and organ preservation solution was infused to rapidly (2°C/min) induce hypothermia (10°C) for 60 minutes. The performance of prototype pump was initially tested in a non-survival experiment (four animals). Then, 12 animals were cooled either with (n=6/group): 1) conventional roller pump, or 2) all prototype pump. The injuries were repaired during hypothermic arrest and the animals were warmed (0.5°C/min). Whole blood was infused during resuscitation on cardiopulmonary bypass. Surviving animals were closely monitored for three weeks for post-operative complications, urologic deficits, and organ dysfunction.

Results: The flow rates and the time needed to induce and reverse profound hypothermia were no different between the prototype and the conventional roller pumps. Three-week survival rates were 50% in both groups. Only a transient increase in liver enzymes, and makers of cellular injury (creatine kinase, lactate dehydrogenase) was noted (no difference between groups), with no long-term organ dysfunction.

Conclusions: In this large animal model of lethal vascular injuries, a portable, battery operated, disposable, rotary pump performed as well as the conventional roller pump. The logistical advantages of this system make it an attractive choice for inducing hypothermia in emergency departments, austere settings (e.g. battlefield hospitals), and for maintaining hypothermia during transport.
HOLE BLOOD LEUKOCYTE MAPK ACTIVATION DIFFERENTIATES ICU PATIENTS WITH SIRS AND SEPSIS

[A. West, MD, PhD, A. Koons, BS, M. Crandall, MD, MPH, R. Skinner, MD, M.B. Shapiro, MI]

Department of Surgery, Northwestern University, Chicago, IL

Presenter: Michael A West, MD, PhD

Senior Sponsor: Michael A West MD, PhD

We sought to determine whether leukocytes from ICU pts have altered ERK and p38 kinase activation and specifically if septic pts manifest changes of endotoxin (LPS) tolerance. In vitro treatment of monocytes (Mono) with LPS induces LPS tolerance with impaired cytokine release and inhibition of ERK and p38 activation after LPS rechallenge.

Methods: Heparinized whole blood from 21 surgical ICU pts and 16 normal controls was incubated 1 min ±10 ng/ml LPS at 37°C. Mono and neutrophil (PMN) diphospho (active) ERK and p38 nase activation were determined using flow cytometry with monoclonal antibodies to. Results are expressed as mean ± SEM of basal and “delta” (Δ) % positive cells [Δ = LPS stimulated – Basal].

<table>
<thead>
<tr>
<th>Patient Group:</th>
<th>Normal</th>
<th>Post Op</th>
<th>Sepsis</th>
<th>SIRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mono</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basal</td>
<td>36±6%</td>
<td>24±14%</td>
<td>25±12%</td>
<td>45±7%</td>
</tr>
<tr>
<td>Δ</td>
<td>22±3%</td>
<td>8±7% *</td>
<td>3±5% *</td>
<td>17±6%</td>
</tr>
<tr>
<td>PMN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basal</td>
<td>13±6%</td>
<td>3±3% *</td>
<td>5±4% *</td>
<td>43±15%</td>
</tr>
<tr>
<td>Δ</td>
<td>3±3%</td>
<td>2±2%</td>
<td>-2±3%</td>
<td>3±5%</td>
</tr>
<tr>
<td>Mono</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basal</td>
<td>2±2%</td>
<td>18±12% *</td>
<td>18±16% *</td>
<td>7±4%</td>
</tr>
<tr>
<td>Δ</td>
<td>72±3% *</td>
<td>42±15% *</td>
<td>29±14% *</td>
<td>58±6%</td>
</tr>
<tr>
<td>PMN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basal</td>
<td>2±1%</td>
<td>1±2%</td>
<td>8±12%</td>
<td>1±2%</td>
</tr>
<tr>
<td>Δ</td>
<td>71±7% *</td>
<td>12±8% *</td>
<td>3±3%</td>
<td>40±13%</td>
</tr>
</tbody>
</table>

*p < 0.05 versus Normal, #p < 0.05 vs Basal

Results: Basal ERK was seen in Mono from all groups, but Δ only increased with in normal and RS pts. No basal Mono or PMN p38 was seen in normal, but LPS significantly activated p38 in ᵀh cells. Mono from pts with sepsis, but not SIRS had impaired ERK activation. Both PMN and Mono from pts with SIRS had low basal but high LPS-stimulated p38, whereas p38 activation was impaired in pts with sepsis.

Conclusion: Alterations in MAPK activation are seen in ICU pts. Leukocytes of septic pts, but not with SIRS, showed characteristics of LPS tolerance. Leukocyte ERK and p38 kinase activation may be useful to identify ICU subgroups.
The elderly trauma patient: An investment for the future?

A. Newell M.D., M.F. Rotondo M.D., E.A. Toschlog, M.D., S.G. Sagraves M.D., P.J. Schenarts D., M.R. Bard M.D., C.E. Goettler M.D.

School of Medicine at East Carolina University, Greenville, NC

Introduction: The cost of care in elderly trauma patients (OLD) has been shown to be high compared to younger patients (YNG), but the association between age and reimbursement relative to cost is less clear. As the elderly population continues to increase, the number of geriatric trauma patients requiring care will similarly soar. An unfavorable financial margin for these patients could have devastating financial implications for trauma centers in the future. The purpose of this study is to explore the relationship between direct cost and reimbursement for both YNG and OLD patients.

Methods: NTRACS was queried to capture consecutive patients admitted to a Level I university trauma center between Jan 2002 to Dec 2004. YNG (18-64 yrs) were compared to OLD (≥65 yrs) on demographics, mechanism of injury, injury severity (ISS), length of stay (LOS in days), complications, and mortality. Data obtained from the hospital cost accounting system included source, direct costs (DC), total payment (TP) and contribution margin (CM = TP - DC). Virtually all patients were reimbursed based on fixed DRG payment. Comparisons between groups were performed using ANOVA. Significance was set at *p ≤ 0.05.

Results: The results noted below are expressed as mean ± standard deviation.

<table>
<thead>
<tr>
<th></th>
<th>Age (yrs)</th>
<th>ISS</th>
<th>LOS</th>
<th>ICULOS</th>
<th>Mort (%)</th>
<th>DC ($)</th>
<th>TP ($)</th>
<th>CM ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>YNG</td>
<td>36 ± 13</td>
<td>13.3 ± 10.9</td>
<td>7.3 ± 11.5</td>
<td>2.1 ± 5.8</td>
<td>4.7</td>
<td>9,962 ± 16,766</td>
<td>16,539 ± 30,889</td>
<td>6,576 ± 22,33</td>
</tr>
<tr>
<td>OLD</td>
<td>76 ± 7</td>
<td>14.9 ± 10.8</td>
<td>8.8 ± 11.7</td>
<td>3.1 ± 6.9</td>
<td>17.0</td>
<td>10,741 ± 15,114</td>
<td>20,021 ± 29,756</td>
<td>9,28 ± 19,78</td>
</tr>
</tbody>
</table>

The mean time to death was 5.5 days for YNG vs. *8.3 days for OLD and the complication rate was higher for OLD (54%) vs. YNG (34%) yet, no difference in DC was noted. Moreover, Medicare (41.1%, mean CM = $7,944) and Commercial (41.7%, mean CM = $10,097) comprised the major payment sources for OLD. For YNG, Medicaid (24.2%, mean CM = $4,659) and Managed Care (58%, mean CM = $15,263) comprised the majority, however, Self Pay (23.5%, mean CM = -0.021) contributed a significant loss.

Conclusions: In this study of primarily fixed DRG payment patients, DC was not the driving factor overall CM. Moreover, LOS, mortality and complications had little effect on DC. TP as determined by payer mix appears to be critical to the effect on CM. We believe that without significant change in the rate of Medicaid reimbursement and additional strategies to remedy the F-pay problem, young trauma patients will continue to represent the dominant financial strain on trauma centers. We speculate that our aging population may represent a shift towards a more financially favorable patient cohort in the future, not the financial burden that one might expect.
NOTES
Invited Lecture

"Endovascular Surgery: A Top Priority in the Development of Acute Care Surgery"

Timothy C. Fabian, MD
Professor and Chairman of Surgery
University of Tennessee Center for the Health Sciences, Memphis, Tennessee,
UNEXPECTED EFFECT OF ENHANCE BORDER SECURITY; FALLS FROM THE NATIONAL BORDER FENCE

K. Hodgekiss-Harlow, D Hoyt, R Coimbra, P. Friedlund and D Fortlage
University of California San Diego, San Diego, CA

Center: Bruce Potenza, MD           Senior Sponsor: Bruce Potenza, MD

Objective: Homeland security has become a national focus with safe and secure borders a high priority. The international border fence parallels the southern most boundaries between the U.S. and Mexico. We designed this study to quantify the type, severity and incidence of trauma sustained by individuals while climbing this fence.

Methods: Analysis of trauma (falls) from the border fence was conducted utilizing a trauma center registry and chart review (1987-2000). Demographic characteristics, time of injury, patterns of injury, therapy, length of stay and hospital charges were examined.

Results: 73 injured patients were treated at a level one trauma center. 96% were admitted after the event was heightened. There were 38 males and 32 females with a combined mean age of 32.5 years. 3 patients had significant comorbid disease and 3 tested positive for alcohol. Overall, there were 5 patients with closed head injuries (4 mild, 1 fatal). There were 3 patients with relatively mild facial injuries (rib fractures, hemo and pneumothoraces. Only 1 patient sustained significant abdominal trauma (AAST Grade 2 liver/splenic injuries). The only operative procedure done on this patient was a craniotomy for evacuation of intracranial bleeding. Orthopedic injuries requiring a higher level of care was the leading reason for admission (93%). Despite a mean Injury Severity Score of 8.6; the orthopedic injuries were complex, multiple and frequently open. 92% of the patients suffered extremity fractures and 24% spinal column injuries. Lower extremity fractures being the site of orthopedic injury (67 patients). In total there were 120 operative orthopedic procedures. The entire cohort of injured border fence trauma patients utilized 550 hospital days and generated charges of 3.8 million dollars. Only three patients were funded whereas 70 were neither red nor covered by any county medical assistance.

Conclusion: The change in the border fence characteristics has an unanticipated result of increasing traumatic falls from the fence. Injuries are predominantly orthopedic, yet require specialized surgical care for their complexity. These patients represent a significant resource and financial burden to local medical resources. Health care institutions in these boundary areas are presently shouldering the burden for care of these individuals. This problem is a direct complication of the need for secure national boundary policy and should be recognized as an additional cost for homeland security.
BLOODY DEVICES: INCIDENCE OF INSTRUMENT CONTAMINATION

DeMoya, M.D. K. Inaba, M.D. D. S. Shatz, M.D.
University of Miami, Miami, FL

enter: M. deMoya
Senior Sponsor: D. Shatz

Objective: Medical devices such as, stethoscopes and non-disposable pulse oximetry probes come in contact with bodily fluids from patients. Studies have shown almost a 50% incidence of pathologic bacteria on devices such as stethoscopes and pagers. The incidence of blood on these devices has not been tested. Our hypothesis is that medical devices harbor blood that may be grossly apparent.

Methods: Using a commercially available reduced phenolphthalein test kit, with high sensitivity specificity for blood, medical devices were tested. A total of 200 devices were tested. These devices were tested among a distribution of ER/trauma personnel, ICU nurses, and Paramedics.

Results: Of the 200 devices tested, 48 were paramedic, 48 ER/Trauma, and 104 ICU personnel. Blood was present in 24/200 (12%). The incidence among each sample of personnel was 18, 8, and 8, respectively for paramedics, ER/Trauma and ICU personnel. There were no signs of gross blood on these devices. 100% of the devices were routinely cleaned using alcohol. The frequency of cleaning ranged from after each patient to every shift. The 25 pulse oximetry probes tested had a 6% incidence of blood contamination.

Discussion: The incidence of non-gross blood noted on medical devices in this small survey demonstrated a rather high incidence of contamination. The much higher incidence of blood present in pulse oximetry probe was particularly alarming. Techniques of reducing this contamination require closer scrutiny of routine inter-patient cleaning to the use of disposable covers for stethoscopes, pulse oximetry probes or other devices in contact with patients.
E IMPACT OF THE CONSOLIDATION AND CORPORATIZATION OF GANG VIOLENCE ON GUN VIOLENCE

Catherine Lavery, MA, Alicia Mohr, MD, Marian Passannante, PhD, David Livingston, MD
DNJ-New Jersey Medical School and UMDNJ School of Public Health, Newark, NJ

Co-PI: Robert F. Lavery, MA
Senior Sponsor: David H. Livingston, MD

After a decline in violence and the overall crime rate at the end of the nineties, we noted a rise in shot wounds (GSW) coming to our trauma center. In addition, there was a major shift in gang structure and a dramatic increase in gang related drug activity. The purpose of this study was to determine the impact of these issues on injury severity and patient outcome.

METHODS: Retrospective analysis of GSW injuries from 1/97-12/04 for GSW injuries. Demographics, location and number of wounds (through/through, entrance/exit or where a “bullet” is documented are counted as one wound), AIS body region and severity score, ISS, and mortality. Means and 95% confidence intervals (CI95) are noted.

RESULTS: Total GSWs have increased 50% (figure, grey bar) as well as the number of wounds patient from 1.48 (CI95 1.35-1.62) 997 to 1.73 (CI95 1.61-1.86) in 2004. More patients are arriving with cal and extremity wounds. The percentage of patients with ≥3 wounds (dotted line) and injuries to ≥8 defined body regions (dashed line) doubled from 1997 to 2004. Mean ISS is also significantly higher, 13 (CI95 11.6-14.1) in 1997 to 15.3 (CI95 14.2-16.5) in 2004. While there was a slight increase in mortality (id line), the percent of patients dying DOA or dying within 1 hour of just under 50% in 1997 to 67% in 2004.

CONCLUSIONS: Gun violence injury severity increased markedly and paralleled the changes in gang structure and related drug use from a local “neighborhood guilds” to a corporate franchise-like business model (data from the Essex County Gang Violence Task Force). Strategies to decrease gun violence needs to be targeted to gangs and related activity and primary prevention in keeping young people away from gangs combined with increasing economic opportunities remains the only long term solution.
NOTES
Invited Lecture
"The Nation's Medical Preparedness: will you know what to do?"

Jeffrey W. Runge, MD FACEP
Chief Medical Officer
United States Department of Homeland Security
E-HOSPITAL Tourniquet Use in Operation Iraqi Freedom: Effect on Morrhage Control and Outcomes

Beekley, J Sebesta, L Blackbourne, J Holcomb
Digan Army Medical Center, Tacoma, WA

Sponsor: Alec C. Beekley, MD
Senior Sponsor: Matthew J. Martin, M.D.

Background: Anecdotal data and early analysis of those killed in action during Operation Iraqi Freedom reveals casualties who died from exsanguination from isolated compressible extremity hemorrhage.

Hypothesis: We hypothesized that pre-hospital tourniquet use decreased hemorrhage from extremity injuries and saved lives. We further hypothesized that pre-hospital tourniquet use was not associated with an increase in adverse limb outcomes. Methods: This is an IRB-approved, retrospective review of the 31st Combat Support Hospital database, which contains 3,460 patients treated from January 4 to December 2004. Inclusion criteria were any patient with a traumatic amputation, any patient with a major extremity vascular injury, and any patient with documented presence of a pre-hospital tourniquet. Patients with other severe system injury were excluded. 33 data points were collected for each patient.

Results: 166 patients met inclusion criteria, of which 67 had pre-hospital tourniquets and 99 did not. 95% of injuries were caused by penetrating trauma. Statistically significant differences were noted in the numbers of patients with arm injuries (16.2% TK vs. 31.6% No TK), injuries requiring vascular reconstruction (29.9% TK vs. 52.5% No TK), traumatic amputations (41.8% TK vs. 26.3% TK), and in those patients with adequate bleeding control on arrival with ISS > 15 (65% TK vs. 6 No TK). The average tourniquet time was 70 minutes (range 5 - 210 minutes). There was no statistically significant difference in secondary amputation rate (4(6.0%) TK vs. 6(6.1%) No TK); mortality with (3 (4.4%) TK vs. 4 (4.1%) No TK). Analysis of the injuries in the 7 patients who died ruled that 4 of these deaths were potentially preventable with adequate tourniquet placement.

Conclusions: Pre-hospital tourniquet use was associated with improved hemorrhage control. Though this data set does not show an improvement in survival, it is biased towards those patients who lived to reach the combat support hospital. No adverse outcomes (secondary amputations or neurologic deficits) related to tourniquet use were noted. Full analysis of those casualties who died in compressible extremity hemorrhage is expected to show that pre-hospital tourniquet use offers a survival benefit.

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NOTES
E USAGE AND AVAILABILITY OF BLOOD PRODUCTS IN MULTIPLE CASUALTY INCIDENTS: THE EXPERIENCE OF A LEVEL 1 TRAUMA CENTER IN ISRAEL.

Soffer MD, J.Klausner MD, D. Bar-Zohar MD, O.Szold MD, C.I. Schulman MD, MSPH, Laperman MD, A.Shimonov RN, M.Hareveni PhD, O.Ben-Tal MD.

Yitzhak Rabin Trauma Center, Tel-Aviv Sourasky Medical Center, Sackler Scool of Medicine, University of Tel-Aviv, Israel.

Senter: Dror Soffer M.D. Senior Sponsor: David V. Shatz, M.D.

Background: The issue of blood products utilization and blood bank preparedness in the setting of multiple casualty incidents (MCI) has not been elucidated yet, and thus guidelines regarding these aspects of MCI management are not established. Since blood transfusions are common in trauma settings it is only logical to assume that multiple casualty incidents will be associated with an exponential rise demand for transfusions, which will pose a greater burden on the blood banking abilities. Therefore, the objectives of the current study were to describe the pattern of blood products administration during MCI, trying to determine whether a special preparedness is needed at a level I Trauma Center blood bank in the setting of such events.

Methods: A retrospective study evaluating data from all relevant information regarding 19 consecutive terrorist attacks that took place in the city of Tel-Aviv between January 1997 and January 2005. Data was retrieved from chart review and from the Blood bank and emergency department’s computerized MCI registry programs.

Results: 320 packed red blood cell (PRBC) units were transfused altogether, with an average of 8±34.7 units per incident. Half of the PRBCs supplied in all MCIs were administered in the setting of massive transfusion (>10XPRBC) to 5.7% of the patients. In total, 230 blood samples were sent for type and cross match. The ratios of transfused PRBC units per evacuated and admitted patients - packed cell per patient index (PPI) - were 0.55±0.96 and 1.0±1.5, respectively. The PPI was significantly when there were over 25 evacuated victims (p=0.030). The most frequent blood group transfused was O+ (40% of all transfused PRBCs) with an average of 6.7±12.8 units per incident, followed by type A+ and O-. Neither AB- nor A- units were transfused. The average number of non-typed and non-screened units of blood transfused was 4.56 ± 12.8 (range0-50) units per incident. Half (51%) of the blood units were supplied during the first two hours post admission.

Conclusions: Blood bank operations must be coordinated with the other medical teams dealing with MCI. Timely information flow to the blood bank regarding the incidents relevant data and application of PPI might help in the initial estimation of the need for blood products.
ESH FROZEN PLASMA SHOULD BE GIVEN EARLIER TO PATIENTS WHO QUOTE MASSIVE TRANSFUSION

Gonzalez, F, Moore, J, Holcomb, C, Miller, R, Kozar, S, Todd, C, Cocanour, B, McKinley University of Texas Health Science Center at Houston, Houston, TX

Presenter: Ernest A. Gonzalez, M.D. Senior Sponsor: Frederick A. Moore, M.D

Our massive transfusion (MT) protocol directs 6 units (U) of packed red blood cells (PRBC) be
en before fresh frozen plasma (FFP). Thereafter, FFP is to be given at a ratio of 1U FFP:1 U BC. Hirshberg et al (J Trauma 2003) challenged this traditional approach of initially withholding FFP and concluded that FFP should be given concurrently with the 1st U of PRBC when the surgeon
cipates severe hemorrhage. To ascertain whether our standard of care MT protocol should be
anged, we retrospectively reviewed prospectively collected data from shock resuscitation patients. A
was compared using a one-way ANOVA to detect change with time and was expressed as an
SEM (P < 0.05 significance). Over 51 months, 91 torso trauma patients (brain injured
undergoing operative interventions received a MT (≥ 10 U PRBC in 24 hrs). 61% were le,
73% blunt trauma, ISS was 29 ± 1 and initial base deficit (BD) was 10 ± 1 mEq/L. All
erwent emergent hemorrhage control interventions and pre ICU resuscitation (Lactated Ringer 9
L, FFP 5 ± 0.4 U, PRBC 11 ± 1 U). Resuscitation variables and cumulative (cum) volumes pre
and during ICU resuscitation were:

<table>
<thead>
<tr>
<th>Variables</th>
<th>ICU admit</th>
<th>4hr ICU</th>
<th>8hr ICU</th>
<th>12hr ICU</th>
</tr>
</thead>
<tbody>
<tr>
<td>T (°C)</td>
<td>35.4 ± 0.1 a</td>
<td>37.0 ± 0.1 b</td>
<td>37.5 ± 0.1 c</td>
<td>37.3 ± 0.1 c</td>
</tr>
<tr>
<td>BD (mEq/L)</td>
<td>6.6 ± 0.5 a</td>
<td>4.8 ± 0.5 b</td>
<td>2.7 ± 0.5 c</td>
<td>2.4 ± 0.5 c</td>
</tr>
<tr>
<td>pH</td>
<td>7.29 ± 0.01 a</td>
<td>7.31 ± 0.01 a</td>
<td>7.35 ± 0.01 b</td>
<td>7.35 ± 0.01 b</td>
</tr>
<tr>
<td>INR</td>
<td>1.58 ± 0.02 a</td>
<td>1.45 ± 0.02 a</td>
<td>1.38 ± 0.02 a</td>
<td>1.36 ± 0.01 a</td>
</tr>
<tr>
<td>PTT (sec)</td>
<td>59.9 ± 2.9 a</td>
<td>44.3 ± 2.7 b</td>
<td>39.2 ± 2.8 b</td>
<td>37.5 ± 2.8 b</td>
</tr>
<tr>
<td>Plt count (kcell/mm³)</td>
<td>94.6 ± 7.1 a</td>
<td>90.8 ± 6.5 a</td>
<td>103.9 ± 6.5 a</td>
<td>92.3 ± 6.9 a</td>
</tr>
<tr>
<td>Fibrinogen (mg/dl)</td>
<td>146.6 ± 10.0 a</td>
<td>193.4 ± 9.2 a</td>
<td>234.3 ± 9.5 a</td>
<td>260.2 ± 9.9 a</td>
</tr>
<tr>
<td>LR (cum L)</td>
<td>9 ± 1</td>
<td>12 ± 1</td>
<td>14 ± 1</td>
<td>16 ± 1</td>
</tr>
<tr>
<td>PRBC (cum U)</td>
<td>11 ± 1</td>
<td>15 ± 1</td>
<td>16 ± 1</td>
<td>17 ± 1</td>
</tr>
<tr>
<td>FFP (cum U)</td>
<td>5 ± 0.4</td>
<td>6 ± 1</td>
<td>8 ± 1</td>
<td>11 ± 1</td>
</tr>
</tbody>
</table>

Means with different letters are significantly different (P < 0.05)

Upon ICU arrival, INR was notably elevated. Consistent with our MT protocol, FFP had been
held until after 6U PRBC and MT patients received a 1U FFP:2U PRBC ratio. MT patients are mildly hypothermic and acidicotic. However, these factors corrected quickly with ICU
cuscitation. In contrast, initial INR of our MT patients were elevated and were not corrected by
standard protocol. As a result, MT patients required ongoing PRBC transfusions (6 ± 1 U over
12 ICU hr). Based on our data, recent literature, and expert opinion, we have changed our MT
ocol to direct an immediate early transfusion ratio of 1 U FFP:1 U PRBC.
AUMA CARE IN THE JUNGLES OF ECUADOR: WHERE THERE IS NO ATLS


Virginia Commonwealth University Medical Center, Richmond, VA

Center: Sharline Aboutanos, MD

Senior Sponsor: Michael Aboutanos, MD, MPH

Background: The Advanced Trauma Life Support (ATLS) course is not available or affordable to areas in low income countries. A trauma continuing education course was created to educate physicians in rural hospitals in the jungles of Ecuador.

Methods: A basic trauma care course was designed based on local resources and location of injury: emergency health posts in the jungle (RHP), rural hospitals (RH) and definitive referral centers (CR). Course effectiveness was evaluated by comparison of pre- and post-course test scores. A multiple choice questionnaire (MCQ) was given. Comparison to previous test scores was also formed. Paired student t-test was used for statistical analysis. An objective structured clinical examination (OSCE), based on the course design, was administered.

Results: Twenty-six rural physicians participated in the course. Mean test scores significantly moved from pretest to posttest (72% to 79%, p=0.032). Knowledge deficiencies in prehospital care, extremity injury care, and patient evaluation adjuncts improved from 23% to 87%, 23% to 31% and 31% to 100%, respectively. Post-course test results showed improvements in all major categories tested. Twelve of the 26 participants were repeat test-takers from a course provided 2 years prior. These participants showed improved pretest scores compared to their highest previous score (76.8% vs. 68.5%, p = 0.0496). Compared to first time test takers, these participants had improved pretest (68.4% vs. 76.8%) and post-test (76% vs. 81%) scores. Twenty-five of the physicians participated in the OSCE with a pass rate of 77%. OSCE identified various strengths and deficiencies based on patient location and available resources. In RHP, management was adequate for hemorrhage control (65%), immobilization (77%), and early transfer to RH (92%). Hospital communication was inadequate (53%). RH management was adequate for primary evaluation (60%) and resuscitation (74%) but poor in secondary patient evaluation (53%), adjuncts (%), and transfer to DRC (11%). OSCE scores differed from MCQ test results.

Discussion: Where there is no ATLS, a tailored trauma course and evaluation can be effective in training local providers. A well designed competency evaluation (MCQ and OSCE) is helpful in identifying deficient local aspects of trauma care. This course design and evaluation methods can be a model for continuing trauma care education in developing countries.
DB OUTCOMES EXPOSE AIS SEVERITY SCORE INCONSISTENCIES

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Presenter: R. Lawrence Reed, II, M.D. Senior Sponsor: R. Lawrence Reed, II, M.D.

Introduction: Trauma outcomes are commonly classified according to the Injury Severity Score (ISS), which is derived from the severity score of the Abbreviated Injury Scale (AIS), ranging from 0 to 6. For the ISS to be a precise injury grading scheme, different injuries with similar severity scores should portend identical mortalities. We sought to determine whether the actual mortality rate observed in the National Trauma Data Bank® (NTDB) were equivalent for patients with different AIS codes (describing the nature of the injury) but with similar AIS severity scores.

Methods: The NTDB database (version 4.0) was imported into SQL Server as a relational set of tables. Distinct trauma episodes were linked between tables using a key field (INC_KEY). Queries were constructed to extract the tallies from the database using Structured Query Language (SQL). Patients with isolated injuries were evaluated for their AIS Code, AIS Severity Score, and outcome.

Results: The NTDB contains a total of 1,130,093 trauma incidents. There are 276,784 patients with a single AIS Code ordered. The mortality rates of patients with isolated injuries correlated positively with their AIS Severity Score (p < 0.0001). Never, there is a wide range of mortality rates among AIS Codes at each severity score. Absolute rates (i.e., from 0% to 1%) exist for the mortality rates of every AIS Severity Score except AIS=2.

Conclusion: AIS Severity scores were established arbitrarily. The recent availability of NTDB data demonstrate great parity with respect to mortality for identical AIS scores. Data-driven recalibration of AIS Severity Score should provide greater precision of mortality risk assessment.
CHYCARDIA: IS IT TRULY A VITAL SIGN?

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Sponsor: Karen Brasel, MD
Senior Sponsor: Ram Nirula, MD

Background: Tachycardia has been utilized as a physical sign of hypovolemic shock among the elderly for decades without evidence to support the use of tachycardia as a predictor of injury or significant hypovolemia. Several studies show tachycardia is absent among penetrating trauma patients. We sought to determine if admission heart rate is a valid predictor of hemodynamically significant injuries.

Methods: Level one trauma registry data from 1998 to 2004 was analyzed with logistic regression to determine if heart rate was associated with need for emergent intervention for bleeding (cardiotomy, thoracotomy or angiography), need for pRBCs in the first 24 hrs, or severe injury S>25) in blunt or penetrating trauma.

Results: A total of 11,017 patients were analyzed. Heart rate was neither sensitive nor specific in determining the need for emergent intervention, pRBCs in the first 24 hours or severe injury. This is not altered by the presence of hypotension.

Heart rate as test of emergent intervention

Blunt Injury

Heart rate as test of pRBCs<24hrs

Blunt Injury

Heart rate as test of emergent intervention

Penetrating Injury

Heart rate as test of pRBCs < 24hrs

Penetrating Injury

Area under ROC curve = 0.61

Area under ROC curve = 0.62

Area under ROC curve = 0.58

Area under ROC curve = 0.65

Conclusions: Heart rate is not a useful physical finding in determining the need for emergency services for hemorrhage. Clinicians should not feel at ease if patients are not tachycardic nor should they feel that tachycardia necessitates emergent interventions.
OBESITY INCREASES THE RISK OF POSTINJURY ORGAN DYSFUNCTION BUT NOT DEATH IN HIGH RISK TRAUMA PATIENTS

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Presenter: David J Ciesla, MD Senior Sponsor: David J Ciesla, MD

Background: The incidence of obesity and morbid obesity has increased dramatically in the recent years. Previous reports have demonstrated an association between obesity and increased risk of postinjury death. However, the relationship between obesity and postinjury organ dysfunction is not well defined. We hypothesized that obesity is associated with postinjury organ dysfunction and an increased risk of multiple organ failure.

Methods: Data were prospectively collected severely injured patients admitted to the ICU within 4 hours of injury over six years. Deaths within 48 hours and isolated head injuries were excluded. ARDS was defined using the American-European consensus definition. Organ dysfunction was defined using the Denver MOF scale. Univariate and multivariate analyses were performed using linear or logistic regression where appropriate, <.05 was significant.

Results: Data was collected on 716 patients the mean±SD age and ISS were 39±17 and 31±11 respectively, blunt mechanism was observed in 572 (80%) patients and 57 (8%) died. Heart, lung, kidney and liver dysfunction were observed in 208 (29%), 573 (80%), 74 (10%), and 193 (27%) patients respectively. ARDS and MOF were observed in 24 (31%) and 179 (25%) of patients respectively. The incidence of MOF was significantly higher in patients with BMI = 25-40 compared to patients with BMI ≤ 25 (figure). BMI > 25 was independently associated with an increased risk of lung heart, liver and renal dysfunction and the number of organs with dysfunction after adjusting for age, ISS and blood transfuse during resuscitation. BMI > 30 was independently associated with an increase risk of acute lung injury, ARDS and MOF but not death after adjusting for age, ISS and blood transfusion during resuscitation.

Conclusion: Obesity is a significant risk factor for the development of postinjury organ dysfunction and multiple organ failure. In this high risk population, obese patients are not at increased risk of death compared to normal patients.
DAYS VERSUS SIX WEEKS OF SYSTEMIC ANTIBIOTICS IN THE TREATMENT
ADULT OSTEOMYELITIS

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Sponsor: George Cierny III, MD
Senior Sponsor: George Cierny III, MD

The study was designed to test the hypothesis that six weeks of parenteral antibiotics are required in sufficient treatment of chronic osteomyelitis.

From 1981 to 1994, 914 adult patients with osteomyelitis sequentially entered our prospective treatment protocols. The surgical team, Clinical Staging System, surgical algorithms, antibiotic action and follow up remained constant throughout the study. Two year outcomes were recorded for all groups.

Following thorough debridement, three antibiotic regimens were implemented.

OUP I (1981-1986): 269 patients received six consecutive weeks of parenteral antibiotics.

OUP II (1986-1991): 361 patients received one to six weeks of parenteral antibiotics based on clinical Stage of their disease and reconstruction criteria.

OUP III (1991-1994): 284 patients received one to two weeks of either parenteral or enteral/oral coverage based only on the physiologic classification of the host.

Results: The distribution of clinical stages, anatomic sites, patient gender, pathogens and deadspace management options remained constant throughout the study. There were no statistical differences in success rates for the three groups: 93%, 94% and 97%, respectively. Complications decreased with time due to the refinement of our treatment strategies.

Conclusions: When an osteomyelitis treatment protocol creates wounds that are live, clean and manageable, six-weeks of parenteral antibiotics are not necessary to maximize outcomes. In this setting, short term coverage is both safe and cost-effective.
ARGinine Infusion Improves Survival Without Generating iNOS in VINE Subjected to Sequential Shock and Abdominal Compartment Syndrome

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Presenter: Hideaki Yoshihara, MD Senior Sponsor: Ajai K Malhotra, MD

Objectives: The current study evaluates the effect of L-Arginine infusion on 1) survival and 2) aortic inducible Nitric Oxide Synthase (iNOS) activity, in our clinically relevant large animal — model of sequential hemorrhagic shock-resuscitation and abdominal compartment syndrome (CS).

Methods: On day1 anesthetized and ventilated swine were randomized to experimental (Exp) — L-Arginine (500mg/Kg IV) — or control (Con) groups. After splenectomy animals were bled (35% of body volume) over 80min. and resuscitated (lactated Ringer’s 4X shed blood) over 120min. ACS was created by intra-peritoneal saline to raise intra-abdominal pressure to 25mmHg for 80 min. Animals were observed for 120min., then replaced in cage. Survivors were euthanized on day2. Modynamics, perfusion indices and 24-hour survival were recorded. 6 Tru-cut liver biopsies (5 on day1, and 1 on day2) were analyzed for presence of iNOS activity (presence of nitrotyrosine — foot of iNOS activity) by immuno-blotting.

Results: Of 19 animals utilized, 1 died during preparation and 18 were randomized (Exp-7: Con-11) modynamic parameters (filling pressures, cardiac output, systemic and pulmonary pressures) and fusion indices (lactate, base excess (Fig. I), gastric mucosal pH) were similar in the 2 groups. 5/7 Exp and 2/11 (18%) Con animals survived (p<0.05 — Fig. II). There was no difference in nitrotyrosine protein detected between the groups in any of the liver samples (Fig. III).

Conclusions: In our clinically relevant large animal — swine — model of sequential hemorrhagic shock-resuscitation and ACS, L-Arginine infusion improved survival, without adversely affecting modynamics. This survival benefit seems to be unrelated to iNOS activity, and maybe due to reNO generated NO. The exact mechanism for the observed survival benefit however, should be elucidated with further experiments.
ORES OF WRATH: A CASE OF DISSEMINATED MUCORMYCOSIS POST-TRAUMA

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senter: Amritha Raghunathan BS Senior Sponsor: Susan I. Brundage, MD

ground: Post-traumatic invasive fungal infections are obscure and predominantly fatal. We ort survival after post-traumatic disseminated pulmonary and intra-abdominal mucormycosis.
g Report: A 38 year-old man was brought to the emergency department after being ejected ing a high-speed, head-on collision between his 18-wheeler and an oncoming truck. Evaluation ealed hypotension despite resuscitation, bilateral hemothoraces drained by chest tubes, equivocal ST and negative diagnostic peritoneal aspiration. Secondary to multiple pelvic fractures, bilatera nogastric arteries were embolized. Abdominal compartment syndrome developed, leading to ompressive laparotomy and repair of a gastric perforation. Respiratory cultures done due to emittent fevers showed Aspergillus and Mucor on hospital days (HD) 3 & 4. In this nocompetent patient without leukocytosis, the results were attributed to contamination and ifungal agents were not initiated. After two further abdominal washouts, the abdomen was closed HD 7. Bronchoalveolar lavage on HD 8 confirmed mucor and amphotericin B was started. Chest revealed fungal disease with multiple pulmonary nodules. Secondary to increased leukocytosis and incisional erythema on HD 9, the abdomen was re- ored with findings of angioinvasion and necrosis of the mesentery representing intra-abdominal or. On HD 13, sepsis ensued with end-organ dysfunction including ARDS, renal failure, and a rubin of 37. Pressors, CVVH, dialysis and activated protein C were initiated. Itraconazole was ed as a second anti-fungal, and discontinued when the patient was stable, the abdominal lesions roved, and repeat chest CT scan showed no fungal infection. Repeat washout revealed an mingly indurated and erythematous appendix. After resection, pathology showed a normal lumen soft tissue necrosis. Itraconazole was restarted on the basis of subsequent laparotomies showed alating invasive fungal infection in the mesentery of the sigmoid colon. Amphotericin B washes reutilized. With combination therapy, the appearance of the bowel and mesentery substantially roved. After 33 days of amphotericin B, 12 days of itraconazole, and 11 laparotomies, the patie discharged home with no end organ sequelae.
clusion: Mucormycosis is traditionally associated with severe immunocompromise. However, V, hepatitis and diabetes tests were negative in this patient. While hospital contamination was isidered, infection control found no source. The patient had multiple risk factors for community-ired mucormycosis including intubation in an agricultural setting and occupational contact with ting vegetables. Aggressive therapy with multiple antifungal agents was likely the key to his vival. Combination treatment with amphotericin and itraconazole was crucial. Further surgical ridement of the abdomen was considered, however, the patient responded to antifungal drugs. trauma and critical care continues to evolve and increasing numbers of patients in extremis vive, surgeons can expect a greater incidence of complex fungal infections. Early diagnosis and gressive combination treatment based on anatomic evidence of disease and good clinical judgment essential to achieve optimal outcomes.
GHT UPPER QUADRANT EXENTERATION FOR CRUSH INJURY: A CASE REPORT

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Presenter: Casey J. Thomas, D.O.  Senior Sponsor: Thomas M. Scalea, M.D.

J was a 23 year-old Hispanic male who was struck in the upper abdomen and chest with a 4000-pound ‘wrecking-ball’ while working at a construction site. He was initially stable with a Glasgow Scale of 14 then his mental status quickly deteriorated and he required intubation.

He demonstrated a grade-5 liver laceration, a grade-3 splenic laceration, a laceration of the uncinate process of the pancreas, and a duodenal injury as well as large hemoperitoneum and retroperitoneal fatoma. He was resuscitated with blood products, placed on veno-venous bypass and taken to angiography for preoperative embolization. Visceral angiography showed a large filling defect in the liver parenchyma, but no active hemorrhage from the arterial system.

Exploratory laparotomy revealed the liver laceration was actually a grade-6 injury with complete avulsion of the left lobe of the liver and near complete avulsion of the right lobe from the hepatic vena cava and portal vein. A total hepatectomy via a thoracoabdominal approach with vascular isolation on veno-venous bypass was performed. The vena cava was reconstructed using a 20mm synthetic graft and an end to side portacaval shunt was created. The patient underwent an duodenectomy for a full thickness duodenal injury of portions 1, 2, and 3 as well as a concomitant pancreatic transection. A subtotal gastrectomy was also done secondary to major vascularization of the stomach. Total estimated blood loss was 22 liters with replacement of 24 units of blood, 27 units of fresh frozen plasma, 4 liters of cell saver blood, 5 packs of platelets and 30 cc’s of crystalloid.

The patient was supported on hepatic dialysis using a 25% albumin dialysate. Multiple staged operations were performed to control bleeding and reconnect the patient’s gastrointestinal tract. Approximately 72 hours later the patient underwent orthotopic liver transplant.

He survived one week post liver transplant. On his 7th post-operative day he was noted to have ateral fixed and dilated pupils. The patient was sent for a cerebral perfusion scan. He was found to have no cerebral blood flow and was pronounced dead on hospital day 10.

This case represents surgery at the extreme. Even in the face of severe poly-trauma, total hepatectomy with liver transplant can be performed successfully. The outcome of this case may have been aided by earlier donor availability. Liver procurement and transplant is a viable option for patients with hepatic injuries that are beyond repair.
TOTALIDAE BITE TO THE FACE (WHY YOU DON'T LET THE SNAKE KISS FIRST)

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University of Texas Medical School At Houston, Houston TX

Presenter: Michelle K. McNutt, M.D.  Senior Sponsor: Christine S. Cocanour, M.D.

Introduction: Approximately 8,000 cases of venomous snakebites are reported annually in the US resulting in 10-15 deaths. The rare fatalities from rattlesnake envenomation are believed to result from direct intravascular envenomation, anaphylaxis, or bites to the head and neck causing airway compromise. This case illustrates two unique aspects of rattlesnake bites. First, local tissue reaction associated with a snake bite to the face can cause rapid airway compromise. Second, it illustrates the refractory nature of coagulopathy following envenomation.

Case Report: An intoxicated 50 year old Caucasian male sustained a rattlesnake bite to his upper arm after attempting to "kiss the snake good-bye". He was treated at a community hospital with 6 vials of Crotalidae polyvalent immune Fab (ovine) (CroFab) and urgently intubated secondary to significant facial edema and airway compromise. On arrival to our facility, his physical exam revealed significant facial edema, bloody oropharyngeal secretions and a 3 cm necrotic appearing ulcer on the upper lip with two puncture sites lateral to the philtrum. He had a severe coagulopathy with prothrombin time > 100 s (PT), partial thromboplastin time > 150 s (PTT), fibrin split products > 20, fibrinogen < 15, and platelets 257,000. He received 6 additional vials of CroFab, 12 units of FFP, 12 units of cryoprecipitate over the first 36 hours to correct his initial coagulopathy. The patient continued to clinically deteriorate. He required increased ventilatory support and had a deteriorating mental status. He received 6 more vials of CroFab. The patient had 2 more recurrences of coagulopathy that responded to FFP and vitamin K. As he clinically improved and had no signs of bleeding, he received no further blood products. By hospital day 16, his coagulation profile returned to normal. After 11 days of ventilatory support, 18 vials of CroFab, 16 days of hospitalization, and atment of multiple recurrent coagulopathies, the patient was discharged home. His lip wound continues to improve and has required no surgical intervention.

Discussion: Local effects and coagulopathic recurrences are well-documented events following venom administration. Management of recurrent coagulopathy is controversial. Our patient's coagulation profile remained abnormal for over 2 weeks following injury. We stopped giving FFP and cryoprecipitate when hemorrhage risk decreased.

Conclusion: Snake envenomation remains a serious physiological insult that requires close clinical and laboratory monitoring in an ICU setting. Early airway protection, circulatory support, venom therapy, and selective treatment of recurrent coagulopathy are the cornerstones of management.
APTIVE TIGER ATTACK: CASE REPORT AND REVIEW OF THE LITERATURE

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Presenter: Henry J. Schiller, M.D. Senior Sponsor: Mark D. Sawyer, M.D.

Summary: Tiger attacks may occur anywhere, due to an increasing number of these feral animals kept in licensed "private zoos" or as pets. This poses a public health risk and makes knowledge of the usual injuries and their treatment desirable.

Discussion: Case report of an attack on a Minnesota woman by a privately owned Siberian tiger.

38 year old woman was attacked by a 700 lb Siberian tiger owned by her boyfriend while cleaning the animal’s cage. She was first bitten on the neck and then suffered mauling of the lower extremities before the animal was controlled. Injuries included cervical laceration/crush injury with fracture, vertebral and external carotid artery occlusion, multiple lacerations, and a comminuted left tibia-fibula fracture with severe soft tissue loss. She underwent multiple surgical procedures, and required physical rehabilitation as well as psychiatric care and grief counseling for the emotional trauma she suffered when the animals were subsequently destroyed.

Discussion: While rare in the United States, large cat attacks continue to occur, and may involve captive animals. For patients surviving the initial attack, wound superinfection may result from a variety of bacteria including Pasteurella multocida, common staphylococci, streptococci, and gram-negative bacteria as well as less common microorganisms such as Pasteurella tularensis, Yersinia pestis, and Yersinia pestis. Rabies may also be transmitted. The details of our case, as I and as others where such animals are kept as performing animals or in illegal or unregulated private zoos highlights the fact that these animals remain fierce and dangerous predators with a high degree of unpredictability regardless of the degree of domestication assumed by the humans caring for them, even if the animals have been raised from infancy. Indeed, in our case and others, owners addicted by their "pets" vehemently argued that the animal did nothing wrong and that the attack was understood by others.

Summary: Large cats held in captivity maintain a degree of their feral nature regardless of how tame they may appear to be; patterns of injury follow the predator’s modus operandi in the wild. Severe complications are frequent, and may be caused by unusual organisms. Disabling injuries post traumatic stress syndrome are common in survivors, and rehabilitation and psychiatric care may be necessary for optimal recovery. As some still erroneously believe that such animals may be easily domesticated, consideration should be given to more stringent regulation.
EUMOTHORAX BY CATFISH

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Sponsor: Reanna C. Adams, M.D. Senior Sponsor: Gage Ochsner, M.D.

INTRODUCTION

Lacerations and puncture wounds to the hands and feet have been oft-reported as sequelae of handling catfish. To our knowledge, however, this is the only reported case of pneumothorax caused by assault with a catfish.

CASE REPORT

A twelve-year-old male was transferred to our Level One Trauma facility for management of a pneumothorax after an assault. He stated that he had been playing by a stream with an acquaintance, an unknown male threw a catfish at his back. He went home, complaining of some back pain increasing shortness of breath. He was taken to the Emergency Department by his mother, where xray was evaluated by the physician and thought to display evidence of a possible right pneumothorax. On review of the xray after transfer, it was confirmed to show an apical pneumothorax, stable in comparison with xray at our hospital. On examination, the patient was noted to be hemostatic, and there was evidence of a small puncture to the right flank at the level of T10. This was thought to be hemostatic, and the patient’s FAST examination was within normal limits with no abdominal fluid seen. Vital signs were stable, and the patient was asymptomatic at this point. Despite earlier complaints of flank pain with shortness of breath and the location of his wound evidence of intrathoracic penetration, a CT of the abdomen and pelvis extending through the thorax lung fields was conducted to rule out intraabdominal or retroperitoneal injury. This showed a moderate anterior right pneumothorax and small posterior pulmonary contusion without abdominal injury. These injuries were managed conservatively, and the patient was discharged approximately thirty-six hours after the initial injury with a resolving pneumothorax on serial chest x-rays.
BYLAWS OF THE
WESTERN TRAUMA ASSOCIATION

ARTICLE I
Name, Objectives, Organization, and Jurisdiction

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

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

2) Core value:
Continuing education by participation in a diverse, multi-disciplinary scientific program with the goal of improving the care of injured patients.

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

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

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

SECTION 5: Governing Board
The affairs of the Association shall be conducted by the Board of Directors.

ARTICLE II
Membership

SECTION 1: Membership Limitation
Membership shall be limited 125 active members. No single specialty shall comprise more than 4 of this total membership of 125.

SECTION 2: Membership and Qualifications
A. 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 apply for membership have credentials comparable to Board Certification. Active members shall be elected 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, and may chair any committee and be elected to any elected position within the organization.
Associate members include qualified members of other (non-M.D.) health care disciplines with a special interest or expertise in trauma. Approval of a majority of the Board of Director 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.

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.

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

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

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 consideration by the Program Committee. A prospective member must attend a meeting within three (3) years prior to the meeting in which he/she is voted on for membership.

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

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

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

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 current in the payment of dues and assessments.

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.

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

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

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

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

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

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

SECTION 1: Composition
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.

The President of the Association shall serve as Chairman of the Board of Directors. The Chair of the Multicenter Trials Committee, the Historian and the President of the Western 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.

At each annual meeting, two members of the Association in good standing named by the 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 to retain the then existing at-large Directors.

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
The annual meeting of the Board of Directors shall be held during and in the same general 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.

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

SECTION 3: Special Meetings
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. Notices 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 general membership of the Association.

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 notification of special meetings shall apply to conference calls.

SECTION 4: Quorum
Majority of the Board of Directors shall constitute a quorum. (No member of the Board may vote by proxy.)
SECTION 5: Powers
Subject only to the limitations of the provisions of the Colorado Nonprofit Corporation Act, all corporate 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.

Section 6: Ex-officio Members of Board of Directors.
The President of the Western Trauma Foundation for Education and Research, Chairman of the Program 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

SECTION 1: Registration Fees
Registration fees for annual meetings shall be paid and used to defray the cost of the functions of the annual 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 a written notice of the annual meeting.

SECTION 2: Dues
Dues of the Association shall be set by the Board of Directors. Each member shall pay dues to the Treasurer of the Association for each fiscal year, beginning with the first new fiscal year after election to membership. The Treasurer shall notify each member of his/her dues obligation during the first quarter 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 required of active members. Failure to pay dues for three (3) years shall be considered cause for termination of membership.

SECTION 3: Assessments
A two-thirds 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 for the promotion of scientific programs at the annual meetings, research papers, and other purposes designed to achieve the exchange of ideas and principles pertaining to the diagnosis and 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 all active and senior members at the last address on record with the Association, postage pre-paid.

SECTION 4: Waiver of Dues and Responsibilities
All requirements for retention of membership including payment of dues and attendance at meetings may be waived by a vote of the majority of the Board of Directors upon petition. Eligibility for such waivers 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 other reason upon the petitioner.

ARTICLE VI
Voting

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

SECTION 2: Majority
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.

**CTION 3: Manner of Voting**

Each member of the Association is entitled to vote in one of three following manners:

1. **In person.**

   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, marked and received on or before the date of the meeting of the membership where the vote is 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.

2. **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 absent members.

**CTION 4: Amendments**

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

**CTION 5: Elections**

Elections and all other matters raised to a vote of the membership cannot be held unless a quorum is present and shall be by majority vote.

**ARTICLE VII**

**Officers**

**CTION 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.

**CTION 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 are 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 term, resignation or inability to perform the duties subsequently described in Article VIII, Section 6. An officer cannot complete his/her term, his/her successor shall be chosen by the Board of Directors at a special meeting to fill the vacancy for the unexpired term of the office. No officer shall serve more than one term. An 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.
SECTION 4: Resignation
Any officer may resign at any time by giving written notice to the Board of Directors and receiving their approval.

ARTICLE VIII
Duties and Authority of Officers

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

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

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

SECTION 4: Secretary
The secretary shall:
1) Keep the minutes of all meetings of the association and the Board of Directors.
2) 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 violations of the bylaws.
3) Maintain the Membership database, with the help of the Treasurer.
4) Record the reports from the other officers and committees and any bylaw changes.
5) Maintain copies of all corporate documents, including contracts, except for those that specifically relate to financial matters.
6) Prepare a report for the membership at the annual business meeting and for the Board of Directors at each of their annual meetings.

SECTION 5: Treasurer
The treasurer shall:
1) Keep the books of account of the Association.
2) Have custody of, and be responsible for all funds, securities, financial documents, and 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.
3) Assist the Secretary in keeping the roster of the membership that is current and accurate.
4) 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 shall 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.
5) Manage all accounts receivable and payable, including such expenses as may be incurred in the name of the Association.
6) Send to all active and associate members a statement of dues in the first quarter of the year, and make all necessary efforts to collect those dues.
7) Serve on the Website Committee and prepare the website annually for the meeting registration process.
Prepare registration packets, including name badges, and other items, for all those attending the annual meeting. Organize, with assistance from the other Officers and Board Members, the registration process at the annual meeting.

SECTION 6. Historian
The Historian should maintain and safeguard the archives of the Association. The Historian shall be an ex-officio member of the Board of Directors. In the 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 for 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, invited 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 meeting. In 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 shall be arranged 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, Orthopedic Surgery, and another 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 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 Orthopedic Surgeon, another specialist (if available), and many other members as the Program Chairman and President deem necessary to a total of不超过10 members. The Chair and the President will appoint the committee members. The President shall inform the Chairman of the Publications Committee to serve as ex-officio members. The Chairman shall 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 shall then present 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 Orthopedic Surgeon, one Plastic Surgeon and another specialist (if available) 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 those...
which 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 design by the President.

Section 5: Multicenter Trials Committee
The 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 for a term of five (5) years. The Chairman will report to the President and board of directors, and at the annual business meeting and serve as an ex-officio member of the Board of Directors.

Section 6: Website Committee
The Website Committee shall consist of a Chairman and four (4) members. The Vice President will 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 for a term of two (2) years. The Committee shall be responsible for development and maintenance of the Association’s Website.

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

ARTICLE X
Conduct and Order of Business

SECTION 1: Business Sessions of the Members
There shall be an annual business meeting of the members during the annual meeting. It shall be preceded by a meeting of the Board of Directors also held during the annual meeting of the Association.

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

ARTICLE XI
Indemnification

Section 1. Definitions. For purposes of this Article:

A. 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 or officer, partner, member, manager, trustee, employee, fiduciary or agent of another for profit or non-profit 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.

B. The term “proceeding” shall mean any threatened, pending, or completed action, suit, 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.
The term "party" includes an individual who is, was, or is threatened to be made a named defendant or respondent in a proceeding.

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

When used with respect to a director, the phrase "official capacity" shall mean the office of director 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 or agency relationship undertaken by the employee or agent on behalf of the Association, but in neither case shall include service for any foreign or domestic Association or for any other person.

Section 2 General Provisions.

The Association shall indemnify any person who is or was a party or is threatened to be made a party 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:

- acted in good faith;
- reasonably believed, in the case of conduct in an official capacity with the Association, that such conduct was in the best interests of the Association, and, in all other cases, that the conduct was not opposed to the best interests of the Association; and
- 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:

- 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
- in connection with any other proceeding charging improper personal benefit to the director or officer, whether or not involving action in that person's official capacity, in which the officer or director was 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 indemnification of any action, suit, or proceeding by judgment, order, settlement, or conviction or upon a plea of guilty made in connection with the defense of a 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.

The extent that a director or officer of the Association has been wholly successful on the merits in 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.

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 of the
director 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.

Section 5. Advance Payment of Expenses; Undertaking to Repay.
The Association may pay for or reimburse the reasonable expenses (including attorneys, fees) incurred by a director or officer who is a party to proceeding in advance of the final disposition or proceeding if:

(i) the director or officer furnishes the Association a written affirmation of the director 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, express or implied, 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 known to such body would not preclude indemnification.

Section 6. Reports to Members.
In the 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, report of that fact shall be made in writing to the member with or before the delivery of the notice of the next meeting of the members.

Section 7. Other Employees and Agents.
The 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 identifying by name or by position the employees or agents entitled to indemnification.

Section 8. Insurance.
The Board of Directors may exercise the Association’s power to purchase and maintain insurance (including without limitation insurance for legal expenses and costs incurred in connection with defending any claim, proceeding, or lawsuit) on behalf of any person who is or was a director, employee, fiduciary, agent or was serving as a director, officer, partner, member, trustee, employee, or fiduciary of another domestic or foreign corporation, nonprofit corporation against any liability asserted against the person or incurred by the person in any such capacity or arising out of the
son's status as such, whether or not the Association would have the power to indemnify that son against such liability under the provisions of this Article.

**Section 9. Nonexclusivity of Article.**

Indemnification provided by this Article shall not be deemed exclusive of any other rights and cures to which one indemnified may be entitled under the Articles of Incorporation, any bylaw, 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 as long as such person has ceased to be a director or officer, and shall inure to the benefit of such person's estate, executors, and administrators.

**Section 10. Notice to Voting Members of Indemnification.**

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 notice of the next voting members' meeting. If the notice of 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 signs the consent to such action.

**ARTICLE XII**

**Conflicts Of Interest, Loans And Private Inurement**

**Section 1. Conflicts of Interest.**

Any person who is a director or officer of the Association is aware that the Association may or is put to enter into any business transaction directly or indirectly with himself, any member of such 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:

- immediately inform those charged with approving the transaction on behalf of the association of such person's interest or position;
- aid the persons charged with making the decision by disclosing any material facts within such person's knowledge that bear on the advisability of such transaction from the standpoint of the association; and
- not be entitled to vote on the decision to enter into such transaction.

Voting on such transaction shall be conducted as follows:

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

The interested officer or director shall withdraw from the meeting.

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

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

**Section 2. Loans to Directors and Officers Prohibited.**
No loans shall be made by the Association to any of its directors or officers. Any director or officer who assents to or participates in the making of any such loan shall be liable to the Association the amount of such loan until it is repaid.

Section 3. No Private Inurement.
The Association is not organized for profit and is to be operated exclusively for the promotion of the welfare in accordance with the purposes stated in the Association’s articles of incorporation. The earnings of the Association shall be devoted exclusively to charitable and educational purposes; shall not inure to the benefit of any private individual. No director or person from whom the Association may receive any property or funds shall receive or shall be entitled to receive any pecuniary profit from the operation thereof, and no event shall any part of the funds or assets of the Association be paid as salary or compensation to, or distributed to, or inure to the benefit of any member of the board of directors; provided, however, that:

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

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

(c) the Association may, by resolution of the board of directors, make distributions to persons from whom the Association has received contributions previously made to support its activities in the extent such distributions represent no more than a return of all or a part of the contributor’s contributions.

ARTICLE XIII
Amendments

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

"The doctor made me do it."

Andrew Schneider
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