

*Robert
Fisher*

TWENTY-SIXTH ANNUAL MEETING



February 25th - March 2nd, 1996

Grand Targhee, Wyoming

Polach

WESTERN TRAUMA ASSOCIATION
PAST PRESIDENTS



President	Year	Location
Robert G. Volz, M.D.	1971	Vail
Robert G. Volz, M.D.	1972	Vail
Peter V. Teal, M.D.	1973	Vail
William R. Hamsa, M.D.	1974	Aspen
Arthur M. McGuire, M.D.	1975	Sun Valley
Lynn Ketchum, M.D.	1976	Snowmass
Fred C. Chang, M.D.	1977	Park City
Glen D. Nelson, M.D.	1978	Steamboat
Gerald D. Nelson, M.D.	1979	Snowmass
Kevin G. Ryan, M.D.	1980	Snowbird
David S. Bradford, M.D.	1981	Jackson Hole
Erick R. Ratzer, M.D.	1982	Vail
William R. Olsen, M.D.	1983	Jackson Hole
Earl G. Young, M.D.	1984	Steamboat
Robert B. Rutherford, M.D.	1985	Snowbird
Rudolph A. Klassen, M.D.	1986	Sun Valley
Robert J. Neviasser, M.D.	1987	Jackson Hole
Robert C. Edmondson, M.D.	1988	Steamboat
Ernest E. Moore, M.D.	1989	Snowbird
Stephen W. Carveth, M.D.	1990	Crested Butte
George E. Pierce, M.D.	1991	Jackson Hole
Peter Mucha, Jr., M.D.	1992	Steamboat
David V. Feliciano, M.D.	1993	Snowbird
R. Chris Wray, M.D.	1994	Crested Butte
David Kappel, M.D.	1995	Big Sky
Thomas H. Cogbill, M.D.	1996	Grand Targhee

****The 1997 WESTERN TRAUMA ASSOCIATION MEETING will be:

Snowbird
March 1-8, 1997

WESTERN TRAUMA ASSOCIATION
26th ANNUAL MEETING
Grand Targhee, WY
1995-1996



OFFICERS:

Thomas H. Cogbill, M.D.	President
G. Jerry Jurkovich, M.D.	President-elect
James Benjamin, M.D.	Vice President
Herbert J. Thomas, M.D.	Secretary
Barry C. Esrig, M.D.	Treasurer

BOARD OF DIRECTORS:

	TERM ENDS
Harvey J. Sugerman, M.D.	1996
Alexander S. Rosemurgy, M.D.	1996
Bruce G. Ferris, M.D.	1997
R. Lawrence Reed, II, M.D.	1997
Steven Shackford, M.D.	1998
Fred Moore, M.D.	1998

PROGRAM COMMITTEE:

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Barry C. Esrig, M.D.	
Jeffry A. Metheny, M.D.	
Frederick Moore, M.D.	
Jeffrey Landercasper, M.D.	
James A. Edney, M.D.	
M. Gage Ochsner, M.D.	
Bruce G. Ferris, M.D.	
Thomas H. Cogbill, M.D., ex-officio	

PUBLICATIONS COMMITTEE:

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Larry Gentilello, M.D.	
Lawrence Reed, M.D.	
Peggy Knudson, M.D.	
Thomas Helling, M.D.	
David W. Tuggle, M.D.	
Kenneth Cherry, M.D.	
Alexander S. Rosemurgy, M.D., ex officio	

NOMINATING COMMITTEE:

David Kappel, M.D.	Chairman
Dwight A. Webster, M.D.	
J. Scott Millikan, M.D.	
M. Gage Ochsner, M.D.	

**EARL YOUNG AWARD
RECIPIENTS**

Resident	University	Year
Joseph Schmocker, M.D.-----	University of Vermont-----	1991
Joseph Schmocker, M.D.-----	University of Vermont-----	1992
Charles Mock, M.D.-----	University of Washington-----	1993
Gino Travisani, M.D. -----	University of Vermont-----	1994
Phillip C. Ridings, M.D. -----	Medical College of Virginia-----	1995

WESTERN TRAUMA ASSOCIATION
Schedule of Events

Sunday, February 25, 1996

4:00 - 7:00 PM Registration
 Welcome Reception

Monday, February 26, 1996

7:00 - 9:00 AM Scientific Paper Session I
11:30- 1:00 PM BBQ at Base of Mountain
1:00 - 3:00 PM NASTAR Race
4:00 - 6:00 PM Scientific Paper Session II
6:00 - 8:00 PM WTA Board Meeting
8:00 - 9:30 PM Movie night

Tuesday, February 27, 1996

7:00 - 9:00 AM Scientific Paper Session III
4:00 - 5:00 PM Scientific Paper Session IV
5:00 - 6:00 PM Members Business Meeting
8:00 - 9:30 PM Water Volleyball Games
 or
2:30 - 4:00 PM

Wednesday, February 28, 1996

7:00 - 9:00 AM Scientific Paper Session V
1:00 - 3:00 PM Cross Country 5km Ski Race
4:00 - 6:00 PM Scientific Paper Session VI
6:00 - 8:00 PM Cocktails & Awards

Thursday, February 29, 1996

7:00 - 9:00 AM Scientific Paper Session VII
9:30 AM Buses depart for Jackson Hole
9:30 AM Buses depart for Yellowstone
8:00 PM Casino Night

Friday, March 1, 1996

7:00 - 9:00 AM Scientific Paper Session VIII
11:30 - 1:00 PM BBQ at Base of Mountain
4:00 - 5:30 PM Scientific Paper Session IX

MONDAY A.M., February 26, 1996

MODERATOR: Thomas H. Cogbill, M.D.

- 7:00 A.M. *“Long-term Functional Status and Mortality of Elderly Patients with Severe Closed Head Injuries”*
Authors: S. Kilaru, M.D., K.F. Lee, M.D.*, J. Garb, MS, V. Fiallo, M.D., B. Simon, M.D., Timothy Emhoff, M.D.**
Presenter: S. Kilaru, M.D.
Baystate Medical Center
**Earl Young Resident Competition
- 7:20 A.M. *“Diaspirin Cross-Linked Hemoglobin (DCLHb) Improves Perfusion Following Head Injury & Shock”*
Authors: J. Chappell, M.D., S. Shackford, M.D., W. McBride, M.D.**
Presenter: J. Chappell, M.D.
University of Vermont, Dept of Surgery
**Earl Young Resident Competition
- 7:40 A.M. *Effectiveness of Two Specialty, Two Tiered Trauma Team Activation Protocol”*
Authors: Brian Plaisier, M.D., Anita Barnoski, R.N.,
Charlene Mancuso, R.N., David Soria, M.D., William Fallon, Jr., M.D.
Presenter: Brian R. Plaisier, M.D.
MetroHealth Medical Center, Cleveland
- 8:00 A.M. *“Associated Head Injury Should Not Impact Nonoperative Management of Spleen and/or Liver Injury in Children”*
Authors: M.S. Keller, M.D., K.H. Sartorelli, M.D., D.W. Vane, M.D.**
Presenter: MS Keller, M.D.
University of Vermont, Division of Pediatric Surgery
**Earl Young Resident Competition
- 8:20 A.M. *“Violence Against Surgical Residents”*
Authors: A.G. Rizzo, M.D., C.B. Barlow, M.S.
Presenter: A.G. Rizzo, M.D.
Hill AF Base Hospital, Rice University, UT
- 8:40 A.M. Adjourn

MONDAY P.M., February 26, 1996

MODERATOR: Edmund J. Rutherford, M.D.

- 4:00 P.M. *"Iliac Vessel Injury: Operative Physiology Related to Outcome"*
Authors: J.G. Cushman, M.D., D.V. Feliciano, M.D., B.M. Renz, M.D.,
 J.D. Ansley, M.D., W.L. Ingram, M.D., J. Gagnon, M.D.,
 G.S. Rozycki, M.D.
Presenter: James G. Cushman, M.D.
Grady Memorial/Emory University
- 4:20 P.M. *"Routine Preoperative "One-Shot" Intravenous Pyelography is Not
Indicated in All Patients with Penetrating Abdominal Trauma"*
Authors: K.K. Nagy, M.D., F.D. Brenneman, M.D., J.J. Fildes, M.D.,
 R.R. Roberts, M.D., S.M. Krosner, M.D., K.T. Joseph, M.D.,
 R.F. Smith, M.D., J. Barrett, M.D.
Presenter: Kimberly K. Nagy, M.D.
Department of Trauma, Cook County Hospital
- 4:40 P.M. *"Prevention of Pulmonary Embolism After Pelvic Fracture: Rational Use
of Inferior Vena Caval Filters"*
Authors: K.F. O'Malley, M.D., S. Marberger, B.A., S.E. Ross, M.D.
Presenter: K.F. O'Malley, M.D.
Cooper Hospital/Univ Medical Center
- 5:00 P.M. *"Multiple Long Bone Fractures in the Patient with Single-System Trauma
Do Not Increase Intra-Hospital Morbidity"*
Authors: M.A. Reynolds, M.D., L.A. Omert, M.D., J.D. Kizer, M.D.,
 A. Chendrasekhar, M.D., G.A. Timberlake, M.D.
Presenter: M.A. Reynolds, M.D.
Section of Trauma, WV University
- 5:20 P.M. *"Rural Trauma Care: Role of the General Surgeon"*
Authors: M. Bintz, M.D., T.H. Cogbill, M.D.,
 J. Bacon, R.N.C., B.S.N., C.C.R.N.
Presenter: Marilu Bintz, M.D.
Gundersen-Farrell Clinic
- 5:40 P.M. Adjourn

TUESDAY A.M., February 27, 1996

MODERATOR: M. Gage Ochsner, M.D.

- 7:00 A.M. *"The CD11/18 Leukocyte Integrins: New Signaling Receptors for Bacterial Endotoxin"*
Authors: S.F. Flaherty, M.D., R.R. Ingalls, M.D., F.H. Milham, M.D.,
 D.T. Golenbock, M.D.**
Presenter: S.F. Flaherty, M.D.
City Hospital - Boston
**Earl Young Resident Competition
- 7:20 A.M. *"Splanchnic Ischemia and Bacterial Translocation in the Abdominal Compartment."*
Authors: L.N. Diebel, M.D., S.A. Dulchavsky, M.D., W.J. Brown, M.D.
Presenter: L.N. Diebel, M.D.
Wayne State University
- 7:40 A.M. *"Ultrasound Training During ATLS: An Early Start for Surgical Interns"*
Authors: D.C. Han, M.D., G.S. Rozycki, M.D., J.A. Schmidt, DNSc,
 D.V. Feliciano, M.D.**
Presenter: David C. Han, M.D.
Emory University School of Medicine
**Earl Young Resident Competition
- 8:00 A.M. *"The Use of Abdominal Ultrasonography as a Screening Examination for Hemoperitoneum in the Blunt Injured Pediatric Patient: A Preliminary Report"*
Authors: J. Rondina, M.D., M.G. Ochsner, M.D., F.E. Davis, M.D.,
 C.R. Boyd, M.D.**
Presenter: J. Rondina, M.D.
Memorial Medical Center, Savannah
**Earl Young Resident Competition
- 8:30 A.M. PANEL DISCUSSION: *"Ultrasound & Trauma"*
Moderator, M. Gage Ochsner, M.D.

TUESDAY P.M., February 27, 1996

MODERATOR: R. Chris Wray, M.D.

- 4:00 P.M. *“Admission Base Deficit Predicts Transfusion Requirements and Risk of Complications”*
Authors: J.W. Davis, M.D., S.N. Parks, M.D., K.L. Kaups, M.D.,
 H.G. Gladen, M.D., Sheila O’Donnell-Nicol, R.N.
Presenter: J.W. Davis, M.D.
Valley Medical Center, Fresno
- 4:20 P.M. *“Resuscitative Efforts in Traumatic Cardiac Arrest: Need for Re-Evaluation?”*
Authors: D.V. Shatz, M.D., O.C. Kirton, M.D., J.H. Davis, M.D.
Presenter: David V. Shatz, M.D.
University of Miami School of Medicine, Dept of Surgery
- 4:40 P.M. *“Outcome Analysis of Blunt Traumatic Thoracic Aortic Laceration (BTTAL): Identification of High Risk Cohort”*
Authors: P. Camp, M.D., S. Shackford, M.D., Western Trauma Association
 Multicenter Study Group.**
Presenter: P. Camp, M.D.
University of Vermont
**Earl Young Resident Competition
- 5:00 P.M. Business Meeting
to
6:00 P.M.

WEDNESDAY A.M., February 28, 1996

MODERATOR: David V. Feliciano, M.D.

- 7:00 A.M. *"Elevated P Selectin Following Severe Trauma - A Potential Target for Immunomodulatory Therapy"*
Authors: R.K. Simons, M.B., D.B. Hoyt, M.D., R.J. Winchell, M.D.,
 R.M. Rose, M.D.
Presenter: Richard K. Simons, M.B., F.R.C.S., F.A.C.S.
University of California, San Diego and Cytel Corporation (RMR)
- 7:20 A.M. *"Early Impaired Oxygen Consumption Due to Supply Independent Mitochondrial Dysfunction Occurs in Patients Who Develop MOF"*
Authors: F. Moore, J. Haenel, E. Moore, B. Gallea, J. Ortner, C. Cairns.
Presenter: F. Moore, M.D.
Denver General Hospital and University of Colorado
- 7:40 A.M. *"Volumetric Estimates of Preload in Trauma Patients; Addressing the Problem of Mathematical Coupling"*
Authors: M.C. Chang, M.D., C.S. Black, M.D., J. Wayne Meredith, M.D.
Presenter: M.C. Chang, M.D.
Wake Forest University, The Bowman Gray School of Medicine
- 8:00 A.M. *"Fluconazole Increases Bactericidal Activity of Neutrophils Without Activation of Cytokine Cascade"*
Authors: E. Zervos, M.D., M.C. Robson, M.D., A.S. Rosemurgy, M.D.
Presenter: Emmanuel Zervos, M.D.
University of South Florida, Tampa
- 8:20 A.M. *"Granulocyte-Macrophage Colony-Stimulating Factor (GM-CSF) Enhances Pulmonary Defenses Against Pneumococcal Infections After Splenectomy"*
Authors: J. Hebert, M.D., M. O'Reilly, M.D.
Presenter: J. Hebert, M.D.
University of Vermont
- 8:40 A.M. *"Role of Calcium in LPS-Stimulated TNF and IL-1 Signal Transduction in Naive and Endotoxin Tolerant Murine Macrophages"*
Authors: M.A. West, M.D., J. Bellingham, B.A., L. Clair, B.A.
Presenter: Michael A. West, M.D.
Hennepin County Medical Center, University of Minnesota

WEDNESDAY P.M., February 28, 1996

MODERATOR: Gregory Jurkovich, M.D.

4:00 P.M. *“Copperhead Snake Bites: A different entity than other pit viper
envenomation”*
Authors: Ronald E. Whitley, M.D.
Presenter: Ronald E. Whitley, M.D.
Chippenham Medical Center, Richmond, VA

4:20 P.M. **PANEL DISCUSSION: “Management of Complex Trauma”**
to **Moderator: Scott Peterson, M.D.**
5:20 P.M.

5:20 P.M. Presidential Address
to Thomas Cogbill, M.D.
6:00 P.M.

7:00 P.M. Dinner

THURSDAY A.M., February 29, 1996

MODERATOR: David A. Kappel, M.D.

- 7:00 A.M. *"An Evaluation of Violence Prevention for High Risk Early Adolescents"*
Authors: H.R. Champion, FRCS (Edin), P.S. Gainer, JD,
 H.S. Bashinski, PhD., D.S. Elliot, Ph.D.
Presenter: HR Champion, FRCS (Edin)
National Study Center for Trauma, Baltimore
- 7:20 A.M. *"Guns in Young Hands: A Survey of Urban Teenagers' Attitudes and Behaviors Related to Handgun Violence"*
Authors: J. Bergstein, M.D., D. Hemenway, Ph.D., S. Quaday, R. Ander
Presenter: J. Bergstein, M.D.
Medical College of Wisconsin, Harvard School of Public Health
- 7:40 A.M. *"The Incidence of Severity of Psychological Dysfunction in Moderately Injured Trauma Patients: A Potential Factor in Delayed Recovery"*
Authors: D. Condren, Ph.D., R.C. Mackersie, M.D., A. Boccellari, Ph.D.,
 B. Stegner, Ph.D., D. Morabito, MPH, H. Ochitill, M.D.
Presenter: D. Condren, M.D.
University of CA, San Francisco, San Francisco General Hospital
- 8:00 A.M. Larry Reed, Pharm. D. *"Pharmacokinetic Changes in ICU"*
to
8:45 A.M.
- 8:45 A.M. Questions
to
9:00 A.M.
- 9:00 A.M. Adjourn

THURSDAY P.M. - FREE

FRIDAY A.M., March 1, 1996

MODERATOR: Barry Esrig, M.D.

- 7:00 A.M. *"Small Bowel Injury in Children Sustaining Blunt Abdominal Trauma: Is Delayed Diagnosis Important?"*
Authors: D.D. Bensard, M.D., B.L. Beaver, M.D., G.E. Besner, M.D.,
 D.R. Cooney, M.D.
Presenter: DD Bensard, M.D.
Children's Hospital of Columbus, The Ohio State University
- 7:20 A.M. *"The Prognostic Significance of the Seat Belt Sign"*
Authors: M. Costa, M.D., L. Jones, M.D., Victor Landry, Ph.D.,
 H. Sherman, M.D., B. Latenser, M.D., R. Barrette, M.D.,
 J. Varcelotti, M.D., C. McAuley, M.D.**
Presenter: Marc L. Costa, M.D.
The Mercy Hospital of Pittsburgh
**Earl Young Resident Competition
- 7:40 A.M. *"Avoidable Pitfalls in the Diagnosis of Colon Injuries After Stab Wounds to the Back and Flank"*
Authors: E.M. Boyle, M.D., J.K. Kovicich, BA, J.D. Salazar, M.D.,
 F. Mann, M.D., A. Wilson, M.D., T.H. Pohlman, M.D.,
 R.V. Maier, M.D., G.J. Jurkovich, M.D.**
Presenter: EM Boyle, M.D.
Harborview Medical Center, University of Washington Department of Surgery
and Radiology
**Earl Young Resident Competition
- 8:00 A.M. *"Urgent Paralysis for Intubation by an Aeromedical Transport Team: A Critical Analysis"*
Authors: Michael Rotondo, M.D., David Zonies, Ronald Sing, DO, C.W.
 Schwab, M.D., *Steven Ross, M.D., *Colin Brathwaite, M.D.
Presenter: Michael Rotondo, M.D.
University of Pennsylvania Medical Center
- 8:20 A.M. *AB2 = "Evaluation of Diagnostic Peritoneal Lavage in Gunshot Wounds to the Abdomen"*
Authors: J. Kelemen, III, M.D., J.Obney, M.D., D. Jenkins, M.D.,
 D. Kissinger, M.D., R. Martin, M.D.**
Presenter: J. Kelemen, III, M.D.
Brooke Army Medical Center & Wilford Hall AF Medical Center, San Antonio
**Earl Young Resident Competition
- 9:00 A.M. Adjourn

FRIDAY P.M., March 1, 1996

MODERATOR: Harold Sherman, M.D.

4:00 P.M. *"Conservation of Hospital and Physician Resources: A Tiered Trauma Response"*

Authors: T. Helling, M.D., M. Watkins, R.N., L. Evans, M.D.,
P. Nelson, M.D., J. Shook, M.D., C. VanWay, III, M.D.

Presenter: T. Helling, M.D.

Department of Surgery, University of Missouri

4:20 P.M. *"Trauma Recidivism in the Elderly"*

Authors: K.D. Gubler, D.O., R. Davis, M.D., F. P. Rivara, M.D.,
T. Koepsell, M.D., R. V. Maier, M.D.

Presenter: K.D. Gubler, D.O.

Naval Medical Center San Diego and The University of Washington

4:40 P.M. *"Clinical Characterization of the Post-Traumatic Autonomic Hyperexcitability Syndrome (AHS)"*

Authors: D. Nayduch, M.S.N., A. Haas, M.A., R.L. Reed, II, M.D.

Presenter: Donna Nayduch, R.N. M.S.N.

Duke University Medical Center

5:00 P.M. *"Injuries to the Pathological Spleen: Is There a Role for Nonoperative Management?"*

Authors: H. Leon Pachter, M.D.*, Amber A. Guth, M.D.,
Glenn R. Jacobowitz, M.D.

Presenter: H. Leon Pachter, M.D.

New York University Medical Center/Bellevue Hospital

5:20 P.M. Adjourn

none - not related to location of brain injury
MS patch 2/24/96
to c m
bronchospasm
tone, dysphoria

- sent puppies
- new york minute
- faster than a bullet
- or higher and higher
- prepare someone

ABSTRACTS



LONG-TERM FUNCTIONAL STATUS AND MORTALITY OF ELDERLY PATIENTS WITH SEVERE CLOSED HEAD INJURIES

S. Kilaru, MD, K. F. Lee, MD*, J. Garb, MS, V. Fiallo, MD, B. Simon, MD, Timothy Emhoff, MD.
Baystate Medical Center

S. Kilaru, MD

H. Sugerman, MD (Richmond, VA)

Springfield, MA

Elderly patients (pts) with severe closed head injuries (CHI) generally have poor outcome. But anecdotal experiences with occasionally "saved" elderly pts compel aggressive, maximum intervention although there are surprisingly little data in the literature on their long-term outcomes. This study was conducted to assess the long-term functional status and mortality of elderly pts with severe CHI, in an attempt to determine any clinical predictor of eventual outcome.

In a 68-month, retrospective analysis of 6500 trauma pts between 1/1/90 and 8/31/95, we studied in-hospital & long-term mortalities and long-term functional status of all elderly pts (age >65 yrs.) with severe CHI. Using chi-square & Student's t-tests, and step-wise multiple logistic regression analysis (MLR), these outcome variables were tested against the independent clinical variables of age, sex, mechanism of injury, injury severity score (ISS), revised Trauma Score (RTS), alcohol or drug intake and arterial blood gas. Heart rate, blood pressure, pupillary reactivity, and Glasgow Coma Scale (GCS) score were recorded at admission and at 24 hour intervals for three days. Long-term functional status was represented by the Glasgow Outcome Scale (GOS) determined by medical chart review and confirmed by telephone interview.

Forty pts with GCS ≤ 8 were identified and evaluated with a follow-up period of 38 ± 17 months (mean \pm STD), ranging from 7 to 68 months. The in-hospital mortality was 68%, and overall long-term mortality was 73%. 85% of the initial survivors were still alive at the time of the study. In a univariate analysis, low GCS ($p < 0.001$) and fixed pupils ($p < 0.007$) correlated significantly with the in-hospital and long-term mortalities. Age, bradycardia, RTS and intubation approached but did not reach statistical significance ($0.05 < p < 0.12$). Overall mortalities among pts aged <75 yrs. vs. >75 yrs. were 60% and 90%, respectively. In step-wise MLR analyses, only the low GCS ($p < 0.0001$) and bradycardia ($p < 0.04$) surfaced as significant independent predictors of mortality. Long-term functional status (GOS) correlated significantly with GCS ($p < 0.001$) and fixed pupils (0.04). Age, RTS, and intubation approached but did not reach statistical significance ($0.05 < p < 0.10$). All pts with GCS 3 (N=17) died in-hospital. One of only two survivors of pts with GCS 4&5 (N=7) died two months after discharge; the other survivor lives in a vegetative state. Six of eleven pts with GCS 6 or 7 survived, but half live in a vegetative state, and the other half are in a functional but dependent state. Three out of four survivors of pts with GCS 8 (N=5) are functionally independent. Pts whose GCS improved in the first three days of injury tended to have better long-term functional outcome.

These data support the anecdotal impression that survival and long-term recovery are possible among elderly pts with severe CHI. However, long-term recovery to functional independence is unlikely. For patients with GCS <8, the likelihood was nil. Consideration of long-term, independent functional recovery is becoming increasingly important in the current healthcare environment of cost-reduction and "quality-of-life." More importantly, these data are crucial when advising distressed families who might value functional independence as a more desired outcome than survival alone.

NOTES

DIASPIRIN CROSS-LINKED HEMOGLOBIN (DCLHb)
 IMPROVES PERFUSION FOLLOWING HEAD INJURY & SHOCK
 J. Chappell MD, S. Shackford MD, W. McBride MD

University of Vermont, Burlington, VT

J. Chappell MD

S. Shackford, MD

Burlington, VT

Shock associated with traumatic brain injury (TBI) doubles the mortality of TBI alone by inducing a secondary ischemic injury. Rapid correction of cerebral perfusion pressure ([CPP] = mean arterial pressure [MAP] - intracranial pressure [ICP]) is important in improving outcome. DCLHb has been shown to improve cerebral blood flow (CBF), increase MAP and reduce lesion size in models of cerebral ischemia but has not been evaluated in a model of TBI combined with hemorrhagic shock (HS). We studied the effects of DCLHb resuscitation in a porcine model of cryogenic TBI and HS (MAP=50 torr). Following combined insults animals were randomized to receive a bolus of 4 cc/kg of either Ringer's lactate (RL, n=5) or DCLHb n=6). RL was then infused in both groups to maintain MAP at baseline. Shed blood was returned *after* the R1 study period. Animals were studied for 24 hours. After euthanasia brains were sectioned and lesion volume was measured as a percent of the hemisphere.

Variable	Group	BL	H45	R1	R24
CPP	RL	84.4 ± 9.3	45.6 ± 3.4	68.4 ± 5.3	71.0 ± 10.7
	DCLHb	87.7 ± 8.7	45.7 ± 4.5	83.2 ± 10.5*	89.0 ± 6.2*
ICP	RL	7.0 ± 1.5	3.6 ± 2.5	11.6 ± 1.9	12.8 ± 3.7
	DCLHb	7.5 ± 2.9	5.5 ± 1.8	11.5 ± 2.3	9.8 ± 1.4

*p<0.05; BL = Baseline, H45 = 45 min. post-hemorrhage, R1, R24 = 1, 24 hr post-resuscitation

DCLHb infusion resulted in a significantly greater CPP for the entire study. ICP was lower in the DCLHb group, but this was not significant. There was no significant difference between the groups in CBF or cerebral oxygen delivery. DCLHb animals required less fluid to maintain MAP (12,094 ± 552 vs 15,542 ± 1094, p<0.05). Lesion size was less in the DCLHb group (11.3 ± 3.1% vs 12.2 ± 2.1%, RL) but this was not significant. These data suggest that DCLHb is beneficial in the early resuscitation of head injury and shock.

NOTES

EFFECTIVENESS OF TWO SPECIALTY, TWO TIERED TRAUMA TEAM ACTIVATION PROTOCOL

Brian Plaisier, MD, Anita Barnoski, RN, Charlene Mancuso, RN,
David Soria, MD, and William Fallon, Jr., MD, MetroHealth Medical
Center, Cleveland, Ohio

OBJECTIVE: To determine the efficacy of a method for trauma team response and resource allocation for Trauma and Emergency Medicine (EM) services.

METHODS: We utilize a graded, tiered response for triage and initial care of trauma patients based on the likelihood of serious injury. In patients with a high likelihood of serious injury (HLSI), resuscitation leadership is equally divided between Trauma and EM. EM physicians form the initial response for all patients with a low likelihood of serious injury (LLSI). Patients are assigned a triage category from prehospital data: Category 1 (HLSI) with a full trauma team response or Category 2 (LLSI) where the Trauma service provides mandatory consultation for the EM service. Both designations are based upon American College of Surgeons triage criteria.

RESULTS: The records of 561 patients (pediatric and adults) admitted over a six month period (11/04/94-04/30/95) were reviewed. Statistical analysis was done with T-test and Chi Square.

	<u>Category 1 (n=272)</u>	<u>Category 2 (n=289)</u>	
Male/Female	186 (68%) /86 (32%)	201 (70%) /88 (30%)	
Mean ISS	19.9*	11.2*	
ISS > 15	59%*	24%*	
Mortality	46 (16.9%)*	3 (1.0%)*	
Complications	16.5%#	10.0%#	
ED direct to OR	10.7%*	1.4%*	
Length of stay (mean)			
Total	9.0 days*	4.9 days*	*p < 0.0001
ICU	6.8 days	4.0 days	**p < 0.001
Discharge to home	17 (6.3%)**	60 (20.7%)**	# p = 0.03
EM-led resuscitations	156	289	
Time savings for			
Trauma residents	not applicable	434 hours	
Procedures in ED			
DPL	36*	3*	
Tube thoracostomy	23*	2*	
Tracheal intubation	33*	6*	
Rehabilitation	59 (21.7%)*	19 (6.6%)*	

CONCLUSION: This tool effectively predicts likelihood for serious injury, mortality, operation, and rehabilitation. It provides for efficient use of surgical personnel. Selected patients may be evaluated without full trauma team activation and no sacrifice in safety.

NOTES

ASSOCIATED HEAD INJURY SHOULD NOT IMPACT NONOPERATIVE MANAGEMENT OF SPLEEN AND/OR LIVER INJURY IN CHILDREN

MS Keller, M.D., KH Sartorelli, M.D., DW Vane, M.D.
University of Vermont College of Medicine
Division of Pediatric Surgery
Presenter: MS Keller
Senior Sponsor: DW Vane
Burlington, Vermont

Background: The appropriate management of children with liver or spleen injuries and associated head injury following blunt trauma remains controversial. Recent data indicates that abdominal operation in patients with concurrent head injury may worsen outcome.

Hypothesis: Children with blunt splenic and/or liver injury and associated head injury can be safely managed nonoperatively.

Methods: Using ICD9 codes, all children (age<19) recorded in the National Pediatric Trauma Registry with injury to the liver (864.X), spleen (865.X) and head (850.X-854.X) were reviewed. Significance was determined using chi-square and Student's t-test ($p<0.05$). Outcomes were evaluated by mortality, morbidity due to treatment, functional neurological status, and discharge disposition.

Results: From Jan 1, 1994 to Apr 1, 1995, 107 children were identified with liver and/or spleen injury and associated head injury from blunt trauma. Forty-five (42%) children had combined head and spleen injury, 51 (48%) had head and liver injury, and 11 (10%) had liver, spleen and head injury. Of these, only 20 underwent laparotomy (19%). [Eleven (10%) spleen + head, 5 (5%) liver + head, 4 (4%) liver, spleen and head] There were no differences in GCS for children requiring laparotomy (13) compared to those managed conservatively (14) ($p>0.05$). Across all groups, the mean ISS score was significantly higher for children requiring laparotomy (19 vs 31, $p<0.05$). However, when comparison of the groups was stratified by ISS, the transfusion requirements, morbidity, mortality and neurologic outcome were all improved in children managed nonoperatively.

Conclusions: These data indicate that contrary to previous recommendations, the association of altered neurologic status or head injury in children with blunt liver and /or splenic injuries should not impact the decision of nonoperative management. In addition, children treated nonoperatively, when stratified by ISS, had no difference in any measured neurological outcome parameter from cohorts treated with abdominal exploration.

NOTES

VIOLENCE AGAINST SURGICAL RESIDENTS
A.G. RIZZO, M.D., C.B. Barlow, M.S.

Hill Air Force Base Hospital
Rice University
A.G. Rizzo, M.D.

A.G. Rizzo, M.D.

Hill Air Force Base, UT 84056

Surgical residents deal with trauma patients on a daily basis. They are well trained in the ABC's of Advanced Trauma Life Support to treat these patients. The majority of these traumas in the inner city and University based hospital are victims of violence themselves. What surgical professionals are not trained to accomplish is the prevention of violence against their own persons in the hospital environment.

This survey was completed by a cohort of surgical house staff nationwide. There were 475 responses from 57 residency programs. Witnessed attacks numbered 280 while 179 residents reported being attacked. The data demonstrated that violent acts were ($p=0.05$) more likely to be committed in a public hospital versus a private institution. As shown in previous research, the attacks were more likely to occur in the emergency room with the wards or parking lot close seconds for locale. (1,2) Women residents were more likely to call security to intervene in a potentially violent situation ($p=0.04$). The attacker was most likely to be a young black male between the ages of 19-30 ($p=0.01$). Of the 475 respondents, 470 reported either carrying a gun themselves or knowing someone in the hospital environment who carries a gun.

As violence against hospital personnel is generally under reported (less than one in five assaults), it is difficult to establish accurate statistics as to the rate of violence. (3) The psychiatric literature has a plethora of data regarding violence against providers in their patient population. (4-12) This survey hopes to set some standards and statistics for the general hospital population with no psychiatric background, focusing on the hospital staff that generally deal with victims of violence on a daily basis.

NOTES

ILIAC VESSEL INJURY: OPERATIVE PHYSIOLOGY
RELATED TO OUTCOME

J.G. Cushman, M.D., D.V.Feliciano, M.D.,
B.M. Renz, M.D., J.D. Ansley, M.D., W.L. Ingram, M.D.,
J. Gagnon, M.D., G.S. Rozycki, M.D.

Grady Memorial Hospital/Emory University School
of Medicine

James G. Cushman, M.D.

David V. Feliciano, M.D.

Atlanta, Georgia

Hypothesis: Body temperature and acid-base status in the operating room in patients with iliac vascular injuries predict outcome and should influence operative management.

Methods: The records of 53 consecutive patients who underwent operation for an injury to an iliac vessel(s) from 1989-1995 were reviewed. Data were collected on demographics, mechanism, body temperature and acid-base status in the operating room, operative management, and outcome. Statistical methods included group comparisons by Student's t-test and calculation of odds ratios for mortality based on body temperature and acid-base status in the operating room.

Results: 53 patients (47 male, 6 female) with a mean age of 29 years (range 7-54) sustained 92 iliac vascular injuries (36 arterial, 56 venous), primarily from penetrating wounds (50/53 = 94.3%) during the period of the review. A systolic blood pressure < 100 mmHg was recorded in 70% of patients in the field and 62.5% in the emergency department. All eight injuries to the internal iliac artery were treated with ligation, while complex repair or shunt (#11), lateral suture (#7), no repair (#5), and ligation (#5) were used for injuries to the common or external iliac artery. Ligation (#32), lateral suture (#17), no repair (#5), and unknown (#2) were used for venous injuries. Mortality was 34% (18/53), with 72% (13/18) of deaths occurring from shock in the first 24 hours. An analysis of temperature and acid-base status measurements and odds ratio calculations for mortality are given below (parameter values are means):

Parameter\ Lived\ Died\ p Value\ Parameter for Odds Ratio\ Odds Ratio* \ Confidence Interval

Initial

OR Temp	35.1°	33.8°	0.01	<34°	3.7x	1.0-13.9
OR pH	7.27	6.94	<0.0001	<7.1	30.8x	5.2-183.0
OR b.d.**	-7.8	-19.9	<0.0001	<-15.0	27.0x	5.2-139.8

Final

OR Temp	35.9°	33.6°	<0.001	<35°	39.4x	4.3-358.9
OR pH	7.37	7.22	<0.001	<7.3	14.4x	2.8-73.0
OR b.d.	-3.5	-9.1	0.005	<-6.0	11.0x	2.2-53.8

*Risk of dying as compared to surviving/ ** b.d. = base deficit

Conclusions: 1. There are significant differences between initial and final operating room temperature and acid-base status in survivors vs. nonsurvivors of iliac vascular injuries. 2. While there are improvements in both pH and base deficit in both survivors and nonsurvivors during operation, a fall in temperature during operation or a final temperature <35° (by odds ratio calculation) is strongly predictive of mortality. 3. A patient with an initial operating room pH <7.1 or a base deficit <-15.0 is 27x-30x more likely to die than a patient with higher levels. Such a patient should have only control of hemorrhage (ligation vs clamp vs shunt) and a rapid damage control celiotomy to allow for reversal of "metabolic failure" in the SICU if survival is to occur.

NOTES

ROUTINE PREOPERATIVE "ONE-SHOT" INTRAVENOUS
PYELOGRAPHY IS NOT INDICATED IN ALL PATIENTS
WITH PENETRATING ABDOMINAL TRAUMA

K.K. Nagy M.D., F.D. Brenneman M.D., J.J. Fildes M.D.,
R.R. Roberts M.D., S.M. Krosner M.D., K.T. Joseph M.D.,
R.F. Smith M.D. and J. Barrett M.D.

Department of Trauma; Cook County Hospital

Kimberly K. Nagy, M.D.

John J. Fildes, M.D.; Chicago, IL.

OBJECTIVE: To determine which patients need a "one-shot" intravenous pyelogram (IVP) prior to laparotomy for penetrating abdominal trauma.

METHODS: Over a 15 month period, 240 laparotomies were performed for penetrating trauma at our urban level I trauma center. Data collected prospectively included clinical suspicion of genitourinary injury, results of preoperative IVP, intraoperative findings and operative decisions affected by the IVP.

RESULTS: Preoperative IVP was performed in 175 patients (73%). 71 (41%) of these had suspicion of a renal injury based on the presence of a flank wound or gross hematuria. The IVP was felt to influence operative decisions in 6 patients, all in this group. Each of these 6 patients had either a shattered kidney or a renovascular injury and had a nephrectomy performed with the knowledge that a normally functioning kidney was present on the contralateral side. No patient without a flank wound or gross hematuria had an IVP that was helpful intraoperatively. Preoperative IVP was therefore helpful in 8% of patients with flank wounds/gross hematuria and 0% of patients without ($p = 0.005$, Fisher's exact χ^2). Nephrectomy was performed in 2 additional patients who did not undergo IVP, both presented in shock.

CONCLUSION: Routine preoperative IVP is not necessary in all patients undergoing laparotomy for penetrating trauma. The number of IVPs can be safely reduced in 60% of patients by narrowing the indications to include only those stable patients with a flank wound or gross hematuria.

NOTES

PREVENTION OF PULMONARY EMBOLISM AFTER
PELVIC FRACTURE: RATIONAL USE OF INFERIOR
VENA CAVAL FILTERS

K.F.O'Malley, M.D., S.Marberger, B.A.
SE.Ross, M.D.
Cooper Hospital/University Medical Center
K.F.O'Malley, M.D.
K.F.O'Malley, M.D.
Camden, New Jersey

Pelvic fracture (PelFx) has been identified as a risk factor for pulmonary embolism (PE). In order to quantify this risk and assess prophylaxis strategies, including inferior vena cava filter placement (IVCF), we performed a review at our Level I trauma center.

In the 27 months period when DVT prophylaxis was not mandatory, 18 PE (6%) were identified among 301 patients with PelFx (Group 1). During the ensuing 24 months, DVT prophylaxis was made mandatory for all admissions to the trauma service (Group 2). This resulted in a decrease in incidence of PE in the PelFx population (3/386; 0.7%: $p < 0.001$).

After occurrence of PE during operative acetabular fracture repair, a policy of placing prophylactic IVCF in such patients was adopted. Patients who require extensive manipulation during ORIF were identified by the attending orthopedist. During the next 18 months (Group 3), there were 2 PE among 276 PelFx (0.7%: $p < 0.001$ vs Group 1; $p = ns$ vs Group 2), 25 patients (9.1%) underwent IVCF placement. One PE occurred in a patient who was a candidate for IVCF, but did not receive one.

	PelFx	PE	IVCF
Group 1 (9/88-12/90)	301	18	1
Group 2 (1/91-12/92)	386	3	3
Group 3 (1/93- 6/94)	276	2	25

From these data, it appears that rigorous DVT prophylaxis provides adequate protection against clinically evident PE for PelFx in general. Prophylactic vena cava filters may offer further protection to patients requiring extensive pelvic manipulation during operative fixation.

NOTES

MULTIPLE LONG BONE FRACTURES IN THE PATIENT WITH SINGLE-SYSTEM TRAUMA DO NOT INCREASE INTRA-HOSPITAL MORBIDITY.

MA Reynolds MD, LA Omert MD, JD Kizer MD, A Chendrasekhar MD, GA Timberlake MD
 Section of Trauma, Department of Surgery, West Virginia University, MA Reynolds MD
 D Kappel, MD
 Morgantown, West Virginia

Background: It has been speculated that multiple long-bone fractures result in greater than expected morbidity, and in particular increased pulmonary morbidity.

Objective: The purpose of the present study is to examine the incidence of intra-hospital morbidity in those patients with multiple long-bone fractures but minimal associated injuries, in order to determine if a multiplicity of fractures results in additional morbidity.

Materials and Methods: A retrospective review was performed, utilizing a database consisting of patients sustaining blunt trauma admitted to a level 1 trauma center from Jan. 1990 to Oct. 1994. The study was limited to those patients with an Abbreviated Injury Score (AIS) of 2 or less in all regions except the extremities and superficial. Long-bone fractures were defined as those fractures involving the femur, tibia, fibula, humerus, radius or ulna. Groups 0, 1 and 2 consisted of patients with 0, 1, and 2 or more long-bone fractures, respectively. The results are presented as the incidence, or the mean +/- the standard deviation. Pearson's chi-square and ANOVA (Tukey's HSD for groups of unequal size) were used to test significance.

Results: Our findings are summarized in the tables below.

Group	0		1		2		p Values		
N	2509		821		89		0 v 1	0 v 2	1 v 2
Hosp LOS	2.49+/-4.04		6.64+/-12.85		8.63+/-8.81		<0.001	<0.001	NS
AGE	30.22+/-18.35		40.92+/-27.20		35.22+/-24.87		<0.001	NS	NS
ISS	5.28+/-3.25		9.00+/-3.52		11.16+/-3.10		<0.001	<0.001	<0.001
# of Fxs	0.38+/-0.59		2.54+/-0.86		4.31+/-1.31		<0.001	<0.001	<0.001
# of Long Bone Fxs	0		1.00+/-0.00		2.16+/-0.42		-	-	-
M/F	1793/716		500/321		54/35		<0.001	<0.05	NS
Death	5	0.2%	11	1.34%	0	0%	<0.001	NS	NS
Pulm Comp	147	5.86%	127	15.47%	14	15.73%	<0.001	<0.05	NS
Pneumonia	7	0.28%	9	1.10%	0	0%	<0.05	NS	NS
Atelectasis	35	1.39%	37	4.51%	4	4.49%	<0.001	NS	NS
ARDS	10	0.40%	4	0.49%	1	1.12%	NS	NS	NS
Infection	136	5.42%	108	13.15%	9	10.11%	<0.001	NS	NS

Those patients with long-bone fractures were more severely injured, older, had a longer hospital length of stay (LOS), and had higher incidence of death and morbidity. The addition of multiple long-bone fractures resulted in a significantly higher ISS, but there was no change in the incidence of any indicator of morbidity.

Conclusions: Our findings do not support the hypothesis that the multiplicity of long bone fractures in those patients with single-system injury results in additional intra-hospital morbidity.

RURAL TRAUMA CARE: ROLE OF THE GENERAL SURGEON
M.Bintz, M.D., T.H. Cogbill, M.D., J. Bacon, R.N.C., B.S.N.,
C.C.R.N.

Gundersen-Farrell Clinic

Marilu Bintz, M.D.

Marilu Bintz, M.D.

Prairie du Chien, Wisconsin

Objective: To profile the experience of a solo, rural general surgeon with multiply-injured patients.

Setting: A community (population 5,500) hospital with 23 acute care beds in rural southwestern Wisconsin.

Patients and Methods: Emergency department (ED) contact sheets for 43,308 patients treated from 9/1/88 through 8/31/95 were reviewed. Eighty-four patients with a single body region injury of AIS ≥ 3 or two or more body region injuries of AIS ≥ 2 formed the basis of this study. Patients with isolated fractures of the proximal femur were excluded. Hospital charts were reviewed for demographic data, procedures performed, injuries sustained and disposition.

Results: Injury mechanisms were motor vehicle crash in 65 (77%), fall in 7 (8%), tractor rollover in 4 (5%), penetrating wound in 4 (5%) and miscellaneous in 4 (5%). ISS ranged from 9 to 43 (mean, 16). ED procedures included endotracheal intubation in 16 patients, tube thoracostomy in 10, diagnostic peritoneal lavage in 4, and resuscitative thoracotomy in one. Four (5%) patients died in the ED, 54 (64%) were transferred to a referral trauma center and 26 (31%) were admitted to the community hospital. Head and spinal cord injuries were the indication for transfer in 56% of patients and complex orthopedic trauma in 20%. Of the 26 patients admitted to the community hospital, 6 required laparotomy and nonoperative management of liver and spleen injuries was accomplished in four. There were no deaths in this group.

Conclusions: The roles of the general surgeon in the management of multiple trauma in a rural hospital are:

1. to coordinate trauma care in the community, including educational and organizational efforts;
2. to perform the necessary techniques in the ED to achieve optimal resuscitation and stabilization;
3. to rationally prioritize patients for transfer to a referral trauma center based upon assessment of patient injuries and institutional capabilities;
4. to provide definitive care for a subset of patients with no need for subspecialty intervention.

NOTES

THE CD11/18 LEUKOCYTE INTEGRINS: NEW
SIGNALING RECEPTORS FOR BACTERIAL ENDOTOXIN
S.F. Flaherty, M.D.; R.R. Ingalls, M.D.;
F.H. Millham, M.D. and D.T. Golenbock, M.D.
Departments of Surgery and Medicine, Boston
City Hospital, Boston, MA

S.F. Flaherty, M.D.

S.M. Cohn, M.D.
New Haven, CT

Exaggerated responses by phagocytes to bacterial endotoxin (lipopolysaccharide, LPS) results in the sepsis syndrome. Only the CD14 antigen has been identified as an LPS signaling receptor for immune cells. The $\beta 2$ leukocyte integrins are a family of transmembrane receptors present on phagocytes in which a unique alpha subunit (CD11a-c) is expressed as an obligate heterodimer with a common beta subunit (CD18). Microvascular injury during sepsis appears to result, in part, from adhesive interactions of the $\beta 2$ integrins with counter receptors present on endothelium. In addition to their role in cell/cell adhesion, the $\beta 2$ integrins also bind a variety of molecules, including LPS. We sought to determine if binding of the $\beta 2$ integrins to LPS results in signal transduction.

We used genetically altered Chinese hamster ovary fibroblasts (CHO) as a model of LPS signaling. Non-transfected CHO cells lack all known binding and signaling receptors for LPS. Transfection of these cells with the LPS receptor CD14 imparted LPS responsiveness to CHO cells: LPS-stimulated CHO/CD14 transfectants were capable of translocating the transcription factor nuclear factor-kappa B (J. Biol. Chem. 269: 22252, 1994). Clonal cell lines which express CD11c/CD18, CD11b/CD18 and CD11a/CD18 were engineered by co transfecting the appropriate full-length cDNA. Although we have not yet analyzed CD11a/CD18 transfected CHO, both CD11c/CD18 (J. Exp. Med. 181: 1473, 1995) and CD11b/CD18 transfectants responded to the presence of ng per ml quantities of LPS. Unlike CHO/CD14, responses of these lines to LPS were serum independent. The anti-CD11b monoclonal antibody 904, which blocks binding of LPS to CD11b/CD18, inhibited LPS responses in CHO/CD11b transfectants.

The importance of the leukocyte integrins in propagating microvascular injury may be complemented by the ability of these receptors to signal cellular activation. The development of novel therapies to prevent the end-organ damage frequently observed during sepsis will require an understanding of these complex cellular events.

NOTES

**SPLANCHNIC ISCHEMIA AND BACTERIAL
TRANSLOCATION IN THE ABDOMINAL COMPARTMENT
SYNDROME**

L.N. Diebel, M.D., S.A. Dulchavsky, M.D., W.J. Brown, M.D.

Wayne State University

Departments of Surgery and Microbiology

L. N. Diebel, M.D.

Clyde E. McAuley, M.D.

Detroit, Michigan

Adverse effects of increased intra-abdominal pressure (IAP) in the abdominal compartment syndrome (ACS) are well-described. The detrimental effect on visceral blood flow persists despite normalization of systemic perfusion indices. Bacterial translocation (BT) is a well-described phenomenon following hemorrhagic shock, presumably due to the resultant splanchnic ischemia. The purpose of this study was to measure ileal mucosal blood flow (MBF) and BT in a rodent model of the ACS.

Methods. Anesthetized adult male rats had jugular and carotid catheters placed for fluid therapy and to monitor mean arterial pressure (MAP). Three groups (Gp) of rats were studied. Gp I had a laparotomy; an enterotomy was made to place a laser flow probe on the ileal mucosa to measure MBF, and a catheter placed to instill filtered CO₂ to raise IAP to 25 mm Hg for 60 minutes. Gp II had a catheter placed to raise and measure IAP only. Twenty-four hours later Gp II animals were sacrificed and mesenteric lymph nodes (MLN), spleen (SPL) and liver (L) were harvested for quantitative cultures. Intravenous LR was used to maintain MAP as IAP was increased in Gp I and Gp II. Gp III was instrumented only and served as sham controls. Tissues were harvested for BT in Gp III as in Gp II.

Results.

	N	MBF	Positive Cultures		
		% Baseline	MLN	SPL	L
Gp I	5	63±14*	-	-	-
Gp II	7	-	5/7**	2/7	1/7
Gp III	5	-	0/5	0/5	0/5

* p < 0.01

** p < 0.05

There was a significant decrease in MBF despite maintaining MAP at baseline levels in Gp I. BT was noted only with increased IAP, principally to the MLN with increased IAP.

Conclusion. The ACS is associated with splanchnic hypoperfusion and BT which may contribute to later septic complications. The mechanism requires further investigation.

NOTES

ULTRASOUND TRAINING DURING ATLS: AN EARLY START
FOR SURGICAL INTERNS

DC Han MD, GS Rozycki MD, JA Schmidt DNSc, DV Feliciano MD

Emory University School of Medicine

David C. Han, MD

Grace S. Rozycki, MD

Atlanta, GA

INTRODUCTION: The new edition of the ATLS manual will include a section on ultrasound (US); the format for teaching and testing US within the ATLS framework, however, has yet to be determined.

HYPOTHESES: #1) Surgical interns can rapidly learn essential principles of US relative to the Focused Abdominal Sonographic examination of the Trauma patient (FAST) using didactics, video, pre-test/post-test, and practical examination format. Endpoints were a significant improvement from the pre to post-test results and a score of at least 80 on the practical examination. #2) Swine are adequate models for learning the FAST.

METHODOLOGY: Sessions were timed and all 25 incoming interns participated.

Day #1: Interns completed a written survey, pre-test/post-test, lecture, and video.

Day #2: Eight-week-old Yorkshire swine were used for ATLS lab skills stations and then euthanized. Three swine, which previously underwent DPL, had US examinations. Because no fluid was detected in the hepatorenal or splenorenal areas, DPL catheters were reinserted, an US probe placed on the abdomen, and fluid infused until an obviously "positive" US examination was produced. The amount of fluid was recorded and these swine were considered the "positives." Two fresh swine, which were not part of the ATLS skills stations (no DPL), were prepared, euthanized and considered "negatives." All 5 swine were draped similarly to disguise ATLS interventions, positioned in adjacent labs and identified by number. Experienced surgeon-sonographers (instructors) in each lab placed the US probe on the animal so that the hepatorenal or splenorenal area was identified. The interns were examined individually and recorded an answer "positive" or "negative." Interns were then dismissed from the lab to complete the post-test while the instructors performed limited postmortem examinations on 2 swine to assess their anatomy. Data from this One-Group Pre-test - Post-test Study Design were analyzed by the paired Student's t-test.

RESULTS: Written Survey (5 min): 48% had exposure to US, 12% had performed an US examination, but none had completed a course or received US training by a surgeon.

Tests (30 min): Mean pre-test and post-test scores were 65.6 and 90.8, respectively ($p < 0.001$).

Practical examination (140 min) Mean practical test score=89.6; 84% of the interns scored ≥ 80 .

Total time added to current ATLS format=175 minutes.

Swine: One liter of saline produced a "positive" US examination while 2 to 3 liters were needed to produce an obviously "positive" US examination. Postmortem examinations showed that the left hepatic lobe partially obscured only the superior pole of the spleen.

CONCLUSIONS: 1) Using lecture, video, pre/post-tests, and practical examination format, surgical interns can learn essential components of US relative to the FAST during the ATLS course. 2) While student time is longer, US instruction can be done within the specified 2.5 days of ATLS. 3) The amount of fluid to produce an obviously "positive" US examination in swine is greater than that reported in trauma patients. 4) Swine are feasible models for teaching the FAST because adequate US views are obtainable despite their hepatic anatomy.

NOTES

THE USE OF ABDOMINAL ULTRASONOGRAPHY AS A SCREENING EXAMINATION FOR HEMOPERITONEUM IN THE BLUNT INJURED PEDIATRIC PATIENT: A PRELIMINARY REPORT

J. Rondina, M.D., M.G. Ochsner, M.D., F. E. Davis, M.D., C. R. Boyd, M.D.
Memorial Medical Center

J. Rondina, M.D.
M. G. Ochsner, M.D.
Savannah, Georgia

Introduction: Current standards for evaluation of the abdomen in blunt injured pediatric patients includes diagnostic peritoneal lavage (DPL), CT scan, and exploratory laparotomy. In hemodynamically stable patients, CT scan is the procedure of choice enabling non-operative management of suitable solid organ injury. In the adult blunt injured patient, abdominal ultrasonography (U/S) is currently undergoing evaluation as a rapid, non-invasive screening procedure for identification of hemoperitoneum, and initial reports have been excellent. We decided to evaluate U/S as a screening procedure for identifying hemoperitoneum in the blunt injured pediatric patient.

Methods: A prospective evaluation of U/S for detection of hemoperitoneum in blunt injured pediatric patients (<17 years) was undertaken including a standard four view U/S examination of the abdomen, by credentialed surgical staff, in the emergency department. All patients with negative U/S exams were monitored with in-hospital observation and/or follow-up U/S examination. Patients with negative U/S examinations as the sole method of evaluation were contacted by phone following hospital discharge. Hemodynamically unstable patients with positive U/S exams underwent emergent laparotomy. Hemodynamically stable patients with positive or equivocal U/S exams underwent further evaluation with CT scan or DPL. Data collected included age, mechanism of injury, ISS, mortality and results of U/S, CT scan, DPL, operative exploration. Descriptive statistical analysis of the data include sensitivity, specificity, accuracy and positive and negative predictive values of U/S for identifying hemoperitoneum.

Results: Fifty six blunt injured pediatric patients were evaluated at our Level I trauma center during the 11 month period from November 1994 through October 1995. The majority of patients were 0-5 years of age (n=23) followed by those who were 6-10 (n=16) and 11-16 (n=17). The ISS scores were as follows: (0-10) = 36, (11-14) = 7, (15-20) = 3, (21-30) = 7, (31-40) = 2 and (41-50) = 1. Mechanism of injury was as follows: motor vehicle crash = 26, pedestrian struck = 16, falls = 8 and others = 6. There were 3 deaths for a mortality of 5%, one died intraoperatively of massive hemorrhage and two died of head injury. Seven patients had hemoperitoneum (12.5%) and 49/56 (87.5%) had no hemoperitoneum. In addition to U/S there were 13 CT scans performed, one DPL and two emergent laparotomies. U/S findings were as follows: true positive (7), true negatives (47), false positive (2) and false negatives (0) for a sensitivity of 100%, a specificity of 96%, an accuracy of 96% and a positive and negative predictive value of 78% and 100% respectively. Of the two false positives U/S examinations, CT scan was negative and neither patient underwent surgical intervention.

Conclusions: Ultrasound is a rapid, non-invasive and reliable screening tool for the diagnosis of hemoperitoneum in the blunt injured pediatric patient.

NOTES

ADMISSION BASE DEFICIT PREDICTS TRANSFUSION
REQUIREMENTS AND RISK OF COMPLICATIONS

J.W. DAVIS, M.D., S.N. PARKS, M.D.,
K.L. KAUPS, M.D., H.G. GLADEN, M.D.,
SHEILA O'DONNELL-NICOL, R.N.
VALLEY MEDICAL CENTER, FRESNO, CALIFORNIA
J.W. DAVIS, M.D.

J.W. DAVIS, M.D.

FRESNO. CALIFORNIA

Base Deficit (BD) has been shown to be a valuable indicator of shock, resuscitation, fluid requirements, and abdominal injury, and to be predictive of mortality after trauma. This study was performed to determine if admission BD was indicative of resource utilization at a trauma center. Specifically, could BD be used to identify those patients likely to require blood transfusion in the first 24 hours (Blood), or to develop shock related complications (ARDS, and coagulopathy). Additionally, is BD indicative of anatomic injury severity score (ISS) and probability of survival (Ps) ?

METHODS: All patients entered in the trauma registry from 7/90 through 6/95 who had arterial blood gases performed within 30 minutes of arrival were included in this retrospective analysis. Data are presented as mean \pm standard error of the mean, and grouped by BD category. Group comparisons were done with paired t-test, dichotomous outcomes were analyzed by Chi-square.

RESULTS: Over the study period, 1408 patients had admission BD data available.

BD Category	Blood (units)	ISS	Ps	ARDS	Coagulopathy
Normal (+2 to -2)	0.6 \pm 0.1	15.6 \pm 0.5	.9303 \pm .0076	0.9 %	0.7 %
Mild (-3 to -5)	1.3 \pm 0.2*	20.1 \pm 0.7*	.8588 \pm .0129*	1.7 %	3.3 % #
Moderate (-6 to -14)	3.9 \pm 0.3*	27.2 \pm 0.8*	.7126 \pm .0171*	4.3 % +	7.5 % #
Severe (\leq -15)	7.5 \pm 0.8*	33.9 \pm 1.9#	.4631 \pm .0386*	3.7 %	17.4 % #

Significantly different from value above: * p < 0.001, # p < 0.01, + p < 0.03

Admission blood pressure, trauma score and revised trauma score all decreased (p < 0.001, ANOVA) while ICU and hospital stay increased with worsening BD category (p < 0.001, ANOVA). There was no significant difference in observed survival versus Ps.

CONCLUSIONS: Admission BD identifies patients likely to require early transfusion, and to have increased risk of developing complications (ARDS, coagulopathy). Patients with BD \leq -6 should undergo type and cross match rather than type and screen.

NOTES

RESUSCITATIVE EFFORTS IN TRAUMATIC CARDIAC ARREST:
NEED FOR RE-EVALUATION?

D.V. Shatz, M.D., O.C. Kirton, M.D., J.H. Davis, M.D.

University of Miami School of Medicine, Department of Surgery

David V. Shatz, M.D.

Larry Gentilello, M.D.

Seattle, WA

Reported survival rates following traumatic cardiac arrest are dismal. Because occasional survivals are reported and anecdotally reported in most trauma centers, general policy continues to require transport of these patients to trauma centers except under extreme conditions (decapitation, rigor mortis, etc). The goal of this study was to analyze characteristics associated with patients in traumatic cardiac arrest in an attempt to better define parameters by which field resuscitative efforts should be ceased or never initiated.

A one year prospective study was undertaken at a Level 1 trauma center, analyzing all patients receiving CPR in the field following trauma, for mechanism of injury, cardiac rhythm and vital sign status at the scene, pronouncement data, and resource utilization.

One hundred fifty-six patients between January and December 1994 were transported to the trauma center with CPR initiated in the field. Eighty-eight (56%) patients arrived by ground ambulance; 68 (44%) were transported by helicopter. Blunt trauma represented 51% of injuries; penetrating trauma 49%. Twenty-four of those sustaining gunshot wounds and 3 with stab wounds underwent emergency thoracotomy. Of these, eight had cardiac injuries, and 9 had major vascular wounds. No blunt injury victims were subjected to thoracotomy. Ninety-seven (62%) had no vital signs (VS) on first contact with paramedics and were in terminal cardiac rhythms (asystole, EMD, agonal); another 30 initially in sinus rhythm lost VS at the scene, and an additional 29 en route. Only 4 patients in arrest upon first contact reached the OR - all died. The sole survivor was resuscitated after 3 minutes of paramedic CPR. There were no other survivors beyond 6 days. Four hundred twenty-eight units of blood products were used. Prehospital and hospital charges totalled \$922,604.

Conclusion: No patient who failed initial resuscitative efforts in the field survived to discharge, and 90% never survived beyond the emergency room. Tremendous cost and resources were expended because protocol prevents paramedics from ceasing resuscitative efforts once initiated. Our data suggests that patients in terminal cardiac rhythms and without VS upon first contact have little hope of survival; policy requiring mandatory prehospital resuscitation once efforts have been initiated should be re-evaluated in selected patients.

NOTES

OUTCOME ANALYSIS OF BLUNT TRAUMATIC THORACIC
AORTIC LACERATION(BTTAL): IDENTIFICATION OF HIGH
RISK COHORT.

P. Camp M.D., S. Shackford M.D., Western Trauma
Association Multicenter Study Group.
University of Vermont, Burlington, VT

P. Camp, M.D.

S. Shackford, M.D.

Burlington, VT

Blunt traumatic thoracic aortic laceration (BTTAL) continues to have a significant mortality. Recent work has suggested that survival could be improved with delayed operative repair in selected high risk patients but no previous study has examined risk stratification in stable patients undergoing surgery. We sought to determine the factors which affect outcome following BTTAL in stable patients undergoing operative repair. We retrospectively identified 395 cases of BTTAL from 14 trauma centers; 185 were hemodynamically stable ($BP \geq 100$) and underwent controlled operative repair; 146 survived (79%). Comorbidities and multiple variables from the prehospital, early hospital and perioperative phases were analyzed using univariate analysis. Scores and categorical variables were dichotomized. Those variables significantly associated with outcome were then assessed using stepwise multivariate logistic regression. Gender, Glasgow Coma Score, Injury Severity Score, time to operation, type of repair, and blood pressure were not associated with outcome. Age, Trauma Score <12 (TS), and the presence of coronary artery disease (CAD) were predictive of mortality, with age becoming more powerful as it increased. The odds of mortality = $e^{-2.974 + 0.0326(\text{AGE}) + (1.203)(\text{TS}) + (2.015)(\text{CAD})}$ with a Hosmer-Lemeshaw goodness of fit of 0.74.

	Descriptor	Adjusted odds ratio	95% Confidence limits lower upper	p
AGE	$\bar{x} = 34.8 \pm 16.3$ (S.D.)	1.386 per 10 years	1.133 - 1.757	< 0.01
TS	<12 = 36 >12 = 149	3.33	1.4 - 7.91	< 0.01
CAD	No = 176 Yes = 9	7.50	1.3 - 43.4	< 0.02

These data suggest that hemodynamically stable elderly patients with BTTAL, especially those with documented CAD, are at substantial risk of mortality following operative repair. In this cohort delayed repair with control of medical comorbidities, endovascular graft placement, or nonoperative management could be considered as alternatives to conventional *urgent* operative repair.

NOTES

ELEVATED P SELECTIN FOLLOWING SEVERE TRAUMA - A POTENTIAL TARGET FOR IMMUNOMODULATORY THERAPY

RK Simons MB, DB Hoyt MD, RJ Winchell MD, RM Rose MD.

University of California, San Diego and Cytel Corporation (RMR)

Richard K Simons, M.B., F.R.C.S., F.A.C.S.

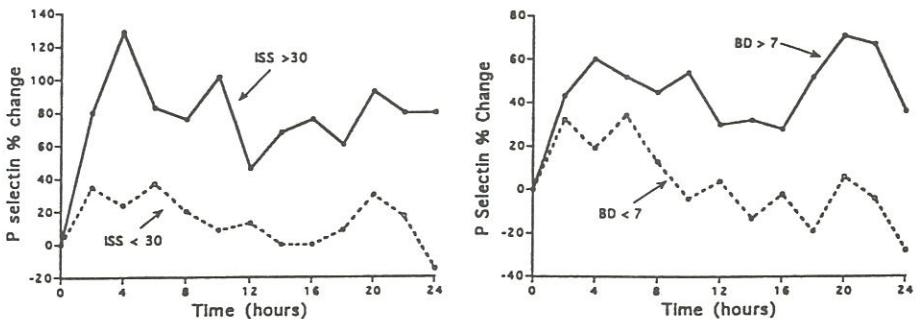
David B Hoyt, M.D., F.A.C.S.

San Diego, California

Activated neutrophils adhering to inflamed endothelium are currently one focus of immunomodulatory therapy. Identification of high risk patients will allow targeting of anti-adhesive therapy for clinical trials. We postulated that patients at high risk for multiple organ failure and potential anti-adhesive therapy could be identified by measuring shed adhesion molecules, as a measure of activation, following injury and reperfusion and correlated this with injury severity, degree of shock, major complications and death.

Methods: Blood samples were drawn prospectively in 30 multiple trauma patients every 2h following admission for the first 24h, and assayed for levels of shed E and P selectin. Patients were stratified for injury severity (ISS \geq / $<$ 30), initial base deficit (BD \geq / $<$ 7), and development of septic complications, organ failure or death. Results are expressed as % change in mean at each time point compared to admission levels.

Results: P selectin levels rose rapidly following resuscitation, remaining elevated in the severe injury group (ISS \geq 30, BD \geq 7) throughout the first 24h:



P selectin levels also correlated with septic complications and organ failure. No differentiation on the basis of the cytokine dependent E selectin was evident in the first 24h.

Conclusion: P selectin levels are elevated early following resuscitation and reperfusion after severe trauma and remain elevated for at least 24h. This elevation correlates with injury severity, degree of shock, septic complications and organ failure. Inhibition of P selectin is a potential, new immunomodulatory strategy in this severely injured group. Clinical trials should be focused on these patients.

NOTES

EARLY IMPAIRED OXYGEN CONSUMPTION DUE TO SUPPLY INDEPENDENT MITOCHONDRIAL DYSFUNCTION OCCURS IN PATIENTS WHO DEVELOP MOF

F. Moore, J. Haenel, E. Moore, B. Gallea, J. Ortner, C. Cairns
Denver General Hospital and University of Colorado

F. Moore

F. Moore

Denver, Colorado

INTRODUCTION

It has been previously shown that an early blunted oxygen consumption (VO_2) response to maximal efforts to enhance oxygen delivery (DO_2) predicts postinjury MOF and it has been proposed that this was due to persistent supply dependency. An alternative hypothesis is that this represents supply independent mitochondrial oxidative dysfunction. The purpose of this study, therefore, was to compare early tissue oxyhemoglobin levels (HbO_2 , reflecting oxygen supply) to cytochrome a, a₃ redox (reflecting mitochondrial O_2 consumption) in patients at known risk for MOF.

METHODS:

High risk patients were resuscitated by a protocol that maximizes DO_2 for the first 24 hours in the SICU. Patients were continuously monitored by near infrared spectroscopy (NIR) via a probe placed on the skin of the left deltoid region. NIR algorithms allow for the direct noninvasive assessment of tissue oxygen delivery (oxyhemoglobin: HbO_2) and tissue oxidation (cytochrome a, a₃ redox state). Under normal conditions, HbO_2 and the cytochrome a, a₃ redox state are tightly coupled (i.e., when HbO_2 falls, cytochrome a, a₃ becomes more reduced). On the other hand, uncoupling of HbO_2 from cytochrome a, a₃ is a sign of derangement in mitochondrial oxidative function. Outcomes included MOF by a standard score, DO_2 , VO_2 , lactate levels, HbO_2 , and the presence of coupling or uncoupling between HbO_2 and cytochrome a, a₃ redox. Differences in continuous variables were analyzed by unpaired t test and categorical variables were analyzed by Fisher's exact test.

RESULTS

Over 12 months, 22 high risk patients (21 major torso trauma patients with Injury Severity Score = 28 ± 2 and 1 ruptured AAA) were studied; nine (41%) developed MOF. At 12 hrs of resuscitation, the MOF patients compared to the non-MOF patients did not have statistically different DO_2 (MOF = 589 ± 74 vs non-MOF = 658 ± 35 , $p = 0.39$) or VO_2 (MOF = 140 ± 14 vs non-MOF = 163 ± 53 , $p = 0.30$), but lactate levels in the MOF patients were significantly higher (MOF = 3.6 ± 1.0 vs non-MOF = 1.7 ± 0.9 mmol/L, $p < 0.001$). NIR monitoring strips revealed that HbO_2 and cytochrome a, a₃ redox were uncoupled in eight (78%) MOF patients compared to two (15%) non-MOF patients ($p = 0.002$).

CONCLUSION

Supply dependent VO_2 has recently been promoted to be an unrecognized risk factor for MOF. The current data, however, indicate that early impaired VO_2 may be due to supply independent mitochondrial oxidative dysfunction and can be detected by NIR. Future therapeutic strategies need to be devised which not only maximize DO_2 but facilitate cellular O_2 utilization.

NOTES

VOLUMETRIC ESTIMATES OF PRELOAD IN TRAUMA PATIENTS: ADDRESSING THE PROBLEM OF MATHEMATICAL COUPLING

M.C. Chang, MD, C.S. Black, MD, J. Wayne Meredith, MD
Wake Forest University, The Bowman Gray School of Medicine
M.C. Chang, MD
Edmund J. Rutherford, MD

Winston-Salem, North Carolina

The availability of the volumetric thermodilution pulmonary artery catheter allows preload assessment based on ventricular volume rather than pressure. This technique has been shown clinically to be a better measure of preload than the pulmonary artery occlusion pressure (PAOP), the previous gold standard. Critics of the technique argue that mathematical coupling due to the use of thermodilution in the measurement of both right ventricular end-diastolic volume (RVEDV) and cardiac output (CO) accounts for the better correlation between RVEDV and CO than PAOP and CO. Previous studies have attempted mathematical corrections for coupling, but direct comparisons using a non-thermodilution measure of CO have not been reported.

Objective: To evaluate the importance of mathematical coupling between RVEDV and CO by assessing the ability of RVEDV to predict CO measured by thermodilution (CO_{TH}) compared to CO simultaneously determined by the Fick principle (CO_{FICK}).

Methods: Prospective study of 53 consecutive trauma patients admitted to a Level I trauma center between 10/1/94 and 6/1/95 who received a volumetric pulmonary artery catheter. Using linear regression analysis, RVEDV and PAOP were correlated with simultaneous measurements of both CO_{FICK} determined via indirect calorimetry and CO_{TH} . Fisher's z-transformation was used to evaluate the correlation coefficients for significant differences ($p < 0.05$).

Results: The correlation coefficients for RVEDV vs CO_{TH} and RVEDV vs CO_{FICK} were similar (Table 1, $p = 0.76$).

There was a significant correlation between CO_{TH} and CO_{FICK} ($r = .74$, $p < .001$). RVEDV was significantly better than PAOP at predicting both CO_{TH} ($p < .001$) and CO_{FICK} ($p = 0.04$, Table 1).

Table 1	r	p
RVEDV vs CO_{TH}	.48	<.001
RVEDV vs CO_{FICK}	.45	<.001
PAOP vs CO_{TH}	.03	0.81
PAOP vs CO_{FICK}	.18	0.19

Conclusions: RVEDV estimates preload better than PAOP does. Mathematical coupling is not responsible for this effect.

NOTES

FLUCONAZOLE INCREASES BACTERICIDAL ACTIVITY OF NEUTROPHILS WITHOUT ACTIVATION OF CYTOKINE CASCADE

E. Zervos M.D., M.C. Robson M.D., A.S. Rosemurgy, M.D.
University of South Florida Department of Surgery

E. Zervos, M.D.

A.S. Rosemurgy, M.D.

Tampa, Fl

Objective: Fungemia increases mortality in critically ill trauma patients. Paradoxically, death in this setting is most commonly associated with gram negative bacterial sepsis. Treating fungemia impacts mortality greatly, implying that antifungal therapy alters the lethality of gram negative bacterial sepsis. Supporting this implication, PMN preincubated with Fluconazole (FCZ) in vitro demonstrate enhanced bactericidal activity. This study was undertaken to determine if upregulation of proinflammatory cytokines occurs with PMN function augmentation. **Methods:** PMN were isolated from 12 volunteers and preincubated with either phosphate buffered saline (PBS) or FCZ (3.3mcg/ml or 6.6mcg/ml) for one hour and then exposed to E. coli for one hour. Cell culture supernatants were collected immediately after preincubation with PBS or FCZ and again after exposure to E. coli. TNF α , IL-1 β and IL-8 levels were measured in each supernatant and compared using the paired Student's t test. After exposure to E. Coli each solution was plated in a colony unit forming protocol to document augmentation of PMN bactericidal properties. **Results:** With exposure to E. coli, PMN, whether preincubated with PBS or FCZ, significantly ($p < .05$) upregulated TNF α , IL-1 β and IL-8 production. Preincubation with FCZ, however, did not effect a significant increase in TNF α , IL-1 β and IL-8 levels before or after exposure to E. coli.

Average cytokine levels in cell culture supernatants after exposure to E. coli:

	TNF pg/ml	p-value*	IL-1 β pg/ml	p-value*	IL-8 pg/ml	p-value*
PMN+PBS	88 \pm 183	-----	49 \pm 89	-----	845 \pm 995	-----
PMN+LO FCZ	86 \pm 194	.8171	52 \pm 110	.7422	825 \pm 1094	.6356
PMN+HI FCZ	102 \pm 207	.1377	55 \pm 94	.1647	936 \pm 1220	.2765

*p values reflect comparisons of each FCZ group with the PBS group

Conclusion: While Fluconazole augments bactericidal activity of PMN in vitro, it does not do so through upregulation of the cytokine cascade.

NOTES

GRANULOCYTE-MACROPHAGE COLONY-STIMULATING FACTOR
(GM-CSF) ENHANCES PULMONARY DEFENSES AGAINST
PNEUMOCOCCAL INFECTIONS AFTER SPLENECTOMY
J. Hébert, M.D., M. O'Reilly, M.D.
University of Vermont

J. Hebert, M.D.

Burlington, VT

Recombinant cytokines and other host response modifiers are being evaluated as new therapies for severe infections. Splenectomy renders the host susceptible to overwhelming infections with *S. pneumoniae* (pneumococcus). Granulocyte colony stimulating factor (G-CSF) has been shown to improve survival of splenectomized mice following a pneumococcal aerosol challenge. Alveolar macrophage bactericidal and phagocytic function are depressed after splenectomy, and cytokines (G-CSF and IL-1) have been shown to improve macrophage function to different degrees depending upon whether mice were eusplenic or asplenic. GM-CSF has pronounced effects on the number and function of macrophages. The purpose of this study was to determine if pretreatment with GM-CSF could improve alveolar macrophage function and survival in splenectomized and sham operated mice following a pneumococcal aerosol challenge. Two weeks after splenectomy or sham operation, mice received either saline or GM-CSF (100 μ g s.c.) every 12 hours for 3 doses. Mice were then challenged with an aerosol of pneumococcus. All of the sham and splenectomized saline treated mice died, whereas 100 percent of the GM-CSF treated sham operated mice survived and 75 percent of the GM-CSF treated splenectomized mice survived ($p > .00001$, Mantel-Cox). Clearance of live pneumococci from mouse lung pairs and tracheobronchial lymph nodes was significantly improved by pretreatment with GM-CSF in both groups. Alveolar macrophages obtained by bronchial pulmonary lavage were studied for phagocytic activity using a flow cytometer and bactericidal activity using live colony counts. Both assays demonstrated improved activity in the GM-CSF treated mice compared to saline controls. Splenectomy did not affect the improved alveolar macrophage activity by GM-CSF. GM-CSF can augment alveolar macrophage function and provide protection against pneumococcal infections. It may be a useful adjuvant for the therapy of these and other infections in both normal and splenectomized individuals.

NOTES

ROLE OF CALCIUM IN LPS-STIMULATED TNF AND IL-1
SIGNAL TRANSDUCTION IN NAIVE AND ENDOTOXIN
TOLERANT MURINE MACROPHAGES.

M.A. West, M.D., J. Bellingham, B.A., L. Clair,
B.A.

Hennepin County Medical Center, University of
Minnesota

Presenter: Michael A. West, M.D.

Sponsor: J.W. McGill, M.D.

Minneapolis, MN 55415

Dysregulated macrophage (MØ) cytokine production may predispose to organ failure during sepsis. We showed that MØ pretreated (PreRx) in vitro with low dose endotoxin (LPS_p) are "reprogrammed" with inhibition of TNF and augmentation of IL-1 in response to subsequent LPS activation (LPS_a). To understand cytokine dysregulation we examined the Ca⁺⁺ dependence of TNF and IL-1 signal transduction to LPS_a and alterations mediated by LPS_p.

Methods: Murine peritoneal exudate MØ received ± 100 ng/ml of LPS_p for 24 hr. Cultures were PreRx for 2 hr with specific signal transduction inhibitors (verapamil, a Ca⁺⁺ channel inhibitor and TMB-8, an inhibitor of intracellular Ca⁺⁺ release) prior to 24 hr LPS_a-stimulation. TNF and IL-1 mRNA were measured 6 hr after LPS_a using RT-PCR. Supernatant TNF and IL-1 were measured by bioassay.

Results: The table shows that PreRx with LPS_p significantly inhibited TNF and augmented IL-1 release by LPS_a. PreRx with verapamil or TMB-8 markedly inhibited TNF release by LPS_a, but had little effect on IL-1 release. Reprogramming by LPS_p did not

LPS _a PreRx	LPS _p :			
	-	+	-	+
	TNF (ng/ml)		IL-1 (pg/ml)	
Control	12.4±.21	0.3±0.3*	50±5	275±20*
TMB-8 50µM	2.8±.2†	0.1±.02§*	84±15§	430±15*
Control	11.7±.6	0.2±.03*	120±10	1480±190*
Verapamil 50µM	3.6±.3†	0.1±.02§*	190±30§	800±300§*

§p = N.S., †p <.05 vs control, *p<.05 vs. No LPS_p by ANOVA

alter the Ca⁺⁺ signal transduction pathways. TNF message was present after LPS_a despite reprogrammed inhibition of TNF protein by LPS_p. Signal transduction inhibitors that blocked Ca⁺⁺ altered TNF and IL-1 message in reprogrammed MØ in a pattern similar to their effects on naive cells (data not shown).

Conclusions: Intracellular Ca⁺⁺ is required for TNF protein release by naive MØ and TNF mRNA transcription of both naive and LPS_p reprogrammed cells, however LPS_a-stimulated IL-1 release in peritoneal MØ does not require Ca⁺⁺ dependent signalling pathways. (Support by NIH GM44764)

NOTES

COPPERHEAD SNAKE BITES: A different entity than other pit viper envenomation.

Ronald E. Whitley, M. D.

CHIPPENHAM MEDICAL CENTER

RICHMOND, VIRGINIA

Treatment of venomous snakebites in the U.S. is separated into two groups (#1. Pit vipers #2 coral snakes.) Although copperheads are members of the pit viper class, in most cases their bites should not be treated with antivenin as are water moccasin or rattlesnake bites. A 12 year review of copperhead bites (86 patients) treated conservatively without antivenin or wound excision resulted in no deaths, no extremity losses, and no long term disabilities. Except in small children with severe systemic signs, antivenin should not be used in the treatment of copperhead snakebites. Skin testing and treatment with antivenin carry higher risks than conservative treatment. Recommended treatment of snakebites in trauma texts should draw distinction between copperhead bites and the more serious rattlesnake and moccasin bites.

NOTES

AN EVALUATION OF VIOLENCE PREVENTION FOR
HIGH RISK EARLY ADOLESCENTS

HR Champion, FRCS (Edin), PS Gainer, JD,
HS Bashinski, PhD, DS Elliot, PhD
Univ. of Maryland; Univ. of Colorado

HR Champion, FRCS (Edin)

HR Champion

Baltimore, Maryland; Boulder, Colorado

*Slavic notes
and problems
during study*

Between 1989 and 1994, we developed and taught a 15-lesson violence prevention course to approximately 4,000 high-risk children and early adolescents in the high crime areas of Washington, D.C. A total of 280 seventh graders in 12 classes at one school were evaluated for the immediate and six-month effects of the course, using a prospective controlled methodology with stratified random sample of classes. A 66-item questionnaire measured problem-solving ability, beliefs supportive of aggression, perceived risk of carrying a weapon or being involved with drugs.

Results: Multivariate analysis showed that the intervention was successful in decreasing support for aggression, increasing awareness of risk factors for becoming involved in violence, decreasing desire to carry a weapon for protection, and decreasing violent conceptualization of solutions to hypothetical problems in the experimental group. The effects were immediate and sustained at least six months.

Conclusion: A school-based public health oriented violence prevention program can achieve sustained changes in knowledge, attitude and skills related to aggressive behavior.

Comment: Such attitudinal changes are a pre-requisite for behavior change.

Postscript: The 15-lesson course was taught to the control group after completion of the study!

NOTES

GUNS IN YOUNG HANDS: A SURVEY OF URBAN TEENAGERS' ATTITUDES AND BEHAVIORS RELATED TO HANDGUN VIOLENCE

J. Bergstein, M.D., D. Hemenway, Ph.D., S. Quaday, R. Ander.
 Medical College of Wisconsin, Harvard School of Public Health
 J. Bergstein, M.D.
 J. Bergstein, M.D.
 Milwaukee, WI

OBJECTIVE: To determine the nature and causes of gun violence among urban youth

METHODS: We conducted a confidential survey of 1,219 seventh and tenth graders in Boston and Milwaukee, regarding their attitudes and behaviors toward violence and handguns.

RESULTS: 29% have had a member of their immediate family shot, 42% could get a gun if they wanted, 28% have handled a gun without adult knowledge or supervision, 17% have carried a concealed gun, and 3% reported bringing a gun to school in the past week. 9% admitted smoking cigarettes in the past week, 11% marijuana. 25% were attacked or threatened within the past year. Reasons for gun carrying were mostly related to perceived safety/threats/revenge (70%), followed by casual handling (16%), hunting (4%), being cool (3%), target practice (2%), gangs (1%). Over 87% would prefer a society with fewer guns versus the same number or more guns; 95% would prefer that it was very difficult or impossible for teens to get guns.

group	% of total	% of group admitting unsupervised gun handling
Overall	100	28
male	49	39*
females	51	19
10th graders	37	35*
7th graders	63	24
Don't wear seatbelt	59	35*
Wear seatbelt	41	20
Have poor grades	23	39*
Have good grades	77	26
Smokers	9	61*
Nonsmokers	81	25
Have gun in home	23	46*
No gun in home	77	23

Risk correlations for unsupervised gun handling, *all significant at $p < 0.001$ (Chi-square)

CONCLUSIONS: Handgun availability and use are high among urban youth; gun carrying is mostly related safety concerns and easy access, rather than to hunting or sport. This may be a cause of high handgun injury rates in this group. Gun injury prevention programs must address youth safety concerns along with handgun availability.

NOTES

**THE INCIDENCE AND SEVERITY OF
PSYCHOLOGICAL DYSFUNCTION
IN MODERATELY INJURED TRAUMA PATIENTS:
A POTENTIAL FACTOR IN DELAYED RECOVERY.**

D Condren, PhD, RC Mackersie, M.D., A Boccellari, PhD,
B Stegner, PhD, D Morabito MPH, H Ochitill, M.D.

University of California San Francisco, San Francisco General Hospital

Presenter: D. Condren

Senior Sponsor: Robert C. Mackersie

San Francisco, California

Psychological factors may be important determinants of delayed functional recovery following traumatic injury. The purpose of this study was to determine the type, incidence, and severity of these factors and their potential for interfering with normal function following moderate trauma.

Methods: Injury type and severity, physical disability, and subjective and objective measures of psychological functioning were measured within forty-eight hours of discharge using standard instruments for evaluating injury severity, and physical and psychological function. Trauma patients were recruited for study on the basis of: 1) pre-injury engagement in productive activity. 2) absence of psychiatric history, 3) ISS > 3 4) absence of spinal cord or head injury. Follow-up data was obtained at 6 weeks following injury.

factor correlated to PTSD	COEFF.	P
male > female	r=.60	.0001
fewer years of education	r=.44	.01
funct indep. measure (FIM)	r = .07	NS
injury severity score (ISS)	r = .08	NS

Results: 39 patients (age 18 - 65 yrs) were recruited. Mean ISS and length of stay were 13.1±6.9 and 8.7±5.5 respectively. 97% of subjects were symptomatic (met DSM-III-R criteria) for post traumatic stress

disorder (PTSD). Subjects reported a variety of intrusive psychological symptoms: trauma flashbacks 53%; difficulty sleeping, 81%; intrusive memories, 69%; irritability, 67%; trouble concentrating 63%. Depression was common with 40% scoring as moderate to severely depressed. There was no relationship between PTSD scores and injury severity or FIM. The mean depression score (16.1) exceeded that of typical clinical depression. Six week follow-up data showed a slight increase in PTSD score (43.5 from 38.6) Over half of the subjects stated that they anticipated a full recovery, although they had rated their injuries as very severe to severe.

Conclusions: Clinically significant post-traumatic stress occurs in most victims of moderate trauma. These patients are highly symptomatic, and do not show any improvement in the first several weeks following injury. This type of psychological dysfunction cannot be predicted on the basis of either injury severity or physical disability. The frequency and severity of these symptoms suggest that psychological dysfunction is a potentially important factor in delayed functional recovery from even moderate injury.

NOTES

SMALL BOWEL INJURY IN CHILDREN SUSTAINING BLUNT
ABDOMINAL TRAUMA: IS DELAYED DIAGNOSIS IMPORTANT?

DD Bensard MD, BL Beaver MD, GE Besner MD, DR Cooney MD

Children's Hospital of Columbus, The Ohio State University

DD Bensard, MD

Frederick M. Moore, MD

Denver, Colorado

Background: All hemodynamically stable children sustaining blunt abdominal trauma (BAT) are candidates for nonoperative management. A subset of these children will suffer small bowel injury not easily identified with current noninvasive diagnostic modalities which may result in delayed diagnosis.

Purpose: To assess 1) the incidence of small bowel injury (SBI), 2) the outcome in children in whom the diagnosis of SBI was delayed, and 3) the influence of SBI upon the nonoperative management of hemodynamically stable children with BAT.

Methods: 168 consecutive hemodynamically stable children with BAT admitted to a level I pediatric trauma center over a 24 month period were identified from the trauma registry and retrospectively studied. All children underwent initial diagnostic evaluation with plain radiography 14/168 (8%) or abdominal CT scan 154/168 (92%, ACT), and were admitted with the intent to treat nonoperatively. Statistical comparisons were made using Student's t-test or ANOVA. $p < 0.05$ was accepted as significant.

Results: 90/154 (58%) children undergoing ACT had an identified intraabdominal injury: 18 (11%) multiple solid organ injury, 62 (70%) isolated solid organ injury, 5 (6%) isolated pancreatic or duodenal injury, 3 (3%) isolated bowel injury, and 2 (1%) isolated bladder injury. 3/168 (1.8%) children underwent immediate operation for identified SBI. 6/165 (3.6%) children required delayed operation for missed SBI (24 ± 14 hours): 4 small bowel perforations, 1 duodenal perforation, 1 small bowel stricture. PTS, RTS, and ISS were comparable between groups ($p > 0.05$). Intraabdominal injury was present in 17/34 (50%) children with abdominal wall ecchymosis (AWE) and all children with SBI had AWE. In children with AWE, occult small injury was further suggested by increased temperature, heart rate, and decreased urine output at 24 hours ($p < 0.05$). No differences ($p > 0.05$) were found in ICU stay, hospital stay, or complications in children with delayed diagnosis of SBI relative to immediate diagnosis SBI or solid organ injury alone. Overall 9/168 (5%) children sustained small bowel injury, and required operation. 7/168 (4%) of children required delayed operation for a complication of the identified non-small bowel injury. 152/168 (90%) children admitted with the intent to treat nonoperatively were successfully managed.

Conclusions: Blunt small bowel injury in children occurs infrequently and is often undetected at initial presentation. Diagnostic delay is not associated with increased morbidity or mortality. Since the majority of hemodynamically stable children sustaining blunt abdominal trauma may be managed nonoperatively, an aggressive approach employing invasive diagnostic modalities is unwarranted.

NOTES

THE PROGNOSTIC SIGNIFICANCE OF THE SEAT BELT SIGN
M. COSTA, M.D., L. JONES, M.D., VICTOR LANDRY, PH.D,
H. SHERMAN, M.D., B. LATENSER, M.D., R. BARRETTE, M.D.,
J. VARCELOTTI, M.D., C. MC AULEY, M.D.

THE MERCY HOSPITAL OF PITTSBURGH

MARC L. COSTA, M.D.

HAROLD F. SHERMAN, M.D., F.A.C.S.

PITTSBURGH, PENNSYLVANIA

OBJECTIVE: To evaluate the significance of the seat belt sign in predicting visceral injury and the need for emergency laparotomy or thoracotomy. METHODS: All victims of vehicle crashes who were admitted to a Level I Trauma Center and who had been using restraints at the time of the crash were grouped according to the presence or absence of a seat belt sign. Both groups were then evaluated and compared for torso injuries sustained, findings at laparotomy or thoracotomy, and classification of the procedure as therapeutic or non-therapeutic. Information regarding patient age, sex, length of stay, Revised Trauma Score, Injury Severity Score, and probability of survival was also obtained. All data was obtained prospectively and verified by retrospective chart review. Data was analyzed for statistical significance using the Yate's corrected Chi-square test with p significant at <0.05 . RESULTS: During the 49 month study period, 228 patients were admitted following auto accidents who were restrained. Seventy-eight displayed a seat belt sign, and of these, 24 patients sustained visceral injuries. Seven of these 24 patients had emergency laparotomies or thoracotomies. Of the 150 patients without a seat belt sign, 29 patients suffered visceral injuries but only 1 had emergency laparotomy. Odds ratio for requiring emergency laparotomy or thoracotomy was 13.4:1 in favor of those with a seat belt sign, ($p=0.004$). Patients with a seat belt sign had a higher incidence of visceral injury ($p=0.029$), bowel injury ($p=0.028$), and liver injury ($p=0.048$) and a higher incidence of emergency operations ($p=0.007$), therapeutic operations ($p=0.002$) and therapeutic laparotomies ($p=0.004$). CONCLUSION: The presence of a seat belt sign following a motor vehicle accident is predictive of severe injury and should alert the physician to the increased need for operative intervention.

NOTES

AVOIDABLE PITFALLS IN THE DIAGNOSIS OF COLON INJURIES AFTER STAB WOUNDS TO THE BACK AND FLANK
 EM Boyle, M.D., JK Kovicich, BA, JD Salazar M.D., F Mann, M.D.,
 A Wilson, M.D. TH Pohlman, M.D., RV Maier, M.D.,
 GJ Jurkovich, M.D.
 Harborview Medical Center, University of Washington Departments
 of Surgery and Radiology
 EM Boyle, Jr, M.D.

GJ Jurkovich, M.D.
 Seattle Washington.

Significant injuries are rare following stab wounds to the back and flank (SWBF). Management protocols are designed to rule out injury, especially to the colon, which can be difficult to detect and devastating when missed. The purpose of this study is to examine various methods of evaluating patients with SW BF and determined what features need to be optimized to make the reliance on diagnostic studies improved.

Methods: All patients with SWBF from 1985 to 1995 were reviewed. Since 1989, the selective use of diagnostic peritoneal lavage (DPL) and triple contrast (oral, iv, rectal) computed tomography (CT) in patients with SWBF has supplanted a policy of mandatory celiotomy (MC) at our institution. All CTs were reviewed retrospectively to determine which features were predictive of verified injury and to identify technical errors.

Results: The study includes 184 patients, divided into two groups, based on whether they had a MC (group I) or selective management(Group II). Group II patients were further divided into those that had CT (IIa), DPL (IIb), DPL followed by CT (IIc) or observation alone (IId). 12 patients in the post 1989 series had immediate celiotomy for obvious signs of injury on initial physical exam.

Group	n	Pos. Tests	Surg. Explore	Therapeutic	False Positive	False Negative
I. MC	58		58	3		1
II. Dx Studies	114	17	15	5		
a. DPL alone	26	13	13	8	5	0
b. CT alone	27	2	2	1	1#	0
c. DPL then CT	31	0	0	0	0	3*
d. Observation	30	0	0		0	0

#There was one false positive CT that was read as positive no colon injury was found at exploration. *There were three false negative initial interpretations of the CT where colon injuries were later found after definitive reading. All were due to interpretive error and in one there was inadequate rectal contrast in the cecum. All four errors were later felt to be avoidable and due to human error.

Conclusions: A policy of MC results in excessive non-therapeutic celiotomies. Diagnostic studies offer a reasonable alternative to MC. In order to avoid an inaccurate interpretation of the CT, the surgeon must make sure the interpretation meets the following standards: 1) There must be contrast in the colon in the area of the presumed injury; 2) There can be no air or contrast outside or adjacent to the colon; 3) The pericolonic fascia must be pristine with no suggestion of edema or hemorrhage. Any suggestion of pericolonic extravasation of contrast, edema or hemorrhage, however small, must be interpreted as a positive study and prompt consideration for operative exploration.

NOTES

URGENT PARALYSIS FOR INTUBATION BY AN
 AEROMEDICAL TRANSPORT TEAM: A CRITICAL ANALYSIS
 Michael Rotondo MD, David Zonies, Ronald Sing DO,
 C.W. Schwab MD, *Steven Ross MD, *Collin Brathwaite MD
 University of Pennsylvania Medical Center
 Cooper Hospital/University Medical Center
 Michael Rotondo MD

Steven Ross MD

Philadelphia, Pennsylvania

OBJECTIVE: A protocol for urgent paralysis for intubation (UPI) by an aeromedical transport team (ATT) has been in place at our institution since June of 1988. This study examines the question: Is UPI a safe and efficacious prehospital practice?

METHODS: The flight and medical records of 86 consecutive patients undergoing UPI between June 1988 and July 1992 by a Level I university-based ATT were retrospectively reviewed. Per protocol, combativeness or direct medical command approval were prerequisites for UPI. Demographics and intubation mishaps (IM - multiple attempts, esophageal intubations, aspiration, arrhythmia) were indexed for all patients. Pulmonary complications (PUC - pneumonia, infiltrates, atelectasis) were recorded for patients surviving >24 hours (AS>24). The relationship between IM and PUC was analyzed and each related to AIS scoring.

RESULTS: Results are stated as means. A p value of < 0.05 was considered significant.

N	AGE	Blunt(%)	Pen(%)	RTS	ISS	IM(%)	AS>24	PUC(%)
86	31	81 (94.2)	5 (5.8)	11.31	19.45	17 (19.8)	77 (89.5)	22 (28.6)

There was no relationship between IM and PUC (p = 0.19, Fisher exact test).

	N	AIS Head	AIS Face		N	AIS Chest
IM+	17	2.59	1.18*	PUC+	22	2.19**
IM-	69	2.70*	0.45	PUC-	55	0.95

Student's t-test * (p < 0.05) ** (p = 0.052)

Severity of facial injury was significantly higher in patients with IM. Degree of chest injury approached significance for PUC. 82 patients (95.3%) had successful UPI; 73 (84.9%) on the first attempt. There were no esophageal intubations. Failure to intubate after paralysis occurred in 4 patients (4.7%): 2 survivors, 1 DOA and 1 death at 72 hours.

CONCLUSIONS: 1.) UPI in critically injured patients is safe and facilitates prehospital airway control. 2.) IM and PUC are common but are not related. 3.) IM usually reflects serious facial injury and PUC reflects chest injury, not procedure efficacy or provider performance. UPI, performed under strict protocol by a highly trained personnel, is an acceptable prehospital practice.

NOTES

EVALUATION OF DIAGNOSTIC PERITONEAL LAVAGE
IN GUNSHOT WOUNDS TO THE ABDOMEN

J. Kelemen, III, M.D., J. Obney, M.D., D. Jenkins, M.D.,
D. Kissinger, M.D., R. Martin, M.D.

Brooke Army Medical Center and Wilford Hall Air Force
Medical Center

J. Kelemen, III, M.D.

P. Offner, M.D. (Seattle, WA)

San Antonio, Texas

Objective: The purpose of this study is to evaluate the clinical utility of diagnostic peritoneal lavage (DPL) in hemodynamically stable patients with gunshot wounds to the abdomen.

Summary Background Data: DPL is currently used to diagnose intraabdominal injury in patients with stab wounds and blunt trauma. Since exploratory celiotomy is routinely performed on patients with gunshot wounds to the abdomen, DPL is rarely employed. However, several recent studies have questioned routine exploration and drawn attention to the associated morbidity of negative celiotomy. DPL is an easily performed and inexpensive test that may be useful in this situation, but there are no data available on the results of this diagnostic test in patients with gunshot wounds to the abdomen.

Methods: Hemodynamically stable patients with gunshot wounds to the abdomen were prospectively entered into the study. Following physical examination and routine radiographic evaluation, the senior surgery resident was asked to predict the presence of an intraabdominal injury requiring repair. DPL was performed in the operating room prior to the initiation of celiotomy. Return of 10ml of gross blood on initial aspiration or greater than 10,000 RBC/mm³ on lavage was considered a positive test. Injuries found at celiotomy were recorded.

Results: A total of 30 hemodynamically stable patients with gunshot wounds to the abdomen underwent DPL and exploratory celiotomy during the study period. The senior surgery resident correctly predicted the presence or absence of intraabdominal injury requiring repair in 80% of cases (24/30). Return of gross blood on DPL aspirate identified 92% (22/24) of patients with intraabdominal injuries that required operative repair and had no false positives (Fisher's Exact Test, $p < 0.01$). Two patients with a negative aspirate were found to have injuries requiring repair: a cecal perforation and a 3x4 cm abdominal wall fascial defect. Red blood cell count analysis of the lavage fluid identified the presence of an injury in the patient with the fascial defect. DPL identified 96% of patients (23/24) with intraabdominal injuries requiring operative correction with no false positives and one missed injury (Fisher's Exact Test, $p < 0.01$). Intraabdominal injury was not present in 20% of stable patients with gunshot wounds to the abdomen. DPL correctly identified these patients.

Conclusions: DPL is highly predictive and out performed clinical judgment alone in indicating a need for operative treatment in stable patients with gunshot wounds to the abdomen. DPL may facilitate prioritization of treatment and reduce unnecessary celiotomies.

NOTES

CONSERVATION OF HOSPITAL AND PHYSICIAN
RESOURCES: A TIERED TRAUMA RESPONSE

T. Helling, M.D., M. Watkins, R.N., L. Evans, M.D., P.
Nelson, M.D., J. Shook, M.D., C. VanWay, III, M.D.
Department of Surgery, University of Missouri
Kansas City School of Medicine
T. Helling, M.D.

T. Helling, M.D.

Kansas City, Missouri

While trauma systems have successfully directed the most critically injured to trauma centers, the trauma centers themselves, in order to avoid under-triage, receive a number of less seriously injured patients not in immediate need of the array of resources which can be mobilized. To avoid the strain on personnel and facilities that such over-triage might cause, in 1991 we instituted a two-tiered response to trauma patients based on perceived severity of injury. Class I patients were physiologically or neurologically unstable and required a full trauma team response. Class II patients were stable with extremity, multisystem, or mechanism injuries and were evaluated promptly by surgical housestaff. Additionally, GSWs to the head with a GCS of 3 or 4 and interhospital transfers were categorized as Class II. From 1991-1994, 1197 trauma admissions were evaluated. Three hundred and one patients were categorized as Class I and 896 as Class II. Class I patients more often had penetrating injuries (163/301 vs 161/896, $p < 0.001$), higher ISS (20.3 ± 16.5 vs 10.7 ± 9.4 , $p < 0.001$), lower RTS (5.8 ± 2.8 vs 7.5 ± 1.0 , $p < 0.001$), and longer LOS (10.8 ± 16.2 days vs 6.9 ± 12.9 days, $p < 0.01$). Ninety-two Class I patients (31%) died compared to 32 Class II patients (4%) ($p < 0.001$). Of the Class II deaths, 19 were from brain death, nine of which were isolate GSWs to the head, 13 were unexpected (TRISS probability of survival $> 50\%$), and three were mis-categorized (actually Class I criteria) with one potentially preventable death. Operations in the first 24 hours were required in 147/301 Class I patients and 238/896 Class II patients ($p < 0.001$). Estimated cost/charge savings by this system for the 896 Class II patients was approximately one million dollars. In conclusion, this two tiered system of patient categorization can correctly identify seriously injured patients with no apparent penalty in patient care for under-triage. In addition, a significant cost/charge savings was realized by conserving trauma team response for the most seriously injured.

NOTES

TRAUMA RECIDIVISM IN THE ELDERLY

K. D. Gubler, D.O., R. Davis, M.D.,
F. P. Rivara, M.D., T. Koepsell, M.D.,
and R. V. Maier, M.D.
Naval Medical Center San Diego and
The University of Washington
K. D. Gubler, D.O.
L. Gentilello, M.D.
Seattle, Washington

The elderly account for nearly one third of trauma related expenses. Although it is recognized that a significant proportion of trauma patients have a history of previous hospitalizations for trauma, the risk of trauma readmission in the geriatric trauma patient is unknown.

Objectives: The purpose of this study was to evaluate the risk of readmission for trauma in elderly trauma patients compared to a previously uninjured geriatric cohort. In addition, the study determined the effects of age, sex, race, pre-existing illness, and Injury Severity Score (ISS) of the index admission on trauma recidivism.

Design: Retrospective cohort analysis. The exposure of interest was injury requiring hospital admission in 1987. The measured outcome was admission for trauma within 5 years subsequent to the index admission for injury.

Methods: HCFA health care data bases were utilized to identify a cohort of geriatric patients at least 66 years of age in 1986. The injured cohort (n=9424) was identified using hospital discharge data for 1987 and the ISS generated by a mapping program (ICD-Map). The uninjured cohort (n=37787) was identified from Medicare eligibility files. Pre-existing illness was assessed using ICD-9CM codes from outpatient and inpatient data files for 1986.

Results: The injured cohort had significantly increased risk of subsequent trauma admission ($p < .001$ Cox's proportional hazards regression). Increasing ISS was associated with increased risk of trauma readmission (ISS 1-8 = RR 2.7, ISS 9-15 RR = 2.4, ISS 16-24 RR = 4.6, ISS 25-40 RR = 4.6). Mild liver disease was the comorbid condition with the greatest risk for readmission (RR = 4.6)

Conclusion: This study demonstrates that trauma in the elderly is recurrent. Traumatized geriatric patients are at risk for subsequent trauma admission. Further study is required to develop age specific interventions for the prevention of recurrent injury in the elderly.

NOTES

CLINICAL CHARACTERIZATION OF THE POST-TRAUMATIC
AUTONOMIC HYPEREXCITABILITY SYNDROME (AHS)

D. Nayduch, M.S.N., A. Haas M.A., R. L. Reed, II, M.D.

Duke University Medical Center

Donna Nayduch, R.N., M.S.N.

R. Lawrence Reed, II, M.D.

Durham, NC

A syndrome of autonomic hyperexcitability, characterized by hyperthermia, hypertension, tachycardia, tachypnea, diaphoresis, increased muscle tone, and diminished level of consciousness, can occur following traumatic brain injury (TBI). We sought to characterize the mechanism of injury, lesions, management, and outcomes of the autonomic hyperexcitability syndrome (AHS). 8,452 consecutive trauma admissions to a Level I Trauma Center between 1988-1994 were reviewed, producing 2,138 patients with TBI & 42 patients with AHS (0.5% of total and 2.0% of TBI). Among the AHS patients, the Abbreviated Injury Score for head/neck area was a unanimous 5. Therefore, to control for the degree of head injury, a subgroup of those TBI patients (n=755) with an AIS=5 for the head/neck area was also used. Comparisons were made for the Injury Severity Scores (ISS), Revised Trauma Scores (RTS), Glasgow Coma Scale Scores (GCS), intensive care unit length of stay (ICU LOS) in days, hospital length of stay (HLOS) in days, and hospital charges.

Parameter	TBI	TBI with AIS=5	AHS
ISS	22.57±0.25**	33.26±0.29*	35.86±1.06
RTS	2.88±0.10**	2.41±0.14**	5.25±0.20
GCS	8.38±0.12**	5.61±0.13	5.10±0.36
ICU LOS	4.98±0.19**	7.48±0.35**	18.14±1.67
HLOS	12.57±0.38**	18.07±0.87**	53.88±5.20
Charges	\$32,554 ± \$1,059**	\$56,926 ± \$2,418**	\$136,420 ± \$1,0756

(* = p < 0.05 vs. AHS; ** = p < 0.001 vs. AHS)

Mean ISS, RTS, ICU days, hospital LOS, and charges were higher for the AHS patient than the TBI patient regardless of the degree of head injury, in contrast to the GCS, which appeared to be associated with the degree of head injury. The most common lesion in AHS was a subdural or epidural hematoma. The most common treatment used was morphine sulfate, while bromocriptine was more commonly used for long term management. Episodes of AHS stopped when patients were actively verbalizing and following commands. AHS was associated with a 98% survival rate with an average improvement of 1-2 levels on the Rancho Los Amigos Scale. This analysis demonstrates AHS to be a rare syndrome following head injury, and is associated with high costs, long stays, and good outcomes.

NOTES

INJURIES TO THE PATHOLOGIC SPLEEN: IS THERE A ROLE FOR NONOPERATIVE MANAGEMENT?

H. Leon Pachter MD*, Amber A. Guth MD, Glenn R.
Jacobowitz MD
New York University Medical Center / Bellevue
Hospital
H. Leon Pachter
H. Leon Pachter
New York City, New York

OBJECTIVE: Nonoperative management of blunt splenic injuries in hemodynamically stable patients has been established as the treatment of choice. Less clear is the management of a blunt traumatic injury to a pathologic spleen. Until recently, these cases have been routinely treated by splenectomy. However, the combination of splenectomy and underlying immunosuppression renders these patients particularly susceptible to post-splenectomy infection. We hypothesized that if these patients were hemodynamically stable, their clinical course should not differ from that of patients with splenic injuries to normal spleens managed nonoperatively. A prospective study was undertaken in a university setting to validate this concept.

METHODS: Hemodynamically stable patients with pre-existing pathologic splenomegaly, isolated AAST Grade 1-4 splenic disruptions diagnosed by CT, and initial blood transfusion requirements of 2 or fewer units were entered into the nonoperative protocol. Candidates were monitored in a critical care setting until significant improvement in the CT appearance of the splenic injury was present. Resolution of the splenic disruption was demonstrated by serial CT examination.

Underlying Disease	Etiology	N
HIV+/AIDS	Blunt trauma	8
Acute leukemia	Spontaneous	1
Mononucleosis	Spontaneous	1

RESULTS:

Nonoperative management was successful in all 10 patients studied. No patient required

surgery for the splenic rupture, and there were no infectious complications. The mean transfusion requirement was 0.8 units (range: 0-5); the mean length of stay was 16 days (range: 4-32).

CONCLUSION: Contrary to previously held dogma, enlarged pathologic spleens are capable of spontaneous healing after parenchymal disruption. The safety of nonoperative management, and the minimal transfusion in these 10 consecutive patients should give pause to routine splenectomy when one is confronted with an injured pathologic spleen.

NOTES

BY-LAWS



**BYLAWS OF
WESTERN TRAUMA ASSOCIATION**

ARTICLE I

Name, Objectives, Organization, and Jurisdiction

SECTION 1: Name

The name of this organization is the Western Trauma Association.

SECTION 2: Objectives

The objectives of the Association are 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.

SECTION 3: Organization

This is a non-profit membership corporate entity, duly incorporated on this 25th day of January, 1971 under, and by virtue of, the provisions of the laws of the State of Colorado.

SECTION 4: 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 throughout the "free world".

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 to 100 members. No single specialty shall comprise more than 40% of the total membership of 100.

SECTION 2: Qualifications

Active members shall be limited to Doctors of Medicine who are Board Certified in their particular medical specialty. The Board of Directors is hereby given discretionary powers to interpret if foreign physicians who apply for membership have the credentials comparable to Board Certification. Certified members of other (non-M.D.) health care disciplines with a special interest or expertise in trauma may be elected to associate membership with the approval of the Board of Directors and the membership. Associate members shall have all the rights and privileges and must satisfy the same requirements for election to and retention of membership as active members except the right to vote or hold office. For applications to be considered, candidates must submit a completed application with a letter of support (sponsorship) from a member of the Association, submit an abstract for consideration by the Program Chairman, and attend the entire meeting during which their application is being considered. A new member must attend a prior meeting in which he/she is voted on for membership in the capacity of a resident, physician or certified specialist.

SECTION 3: Membership Retention

To retain membership in the Association, each member must comply with the following:

- (a) Be a physician in good standing before his or her professional specialty board.
- (b) Attend at least one out of every three consecutive meetings of the Association.
- (c) Tender to the Program Chairman for consideration an abstract relating to the diagnosis or management of traumatic conditions within the particular medical specialty of the member at one out of every three consecutive meetings of the Association. An invited active panelist can fulfill this requirement.
- (d) Agree to be responsible for annual membership dues and any assessments as set by the Board of Directors at a special or the annual meeting and to remain current in the payment of same.

At age 55, members in good standing will automatically accept the position of senior membership in the Western Trauma Association. A senior member must pay dues annually and retains all voting privileges and rights of active members, but does not have to attend the meetings, or submit an abstract once every three years, and his membership is not counted as part of a given specialty's membership quota or the total membership number.

SECTION 4: Board Action Concerning Membership

Applicants to the Association can obtain membership on a two-thirds vote of the Board of Directors.

Termination of membership can only be obtained on a two-thirds vote of the Board of Directors for a violation of one or more of the items set forth in Article II, Section 3 of the By-Laws of this association.

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 Board of Directors. Funds shall be made available for the conduct of the scientific program at the annual meeting (the exact amount of the funds shall be set by the Board of Directors).

SECTION 2: Special Meetings

Special meetings of the Association may be called by the Board of Directors or two-thirds of the membership 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 by the secretary of the Association to each and every member at his address as it last appears on the 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.

SECTION 4: Quorum

One-fourth of the membership present at any meeting of the Association shall constitute a quorum.

ARTICLE IV

Meetings of the Directors

SECTION 1: Annual Meetings

The annual meetings of the Board of Directors shall be held on the same day or days and at the same place as the annual meeting of the Association.

SECTION 2: 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.

SECTION 3: Quorum

A majority of the Board of Directors shall constitute a quorum.

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 treasurer and president and notice thereof shall be sent to the membership along with the 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 prior to the annual meeting. Failure to pay dues 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 only for the promotion of scientific programs at the annual meetings, research papers or 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 to respective members at their last address on record with the Association, postage pre-paid.

SECTION 4: Waiver of Dues

All requirements for retention of membership including payment of dues, submission of abstract, and attendance at meetings may be waived by the Board of Directors upon petition. Eligibility for such waivers shall include inductions into the Armed Forces of the United States on a temporary basis, physical disability, or other reasons which would place unreasonable hardship, physical disability, or other reason upon the petitioner.

ARTICLE VI

Voting

SECTION 1: Voting Rights

Each active 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

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

SECTION 3: Manner of Voting

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

- (1) In person.
- (2) By United States Mail, postage pre-paid, addressed to the secretary of the Association at the Association's registered office, postmarked on or before the date of the meeting of the membership where the vote is to be taken.
- (3) By proxy duly executed in writing by the member or his authorized attorney-in-fact. No voting member in attendance at a meeting shall hold or vote more than one duly executed proxy for absent members.

SECTION 4: Cumulative Voting

Cumulative voting shall not be allowed.

SECTION 5: Amendments

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

SECTION 6: 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

SECTION 1: Officers

The officers of the corporation shall consist of the president, president-elect, vice president, secretary, treasurer, and such other officers as from time to time may be appointed by the Board of Directors. The president, president-elect, vice president, secretary, and treasurer shall be elected at the annual meeting of the members.

SECTION 2: Term and Vacancies

The secretary and treasurer shall each hold office for the term of three (3) years. The remaining officers shall be elected at the annual meeting of the members. In the event that an officer cannot fill his term, his successor shall be chosen by the Board of Directors to fill the vacancy for the unexpired term of the office.

SECTION 3: Removal

Any officer may be removed, with or without cause, by a vote of a majority of the members of the Board of Directors present at any meeting for that purpose.

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 of Officers

SECTION 1: President

Following his ascension to the chair, the president shall preside at all meetings of the members and shall serve as ex-officio member at all committees. The president shall be Chairman of the Board of Directors and shall serve as the 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 shall assign to him.

SECTION 3: Vice President

The vice president shall preside at all business meetings in the absence of the president.

SECTION 4: Secretary

The secretary shall keep the minutes of all meetings of the members and the Board of Directors; shall keep all records and information pertaining to the history of the Association; and be responsible for applications for membership, approvals, and deletions as well as communications to the membership, especially those whose membership is in jeopardy.

SECTION 5: Treasurer

The treasurer shall have the following duties:

- (1) Shall keep the books of account of the Association and shall cause to be prepared an annual audit for presentation at the annual meeting.
- (2) Shall have custody of, and be responsible for all funds, securities, and other properties of the Association and shall deposit all such funds in the name of the Association in such banks or other depositories as shall be selected by the Board of Directors.
- (3) Shall assist the secretary in keeping the roster of the membership which is current and accurate.
- (4) Shall engage a certified public accountant, approved by the president to audit annually the books of the Association. The accountant's report shall be reviewed by the auditing committee.

ARTICLE IX

Board of Directors

SECTION 1: Composition

The Board of Directors of the Association shall consist of the following individuals:

- (1) The president, president-elect, vice president, secretary, and treasurer, immediate past president, and six members-at-large.
- (2) Two members of the Association in good standing shall be elected annually to replace two existing members-at-large of the Board unless the membership should, by majority vote, elect to retain the then existing Board of Directors.
- (3) 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: 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 corporate shall be controlled by, or under the authority of, the Board of Directors.

ARTICLE X

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 the members.

SECTION 2: Program Committee

The Program Committee shall consist of a Chairman and a Committee including a General Surgeon, and Orthopedic Surgeon, another specialist, and the Chairman of the Publications Committee (ex-officio), all appointed by the President. The Chairman is appointed for a two-year term. This Committee will be responsible for the organization and conduct of the program at the annual meeting.

SECTION 3: Membership Committee

The Membership Committee shall consist of the Board of Directors. 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 be then presented to the membership for its approval as previously outlined.

SECTION 4: Publications Committee

The Publications Committee will consist of a Chairman and a Committee including a General Surgeon, an Orthopedic Surgeon, a Plastic Surgeon, another specialist, and the Chairman of the Program Committee (ex-officio), all appointed by the President. 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* designated by the President.

ARTICLE XI

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 XII

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 to the date of the meeting at which the proposed amendment is to be voted upon. It shall require a two-thirds vote of a quorum of the membership present at the meeting to amend a Bylaw.

MEMBERSHIP



**WESTERN TRAUMA ASSOCIATION
1995 - 1996
MEMBERSHIP LISTING**

AMMONS, Mark A. (Lee Anne)	2005 Franklin Midtown II, Suite 410 Denver, CO 80205	O:303-832-6165 H:303-355-5709 Gen/Thoracic Surgery
* APRAHAMIAN, Charles (Patricia)	8700 W. Wisconsin Ave. Milwaukee, WI 53226	O:414-257-5022 H:414-781-2209 Surgery
BAHNSON, David H. (Peggy)	3 Albert Cree Drive Rutland, VT 05701	O:802-775-2937 H:802-773-4143 Orthopedics
BARTON, Richard G. (Janet)	50 North Medical Drive - #38313 Salt Lake City, UT 84132	O:801-581-4314 H:801-582-4202
BENJAMIN, James (Laurie)	Univ. Medical Center Room 4318 Tucson, AZ 85724	O:602-626-4024 H:602-795-7015 Orthopedics
BERGSTEIN, Jack	Medical Coll Wisconsin 8700 W. Wisconsin Ave Box 205 Milwaukee, WI 53226	O:414-257-5023
BINTZ, Marilu	610 East Taylor Street Paririe DuChien, WI 53821	O:608-326-6466 H:608-326-4306 Surgery
BOYD, Allen D., Jr. (Claire)	601 Elmwood Avenue Box 665 Rochester, NY 14642	O:716-275-7938 H:716-264-9489 Orthopedics
BROECKER, Bruce H.	1901 Century Blvd. Atlanta, GA 30345	O:404-320-9179 H:404-325-2297 Urology
BURCH, Jon M. (Rita)	Baylor College of Medicine Houston, TX 77030	O:713-798-3432 H:713-666-3569 Surgery/Vascular
CABANELA, Miguel E. (Rosa)	200 First Street, SW Rochester, MN 55905	O:507-284-2226 H:507-285-1045 Orthopedics
CARTER, Donald R.	8200 E. Belleview #400 Englewood, CO 80111-2807	O:303-740-7760 H:303-671-0250 Head & Neck Surg
* CARVETH, Stephen (Kay)	6200 Old Cheney Road Lincoln, NE 68516	O:402-489-6553 H:402-423-1768 Thoracic/ Cardiovasc Surg

* -- Denotes Senior Member

CHAMPION, Howard R. (Maria)	1900 Quincy St.,NW Washington, D.C. 20010	O:202-877-6424 H:202-829-3486 Gen/Trauma Surg
CHANG, Frederic C. (Jan)	14809 Willowbend Circle Wichita, KS 67230	O:316-268-0296 H:316-753-0627 General Surgery
CHERRY, Kenneth J. (Robin)	Mayo Clinic 200 First St., S.W. Rochester, MN 55905	O:507-284-2644 H:507-288-3131 Vascular Surgery
COBEAN, Roy A. (Linda Rathburn, M.D.)	Maine Medical Center Surgical Associates 229 Vaughan Street Portland, ME 04102	O:207-774-2381 H:207-781-4735 Surgery
COCANOUR, Christine S.	Univ of TX, Dept of Surg 6431 Fannin, #4.164 Houston, TX 77030	O:713-792-5407 Fax:713-792-5417
COGBILL, Thomas H. (Jan)	1836 South Avenue La Crosse, WI 54601	O:608-782-7300 H:608-788-7808 Gen/Vasc Surgery
COHN, Stephen M. (Kelly)	350 Congress Avenue Suite 3A New Haven, CT 06510	O:203-785-2572 H:203-466-0006 Surgery
COIL, James A.,Jr. (Sharon)	Dept of Surgery St. Vincent's Med Ctr 355 Baird Ave Staten Island, NY 10310	O:Not Available H:Not Available General Surgery
DAVIS, James W.	Department of Surgery Valley Medical Center 445 S. Cedar Fresno, CA 93701	O:209-453-4490 H:209-434-2742 Gen/Trauma Surg
EBERSOLD, Michael J. (Janet)	Mayo Clinic 200 First Street, S.W. Rochester, MN 55905	O:507-284-3714 H:507-288-5781 Neurosurgery
EDMONDSON, Robert C. (Ann)	921 Cleveland Street Woodland, CA 95695	O:916-666-1631 H:916-662-7856 Internal Medicine (Oncology)
EDNEY, James A. (Debbi)	University of Nebraska Medical Center 42nd and Dewey Omaha, NE 68150	O:402-559-4075 H:402-592-4335 General Surgery
ESPOSITO, Thomas J.	2160 South First Avenue Bldg 54, Room 260 Maywood, IL 60153	O:708-216-8351 H:708-531-1271 Surgery
ESRIG, Barry C.	50 Bellefontaine Street Suite 403 Pasadena, CA 91105	O:818-683-9000 H:818-355-1893 Thoracic Surgery

FELICIANO, David V.	Dept. Surg, Glenn Bldg. Grady Mem. Hospital 69 Butler Street Atlanta, GA 30303	O:404-616-5456 H:404-875-1648 Gen/Trauma Surg
FERRIS, Bruce G. (Joan)	825 N. Hillside Wichita, KS 67214	O:316-688-7500 H:316-733-1241 Plastic Surgery
FILDES, John (Elizabeth)	Cook County Hospital Trauma Department RM 3241 1835 West Harrison Street Chicago, IL 60612	O:312-633-8075 H:708-963-3228 Trauma Surgery
* FISCHER, Ronald P. (Nancy)	UTMSM 6431 Fannin, Suite 4.286 Houston, TX 77030	O:713-636-5765 H:713-745-1477 O:713-827-7925 Gen/Trauma Surger
FRAZEE, Richard C. (Debbie)	2401 S. 31st Street Temple, TX 76508	O:817-774-4976 H:817-939-6009 General Surgery
GALL, Warren (Beth)	345 W. Washington Madison, WI 53703	O:608-252-8473 H:608-276-8605 Thoracic/Cardiova Surgery
GENTILELLO, Larry M. (Olivia)	Harborview Medical Center 325 9th Avenue, ZA-16 Seattle, WA 98104	O:206-223-3956 H:206-641-4191 General Surgery
GUSSACK, Gerald S. (Lynn)	1365 Clifton Road Atlanta, GA 30322	O:404-248-5724 H:404-621-9350 Otolaryngology
HALL, John R. (Mary)	Cook County Hospital 700 S. Wood Street Chicago, IL 60612 B-40	O:312-633-8583 H:312-383-5724 Surgery/Peds
HARRISON, Paul B. (Carolyn)	3243 Murdock, 404 Wichita, KS 67208	O:316-685-6222 H:316-686-3075 General Surgery
HAUTY, Michael (Rose)	800 S. W. 13th Street Portland, OR 97205	O:503-221-0161 H:503-294-0754 Surgery
HEBERT, James C. (Mary Ellen)	Dept. of Surgery Fletcher 301 Medical Center Hospital Burlington, VT 05401	O:802-656-5354 H:802-985-3937 Surgery
HELLING, Thomas C. (Linda)	4320 Wornall, #308 Kansas City, MO 64111	O:816-753-7460 H:913-649-6164 General Surgery
HOLEVAR, Michele R. (John Anderson)	Christ Hospital & Med Ctr 4440 West 95th Street Oak Lawn, IL 60453	O:708-346-4254 H:708-354-1941

HOYT, David B. (Beth)	Division of Trauma H-640-B UCSD Medical Center 225 Dickinson Street San Diego, CA 92103	O:619-294-6400 H:619-272-5893 Surgery
IANNACONE, William, M.D. Ph.D. (Jane)	Three Cooper Plaza Camden, NJ 08103	O:609-342-3253 H:215-664-4786 Orthopedic Surgery
JURKOVICH, Gregory (Deanne)	Harborview Medical Center 325 9th Avenue, ZA-16 Seattle, WA 98104	O:206-223-5912 H:206-232-2153 Gen/Trauma Surgery
KAPPEL, David A. (Charl)	Professional Bldg. IV Suite 200 Medical Park Wheeling, WV 26003	O:304-242-0590 H:304-277-3018 Plastic Surgery
KARRER, Frederick M. (Debra)	The Children's Hospital 1950 Odgen Street, B323 Denver, CO 80218	O:303-861-6571 H:303-3220-4328
KEARNEY, Robert E. (Becky)	Harbourside Medical Tower #730 4 Columbia Drive Tampa, FL 33606	O:813-253-6001 H: General Surgery
KING, Brent R. (Rosemary Kozar)	Dept. of Emergency Med. Medical College of PA 3300 Henry Ave. Philadelphia, PA 19129	O:215-427-5369 H:215-782-1448 ER/Pediatrics
KLASSEN, Rudolph A. (Frieda)	200 First Street, SW Rochester, MN 55905	O:507-284-3662 H:507-288-4879 Orthopedics
KNUDSON, Mary Margaret (Stephen A. Delateur)	SF General Hospital Ward 3A, 1001 Potrero San Francisco, CA 94110	O:415-206-8820 H:415-948-3419 Gen/Trauma Surgery
LANDERCASPER, Jeffrey (Betty)	1836 South Avenue La Crosse, WI 54601	O:608-782-7300 H:507-895-6222 General Surgery
LANZI, Guy L. (Maureen) (Associate Member)	15 E. Euclid Avenue Haddonfield, NJ 08033	O:609-429-1711 H:609-427-0722 Oral and Maxillofacial Surg.
LATENSER, Barbara A.	1400 Locust Street Pittsburgh, PA 15219	O:412-232-5612 H:412-361-6808
LAU, Jeffrey M. (Diane)	1329 Lusitana Street Suite 108 Honolulu, HI 96813	O:808-537-1974 H:808-595-7039 Thoracic/Cardio Vascular Surgery
LEWALLEN, David G. (Marti)	200 First Street, SW Rochester, MN 55905	O:507-284-4896 H:507-282-4463 Orthopedics

LINDEN, Christopher H. (Jeanne)	Univ. of Mass. Med. Center 55 Lake Avenue North Worcester, MA 01655	O:508-856-4101 H:508-756-3993 Emerg. Medicine
LUCIE, Stephen R. (Sharon)	3804 McGirts Boulevard Jacksonville, FL 32210	O:904-399-3604 H:904-387-3604 Orthopedics
MACKERSIE, Robert C. (Katherine)	Ward 3A, Dept. of Surg. SFGH 1001 Portero Avenue San Francisco, CA 94110	O:415-206-8814 H:415-731-8466 Gen/Trauma Surgery
MCAULEY, Clyde E.	St. Elizabeth Hospital 1044 Belmont Ave Youngstown, OH 44501	O:216-746-7211
*MCGILL, J. Bishop (Betty)	154 East Avenue Burlington, VT 05401	O:None H:802-862-7611
*MCGILL, John W.	Hennepin County Medical Center Emergency Department 701 Park Avenue, S. Minneapolis, MN 55415	O:612-347-5683 H:612-825-4281 Emergency Medicine
* MCGUIRE, Arthur M. (Peggy)	COL. MC 98th GEN Hospital Unit 27401-Box R APO AE 09105	
MCINTYRE, Kenneth E.	1501 N. Campbell Avenue Tucson, AZ 85724	O:602-626-7747 H:602-299-1539 Vasc/Gen Surgery
MCKINLEY, Richard C. (Cheryl)	P.O. Box 199 Augusta, MO 63332	O:314-781-1317 H: Addiction Medicine
MEHRHOF, Austin I., Jr. (Trudi)	Box 154, MCV Station Richmond, VA 23298	O:804-786-9318 H:804-794-6329 Gen/Plastic Surgery
METHENY, Jeffry	2031 Anderson Rd., St. A Davis, CA 95616	O:916-756-2221 H:916-758-0597 Orthopedics
METZDORFF, Mark T. (Marie-Louise)	2226 NW Pettygrove Street Portland, OR 97210	O:503-226-6321 H:503-243-1088 Gen/Thor Surgery
MILLIKAN, J. Scott (Ann)	1138 Moon Valley Road Billings, MT 59105	O:406-238-2770 H:406-256-8434 Thoracic/Cardio- Vascular Surgery
MOORE, E. Eugene (Sarah)	Denver General Hospital 777 Bannock Street Denver, CO 80204	O:303-436-6565 H:303-831-4102 Gen/Trauma Surgery

MOORE, Fred (Paula)	Denver General Hospital 777 Bannock Street Denver, CO 80204	O:303-436-6592 H:303-741-1210 Gen/Trauma Surgery
MOORE, John B. (Debbie)	9351 Grant Street Suite 400 Thornton, CO 80229	O:303-452-0059 H:303-467-2321 General Surgery
MORRIS, John A., Jr. (Julia)	S-2304 Medical Center, No. Vanderbilt University Nashville, TN 37232	O:615-936-9175 H:615-292-0483 Gen/Trauma Surgery
MUCHA, Peter, Jr. (Sonja)	RR #9 Bingen Road Bethlehem, PA 18015	O:717-272-6621 H: Gen/Trauma Surgery
NELSON, Gerald D. (Doris)	825 N. Hillside Street Wichita, KS 67214	O:316-688-7500 H:316-684-1524 Plastic Surgery
NEVIASER, Robert J. (Anne)	2150 Pennsylvania Ave.,NW Washington, DC 20010	O:202-994-4386 H:301-869-1919 Orthopedics (Hand)
NICHSENER, M. Gage (Judy)	110 Irving Street, NW Washington, DC 20010	O:202-877-6424 H:703-329-0828 Gen/Trauma Surgery
NIFFNER, Patrick J. (Kelly Greene)	Chief, Critical Care Department of Surgery Brooke Army Med. Ctr., Fort Sam Houston, TX 78216	O:210-916-8000 H: Critical Care
NIELFELT, Paul C. (Helen)	2206 Parkland Lane Minneapolis, MN 55416	O:612-932-5000 H:612-922-1735 Radiology
NILSEN, William R. (Joan)	3387 Herron Road Frankfort, MI 49635	O: H:616-352-4815 Retired
NIMMALLEY, Keith F.	Three Cooper Plaza Suite 411 Camden, NJ 08103	O:609-342-3013 H:609-234-0253 Gen/Trauma Surgery
NISBORNE, Robert W., Jr. (Martha)	1802 S. Yakima, #204 Tacoma, WA 98405	O:206-383-3325 H:206-754-7858 Vascular Surgery
NISCHTER, H. Leon (Rena)	530 First Avenue, NY/6C New York City, NY 10016	O:212-340-7302 H:212-679-9633 Gen/Trauma Surgery
NITENSEN, Scott R. (Elizabeth)	St. Joseph's Hospital & Medical Center 350 W. Thomas Road Phoenix, AZ 85013	O:602-285-3157 Surgery
NIPHILLIPS, Thomas F. (Bonnie)	326 Montcalm San Francisco, CA 94110	O:415-476-1166 H:415-821-0427 Gen/Ortho Surgery

PICKARD, Laurens (Bonnie)	One Baylor Plaza Houston, TX 77030	O:713-798-4599 H:713-669-9722 Gen/Thoracic/Ped Surgery
PIERCE, George (Carolyn)	University of Kansas Medical Center 39th & Rainbow Boulevard Kansas City, KS 66103	O:913-588-6128 H:913-268-5631 Gen/Thoracic/Vasc Surgery
POLACK, Edward P. (Wendy)	Professional Building,IV Suite 200 Medical Park Wheeling, WV 26003	O:304-242-0590 H:304-233-6132 Plastic Surgery
RATZER, Erick R. (Jeanne)	Three Cimmaron Drive Littleton, CO 80121	O:303-399-1194 H:303-781-2002 General/Oncology Surgery
REED, R. Lawrence, II (Geraldine)	Box 3501, Dept. of Surg. Duke Univ. Med. Center Durham, NC 27710	O:919-681-5080 H: Gen/Trauma Surgry
ROETTGER, Richard (Sara)	Department of Surgery University of Louisville Louisville, KY 40292	O:502-588-1727 H:502-896-8330 Gen/Trauma Surgery
ROSEMURGY, Alexander S. (Kathryn)	Department of Surgery 730 Harbourside Tower 4 Columbia Drive Tampa, FL 33606	O:813-253-6001 H:813-932-9167 Gen/Trauma Surgery
ROSENBERGER, Alan (Mary)	9351 Grant Street Suite 400 Thornton, CO 80229	O:303-452-0059 H:303-467-1243 Gen/Thor/Vascular Surgery
ROSS, Steven E. (Carolyn)	3 Cooper Plaza Suite 411 Camden, NJ 08103	O:609-342-3014 H:609-427-4352 Gen/Trauma Surgery
ROZYCKI, Grace S.	Glenn Bldg, Grady Hosp 69 Butler St SE Atlanta, GA 30303	O:404-616-3553
RUTHERFORD, Edmund J. (Eloise)	2100 Pierce Ave., 243 MCS Division of Trauma Nashville, TN 37212	O:615-936-0175 H:615-298-5775 General Surgery Critical Care
RUTHERFORD, Robert B. (Kay)	Box C-312-4200 East 9th Avenue Denver, CO 80262	O:303-394-8552 H:303-322-3790 Gen/Thor/Vascular Surgery
SAFFLE, Jeffrey R. (Susan)	50 N. Medical Drive #3B-306 Salt Lake City, UT 84132	O:801-581-3595 H:801-582-6603 Gen Surg/Burns
SCALEA, Tom M.	116 Willow Street, #2 Brooklyn, NY 11201	O:718-735-3416 H:718-402-0924 Gen/Trauma Surgery

SCHECTER, William P. (Gisela)	1001 Potrero Avenue Ward 3A San Francisco, CA 94110	O:415-821-8817 H:415-726-1339 Anesthesia/Surgery
SEIBERT, Charles E. (Mary)	One Cimmaron Drive Littleton, CO 80121	O:303-761-9190 H:303-781-7760 Radiology
SHACKFORD, Steven R. (Ellen)	301 Fletcher House Medical Center Hospital of Vermont Burlington, VT 05401	O:802-656-5354 Gen/Trauma Surgery
SHARP, Kenneth W. (Eileen)	TVC 3662 Vanderbilt University Nashville, TN 37232	O:615-322-0259 H:615-377-1978 Gen/Trauma Surgery
SHERMAN, Harold	Division Multisystem Trauma Mercy Hospital of Pittsburgh 1400 Locust Street Pittsburgh, PA 15219	O:412-232-7786 H:412-683-7744 Gen/Trauma Surgery
SIMONET, William T. (Michele)	6363 France Ave. S. Suite 500 Edina, MN 55435	O:612-925-2535 H:612-926-5693 Orthopedics
STOTHERT, Joseph C. (Jean)	Department of Surgery E-45 University of Texas Medical Branch Galveston, TX 77550	O:409-761-6366 H:409-740-4191 General Surgery
STREET, David E. (Karen)	818 N. Emporia, #200 Wichita, KS 67214	O:316-263-0296 H:316-682-2012 General Surgery
SUGERMAN, Harvey J. (Betsy)	Box 519 Medical College Virginia Richmond, VA 23298-0519	O:804-786-0032 H:804-741-2764 General Surgery
TAWES, Roy L. (Joyce)	117 N. San Mateo Drive San Mateo, CA 94401	O:415-342-4113 H:415-347-4319 Vascular Surgery
FEAL, Peter V. (Annie)	1232 N. 30th Street Billings, MT 59101	O:406-245-3149 H:406-245-6565 Orthopedics
THOMAS, Herbert, III (Klařma)	601 E. Hampden #180 Englewood, CO 80110	O:303-788-6446 H:303-368-0304 Orthopedics
FUGGLE, David W. (Judy)	940 NE 13th Street Room #2B204 Oklahoma City, OK 73126	O:405-271-5922 H:405-271-5922 Pediatric Surgery
VANE, Dennis W. (Jerrie)	University of Vermont Given Building, Rm. D319 Department of Surgery Burlington, VT 05405	O:802-656-4274 H:802-425-4086

* VOLZ, Robert G. (Anne)	1501 N. Campbell Tucson, AZ 85724	O:602-626-6110 H:602-299-3634 Orthopedics
WALD, Steven L. (Linda)	University Health Center One South Prospect Street Burlington, VT 05401	O:802-656-8226 H:802-985-2582 Neurosurgery
* WALDRON, John F. (Helen)	104 Medical Office Bldg. 2545 Chicago Avenue S. Minneapolis, MN 55404	O: H: Pediatric Surgery
WEBSTER, Dwight A. (Constance)	550 Harrison Court Syracuse, NY 13202	O:315-742-2015 H:315-446-1802 Orthopedics
WHITLEY, Ronald	1401 Johnston-Willis Dr. Richmond, VA 23235	O:804-320-2900 H:804-598-2195 General Surgery
* WILSON, Robert F. (Jacqueline)	376 Wattles Road Bloomfield Hills, MI 48103	O:313-745-3485 H:313-644-1091 Gen/Thoracic/CV Surgery
WITTMAN, Dietmar, M.D. Ph.D. (Heide-Marie)	Medical College of Wisconsin Division of Surgery Section of Trauma 8700 West Wisconsin Ave, Box 205 Milwaukee, WI 53226	O:414-257-5303 H:414-797-9190 Surgery & Trauma
WRAY, R. Chris (Rockeye)	601 Elmwood Avenue Box 661 Rochester, NY 14642	O:716-275-5818 H:716-385-3454 Plastic Surgery
ZELKO, John R. (Katherine)	Metropolitan Clinic 265 North Broadway Street Portland, OR 97227	O:503-288-5381 H:503-241-9125
ZIETLOW, Scott P. (Jill Swanson)	Mayo Clinic Department of Surgery 200 First Street, SW Rochester, MN 55905	O:507-255-6960 H:507-285-0074

**WESTERN TRAUMA ASSOCIATION
1995-1996
GEOGRAPHIC MEMBERSHIP LISTING**

ARIZONA

BENJAMIN, JAMES (Laurie)
University of Arizona Health Sciences Center
1501 N. Campbell Avenue
Tucson, AZ 85724-5064

PETERSEN, SCOTT R. (Elizabeth)
St. Joseph's Hospital & Medical Center
350 W. Thomas Road
Phoenix, AZ 85013

CALIFORNIA

DAVIS, JAMES W. (Amy)
Department of Surgery/Valley Medical Center
445 S. Cedar
Fresno, CA 93702

EDMONDSON, ROBERT C. * * * (Ann)
921 Cleveland Street
Woodland, CA 95695

ESRIG, BARRY C.
50 Bellefontaine Street Suite #403
Pasadena, CA 91105

HOYT, DAVID B. (Beth)
UCSD Medical Center
200 West Arbor Drive
San Diego, CA 92103-8896

KNUDSON, MARY MARGARET (Stephen A. Delateur)
SF General Hospital/Ward 3A
1001 Potrero
San Francisco, CA 94110

MACKERSIE, ROBERT C. (Katherine)
Ward 3A/Department of Surgery
San Francisco General Hospital
1001 Portrero Avenue
San Francisco, CA 94110

METHENY, JEFFRY
2031 Anderson Road Suite A
Davis, CA 95616

PHILLIPS, THOMAS F. (Bonnie)
P.O. Box 158
Eureka, CA 95502

SCHECTER, WILLIAM P. (Gisela)
1001 Potrero Avenue Ward 3A
San Francisco, CA 94110

TAWES, ROY L. * (Joyce)
1828 El Camino Real Suite 601
Burlingame, CA 94010

COLORADO

AMMONS, MARK A. (Lee Anne)
2005 Franklin
Midtown II, #410
Denver, CO 80205

BURCH, JON. M. (Rita)
Department of Surgery
Denver General Hospital
777 Bannock Street
Denver, CO 80204-4507

CARTER, DONALD R.
8200 East Belleview Suite 400
Englewood, CO 80111-2807

KARRER, FREDERICK M. (Debra)
The Children's Hospital
1950 Ogden, B323
Denver, CO 80218

MOORE, ERNEST E. (Sarah)
Denver General Hospital
777 Bannock Street
Denver, CO 80204

MOORE, FRED (Paula)
Denver General Hospital
777 Bannock Street
Denver, CO 80204

MOORE, JOHN B. (Debbie)
9351 Grant Street Suite 400
Thornton, CO 80229

RATZER, ERICK R. (Jeanne)
Three Cimarron Drive
Littleton, CO 80121

ROSENBERGER, ALAN (Mary)
9351 Grant Street Suite 400
Thornton, CO 80229

RUTHERFORD, ROBERT B. * (Kay)
Box C-312
4200 E. 9th Avenue
Denver, CO 80262

SEIBERT, CHARLES E. * (Mary)
One Cimarron Drive
Littleton, CO 80121

THOMAS, HERBERT J., III (Klasina)
799 East Hampden Avenue Suite 400
Englewood, CO 80110

VOLZ, ROBERT G. * (Anne)
P.O. Box 2298
Breckenridge, CO 80424

CONNECTICUT

COHN, STEPHEN M., FACS (Kelly)
Yale School of Medicine
350 Congress Avenue Suite 3A
New Haven, CT 06510

DISTRICT OF COLUMBIA

CHAMPION, HOWARD R., F.R.C.S (Maria)
1900 Quincy St., NW
Washington, D.C. 20010

NEVIASER, ROBERT J. * (Anne)
2150 Pennsylvania Avenue, NW
Washington, D.C. 20037

FLORIDA

KEARNEY, ROBERT E. (Becky)
Harbourside Medical Tower
4 Columbia Dr #730
Tampa, FL 33606

LUCIE, STEPHEN R. (Sharon)
3804 McGirts Blvd.
Jacksonville, FL 32210

ROSEMURGY, ALEXANDER (Kathryn)
Tampa General Hospital
P.O. Box 1289 Room A171
Tampa, FL 33601

GEORGIA

BROECKER, BRUCE H.
1901 Century Blvd.
Atlanta, GA 30345

FELICIANO, DAVID V.
Department of Surgery
Glenn Bldg/Grady Memorial Hospital
69 Butler Avenue
Atlanta, GA 30303

GUSSACK, GERALD S. (Lynn)
1365 Clifton Road
N.E. Room 3303
Atlanta, GA 30322

OCHSNER, M. GAGE (Judy)
Chief, Trauma & Surgical Critical Services
P.O. Box 22084
Savannah, GA 31403-2084

HAWAII

LAU, JEFFREY M. (Diane)
1329 Lusitana Street Suite 108
Honolulu, HI 96813

ILLINOIS

ESPOSITO, THOMAS J.
2160 South First Avenue
Bldg. 54 - Room 260
Maywood, IL 60153

FILDES, JOHN (Elizabeth)
Cook Count Hospital
Trauma Dept/Room 3241
1835 W. Harrison
Chicago, IL 60612

HALL, JOHN R. (Mary)
Cook County Hospital
700 S. Wood Street #B-40
Chicago, IL 60612

HOLEVAR, MICHELE R. (John Anderson)
Christ Hospital & Medical Center
Trauma Office 102T
4440 West 95th Street
Oak Lawn, IL 60453

IOWA

GALL, WARREN (Beth)
100 Langworthy
Dubuque, IA 52001

KANSAS

CHANG, FREDERIC C. * (Jan)
35 Via Roma
Wichita, KS 67230

FERRIS, BRUCE G. (Joan)
825 N. Hillside
Wichita, KS 67214

HARRISON, PAUL B. (Carolyn)
3243 Murdock Suite 404
Wichita, KS 67208

NELSON, GERALD D. * (Doris)
825 N. Hillside Street
Wichita, KS 67214

PIERCE, GEORGE * (Carolyn)
University of Kansas Medical Center
3901 Rainbow Blvd.
Kansas City, KS 66103

STREET, DAVID E. * (Karen)
818 N. Emporia Suite 200
Wichita, KS 67214

MAINE

COBEAN, ROY A. (Linda K. Rathburn)
Maine Medical Center
Surgical Associates
229 Vaughan Street
Portland, ME 04102

MASSACHUSETTS

LINDEN, CHRISTOPHER H. (Jeanne)
University of Massachusetts Medical Center
55 Lake Avenue North
Worcester, MA 01655

MICHIGAN

OLSEN, WILLIAM R. * (Joan)
3387 Herron Road
Frankfort, MI 79635

WILSON, ROBERT F. * (Jacqueline)
376 Wattles Road
Bloomfield Hills, MI 48103

MINNESOTA

AMADIO, PETER C. Mayo Clinic 200 First St., SW Rochester, MN 55905	(Bari)
CABANELA, MIGUEL E. 200 First Street SW Rochester, MN 55905	(Rosa)
CHERRY, KENNETH J. Mayo Clinic 200 First Street S.W. Rochester, MN 55905	(Robin)
EBERSOLD, MICHAEL J. Mayo Clinic 200 First Street S.W. Rochester, MN 55905	(Janet)
HANSSEN, ARLEN D. Mayo Clinic 200 First Street S.W. Rochester, MN 55905	
KLASSEN, RUDLPH A. * Mayo Clinic 200 First Street S.W. Rochester, MN 55905	(Frieda)
LEWALLEN, DAVID G. Mayo Clinic 200 Forst Street S.W. Rochester, MN 55905	(Marti)
MCGILL, JOHN W. Hennepin County Medical Center Emergency Department 701 Park Avenue S. Minneapolis, MN 55415	
OLFELT, PAUL C. * 2206 Parkland Lane Minneapolis, MN 55416	(Helen)
SIMONET, WILLIAM T. 6600 France Avenue South Suite #605 Edina, MN 55435	(Michele)
WALDRON, JOHN F. * 6230 Braeburn Circle Edina, MN 55439	(Helen)

ZIETLOW, SCOTT P. (Jill Swanson)
Mayo Clinic/Dept. Of Surgery
200 First Street S.W.
Rochester, MN 55905

MISSOURI

HELLING, THOMAS C. (Linda)
4320 Wornall
Suite #308
Kansas City, MO 64111

MCKINLEY, RICHARD C. (Cheryl)
P.O. Box 199
Augusta, MO 63332

MONTANA

MILLIKAN, J. SCOTT (Ann)
1138 Moon Valley Road
Billings, MT 59105

TEAL, PETER V. * (Annie)
1232 N. 30th Street
Billings, MT 59101

NEBRASKA

CARVETH, STEPHEN * (Kay)
6200 Old Cheney Road
Lincoln, NE 68516

EDNEY, JAMES A. (Debbi)
Univ. of Nebraska Medical Ctr.
Dept. of Surgery
600 S. 42nd Street
Box 983280
Omaha, NE 68198-3280

STOTHERT, JOSEPH C. (Jean)
Creighton Univ. Dept. of Surgery
601 N. 30th
Suite #3740
Omaha, NE 68131

NEW JERSEY

IANNACONNE, WILLIAM (Jane)
Three Cooper Plaza
Suite #411
Camden, NJ 08103

LANZI, GUY L. (Maureen/Associate Member)
15 E. Euclid Avenue
Haddonfield, NJ 08033

O'MALLEY, KEITH F.
Three Cooper Plaza
Suite #411
Camden, NJ 08103

ROSS, STEVEN E. (Carolyn)
Three Cooper Plaza
Suite #411
Camden, NJ 08103

NEW YORK

BOYD, ALLEN D., JR. (Claire)
601 Elmwood Avenue
Box 665
Rochester, NY 14642

COIL, JAMES A., JR. * (Sharon)
St. Vincent's Med. Ctr./Dept. of Surgery
355 Baird Avenue
Staten Island, NY 10310

PACHTER, H. LEON (Rena)
530 First Avenue
NY/6C
New York City, NY 10016

SCALEA, TOM M.
116 Willow Street #2
Brooklyn, NY 11201

WEBSTER, DWIGHT A. (Constance)
550 Harrison Court
Syracuse, NY 13202

WRAY, R. CHRIS * (Rockeye)
601 Elmwood Avenue
Box 661
Rochester, NY 14642

YAUN, HANSEN
550 Harrison Center
Syracuse, NY 13202

NORTH CAROLINA

REED, R. LAWRENCE, II (Geraldine)
Box 3501
Duke Univ. Med. Ctr./Dept. of Surgery
Durham, NC 27710

ROETTGER, RICHARD (Sara)
2104 Randolph Road
Charlotte, NC 28207

OKLAHOMA

TUGGLE, DAVID W. (Judy)
940 N.E. 13th Street Rm #2B204
Oklahoma City, OK 73126

OREGON

BEAL, SANDRA L. (Steve Smith)
655 East 11th
Eugene, OR 97401

HAUTY, MICHAEL (Rose)
800 S.W. 13th Street
Portland, OR 97205

METZDORFF, MARK T. (Marie-Louise)
2226 NW Pettygrove Street
Portland, OR 97210

ZELKO, JOHN R. (Katherine)
Metropolitan Clinic
265 N. Broadway Street
Portland, OR 97227

PENNSYLVANIA

KING, BRENT R. (Rosemary)
Dept. of Emergency Medicine
Med. College of PA
3300 Henry Avenue
Philadelphia, PA 19129

LATENSER, BARBARA A.
1400 Locust Street
Pittsburgh, PA 15219

MUCHA, PETER, JR. (Sonya)
RR #9 Bingen Road
Bethlehem, PA 18015

SHERMAN, HAROLD
Div. Multisystem Trauma
Mercy Hospital of Pittsburgh
1400 Locust street
Pittsburgh, PA 15219

TENNESSEE

MORRIS, JOHN A., JR. (Julia)
S-2304 Medical Center, No.
Vanderbilt University
Nashville, TN 37232

RUTHERFORD, EDMUND J. (Eloise)
2100 Pierce Avenue
243 MCS/Division of Trauma
Nashville, TN 37212

SHARP, KENNETH W. (Eileen)
TVC 3662
Vanderbilt University
Nashville, TN 37232

TEXAS

FISCHER, RONALD P. * (Nancy)
Chief of Surgery/LBJ Hospital
5656 Kelley Street
Houston, TX 77026

FRAZEE, RICHARD C. (Debbie)
2401 S. 31st Street
Desk 4 -A
Temple, TX 76508

MCINTYRE, KENNETH E.
Univ. of Texas Medical Branch
Mail Rt E-41
Room 6.110
Galveston, TX 77555-0544

PICKARD, LAURENS (Bonnie New, M.D.)
Scurlock Tower
6560 Fannin Suite #1612
Houston, TX 77030

UTAH

BARTON, RICHARD G. (Janet)
50 N. Medical Drive
#3B-313
Salt Lake City, UT 84132

SAFFLE, JEFFREY R. (Susan)
50 N. Medical Drive
#3B-306
Salt Lake City, UT 84132

VERMONT

HEBERT, JAMES C. (Mary Ellen)
Department of Surgery
Fletcher 301
Medical Center Hospital
Burlington, VT 05401

OSBORNE, ROBERT W., JR. (Martha)
1802 S. Yakima Suite #204
Tacoma, WA 98405

WEST VIRGINIA

KAPPEL, DAVID A. (Charl)
40 Medical Park
Suite #200
Wheeling, WV 26003

POLACK, EDWARD P. (Wendy)
40 Medical Park
Suite #200
Wheeling, WV 26003

WISCONSIN

APRAHAMIAN, CHARLES * (Patricia)
8700 W. Wisconsin Avenue
Milwaukee, WI 53226

BINTZ, MARILU
610 E. Taylor Street
Prairie du Chien, WI 53821

COGBILL, THOMAS H. (Jan)
Gundersen Clinic, Ltd.
1836 South Avenue
La Crosse, WI 54601

LANDERCASPER, JEFFREY (Betty)
Gundersen Clinic, Ltd.
1836 South Avenue
La Crosse, WI 54601

WITTMANN, DIETMAR H. (Heidi-Marie)
Medical College of Wisconsin
Department of Surgery
8700 W. Wisconsin Avenue, DH205
Milwaukee, WI 53226

MCGUIRE, ARTHUR M. + (Peggy)

- * DENOTES SENIOR MEMBERS
** DENOTES HONORARY MEMBERS
+ NO DEMOGRAPHIC INFORMATION AVAILABLE

MCGILL, J. BISHOP * ** (Betty)
154 East Avenue
Burlington, VT 05401

SHACKFORD, STEVEN R. (Ellen)
301 Fletcher House
Medical Center Hospital of Vermont
Burlington, VT 05401

VANE, DENNIS W. (Jerrie)
University of Vermont
Given Building/Room D319
Department of Surgery
Burlington, VT 05404

WALD, STEVEN L. (Linda)
University Health Center
One South Prospect Street
Burlington, VT 05401

VIRGINIA

MEHRHOF, AUSTIN I., JR. (Trudi)
Box 154, MCV Station
Richmond, VA 23298

SUGARMAN, HARVEY J. * (Betsy)
Box 980519
Medical College
Virginia Station
Richmond, VA 23298-0519

WHITLEY, RONALD
The Atrium - #1100
1401 Johnston-Willis Drive
Richmond, VA 23235

WASHINGTON

GENTILELLO, LARRY M. (Olivia)
Harborview Medical Center
325 9th Avenue
ZA-16
Seattle, WA 98104

JURKOVICH, G. JERRY (Deanne)
Harborview Medical Center
325 9th Avenue
ZA-16
Seattle, WA 98104

OFFNER, PATRICK J. (Kelly Greene)
General Surgery Services
Madigan Army Medical Center
Tacoma, WA 98431

WESTERN TRAUMA ASSOCIATION
TWENTY-SIXTH ANNUAL MEETING
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Return form to:

Herbert J. Thomas, III
799 East Hampden Avenue
Suite 400
Englewood, CO 80110

