TWENTY-SECOND ANNUAL MEETING

February 29 - March 7, 1992

Steamboat Springs, Colorado

KAPPEL, DAVID

WESTERN TRAUMA ASSOCIATION
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Robert G. Volz, M.D.	1972	Vail
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Ernest E. Moore, M.D.	1989	Snowbird
Stephen W. Carveth, M.D.	1990	Crested Butte
George E. Pierce, M.D.	1991	Jackson Hole

****The 1993 WESTERN TRAUMA ASSOCIATION MEETING will be:
February 27- March 6, 1993
Snowbird, Utah

1991 - 1992

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WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING
SHERATON STEAMBOAT RESORT AND CONFERENCE CENTER

SCHEDULE

Sunday, March 1, 1992	
4:00 - 7:00 p.m.	Registration and Welcoming Reception
Monday, March 2, 1992	
6:30 - 7:00 a.m.	Breakfast
7:00 - 9:00 a.m.	First Scientific Session
4:00 - 5:00 p.m.	Second Scientific Session
5:00 - 6:00 p.m.	Invited Lecture-"Cerebral Trauma" Thomas A. Gennarelli, M.D.
6:00 p.m.	Board of Directors Meeting
Tuesday, March 3, 1992	
6:30 - 7:00 a.m.	Breakfast
7:00 - 9:00 a.m.	Third Scientific Session-Earl Young Competition
10:00 a.m.	NASTAR Race
12:00 noon	Picnic and Picture - Bashore
4:00 - 6:00 p.m.	Fourth Scientific Session-Earl Young Competition
6:00 - 8:00 p.m.	Western Trauma Association Business Meeting
Wednesday, March 4, 1992	
6:30 - 7:00 a.m.	Breakfast
7:00 - 9:00 a.m.	Fifth Scientific Session
4:00 - 5:00 p.m.	Sixth Scientific Session
5:00 - 6:00 p.m.	Guest Presentation - "Skiing Injuries" Richard J. Steadman, M.D. Richard J. Hawkins, M.D.
6:30 p.m.	Reception - Cash Bar
8:00 p.m.	Annual Banquet Awards
9:00 - 12:00 Midnight	Band - Dancing
Thursday, March 5, 1992	
6:30 - 7:00 a.m.	Breakfast
7:00 - 9:00 a.m.	Seventh Scientific Session
4:00 - 5:00 p.m.	Eighth Scientific Session
5:00 p.m.	Presidential Address "Selected Decontamination of the Digestive Tract" Peter Mucha, Jr., M.D.
Friday, March 6, 1992	
6:30 - 7:00 a.m.	Breakfast
7:00 - 9:00 a.m.	Ninth Scientific Session
4:00 - 6:00 p.m.	Tenth Scientific Session
6:00 p.m.	Adjourn
Spouse's Breakfast	Monday thru Friday 8:00 - 9:00 A.M.

WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING
STEAMBOAT SPRINGS, COLORADO

Monday, March 2, 1992 — **Session: General Surgery**

7:00 a.m. Welcome from President Peter Mucha, Jr., M.D.

7:05 a.m. Program introduction from John A. Morris, Jr., M.D.

Moderators: Morris/Mucha

Time	Page	Title	Presenter
7:10 a.m.	9	Staged abdominal repair (STAR) compares favorably to conventional operative therapy for intraabdominal infections when stratified by APACHE-II	D. Wittman
7:30 a.m.	11	The role of laparoscopy in abdominal trauma	D. Livingston
7:50 a.m.	13	Blunt colonic injury - Multicenter review	S. Ross
8:20 a.m.	15	Infrahepatic vena cava injury: Predictors of mortality	J. Constant
8:40 a.m.	17	Chest tube removal methods: Suction vs. water-seal	J. W. Davis

Moderators: Knudson/Jurkovich

4:00 p.m.	19	An evaluation of provider and disease related morbidity in a Level I trauma service - Directions for quality improvement	D.B. Hoyt
4:20 p.m.	21	Percutaneous tracheostomy/gastrostomy in the brain injured patient - A minimally invasive alternative	F. Moore
4:40 p.m.	23	The utility of CT scanning in patients with minor head injury	S. Shackford
5:00		**INVITED LECTURE** "Cerebral Trauma" Thomas A. Gennarelli, M.D.	
6:00 p.m.		Board of Directors Meeting	

WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING
STEAMBOAT SPRINGS, COLORADO

Tuesday, March 3, 1992

Session: Earl Young Prize

Moderators: Cogbill/Wray

Time	Page	Title	Presenter
7:00 a.m.	25	Diagnostic peritoneal lavage (DPL) plus computed tomography (CT) in the evaluation of blunt abdominal trauma (BAT)	B. Baron
7:20 a.m.	27	Mortality in geriatric trauma victims: The link between preventable complications & death from organ failure	J. Pellicane
7:40 a.m.	29	Monoethylglycinexylidide (MEGX) production parallels changes in hepatic blood flow & oxygen delivery in lung injury managed with PEEP ventilation	P. Purcell
8:00 a.m.	31	Effect of ibuprofen on bacterial translocation	R. Toyos
8:20 a.m.	33	Impact of minimal injury on a Level I trauma center	W. Hoff

Moderators: Ross/Feliciano

4:00 p.m.	35	Routine pelvic x-ray in the awake blunt trauma patient: Is it a sensible policy?	C. Salvino
4:20 p.m.	37	Fluid and sodium administration during the first 72 hours after head injury have no effect on intracranial pressure	J. Schmoker
4:40 p.m.	39	Adequate resuscitation with 3% hypertonic saline: A mechanism of protection against bacterial translocation in hemorrhagic shock	M. Hochman
5:00 p.m.	41	Laparoscopic injection of fibrin glue to arrest major intraparenchymal abdominal hemorrhage	C. Salvino
5:20 p.m.	43	Deleterious effects of intraoperative hypotension on outcome in patients with severe head injury	J. Pietropaoli
5:40 p.m.	45	Admission base deficit reflects prehospital O_2 debt and predicts outcome	E. Rutherford
6:00 p.m.		Western Trauma Association Business Meeting	

WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING
STEAMBOAT SPRINGS, COLORADO

Wednesday, March 4, 1992

Session: Orthopaedic Trauma

Moderators: Lewallen/Hoyt

Time	Page	Title	Presenter
7:00 a.m.	47	The etiology of missed cervical spine injuries	J. Davis
7:20 a.m.	49	Acute stabilization of the cervical spine by halo/vest application facilitates evaluation & treatment of the multiple trauma victim	R. Heary
7:40 a.m.	51	Treatment of supracondylar femoral fractures using the supracondylar intramedullary nail	W. Iannacone
8:00 a.m.	53	Open fractures of the calcaneus	J. Foskett
8:20 a.m.	55	Arterial injuries associated with the floating knee	A. Amin
8:40 a.m.	57	The effects of dopexamine hydrochloride on tissue oxygenation (gut, liver, & muscle) in septicemia	P. Papadakos

Moderators: Kappel/Oschner

Session: Maxillofacial Trauma

4:00 p.m.	59	Electrophrenic respiration in spinal cord injury patients	L. Pickard
4:20 p.m.	61	Emergency percutaneous translaryngeal ventilation in multiple trauma: An eleven year experience	J. McGill
4:40 p.m.	63	Decisions in mandibular fractures management	L. Chu
5:00 p.m.		**INVITED PRESENTATION*** "SKIING INJURIES" Richard J. Steadman, M.D. Richard J. Hawkins, M.D. Steadman Hawkins Partnership Vail, Colorado	

* Introduction by Stephen Carveth, former President of the Western Trauma Association

WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING
STEAMBOAT SPRINGS, COLORADO

Thursday, March 5, 1992 — **Session: Critical Care**

Moderators: Scalea/Benjamin

Time	Page	Title	Presenter
7:00 a.m.	65	Candida antigen titer dilution and death after injury	A. Rosemurgy
7:20 a.m.	67	The disparity between hypothermic coagulopathy and clotting studies	L. Reed
7:40 a.m.	69	Aortic rupture-pelvic fracture complex: An alert for orthopedic and general surgeons	M. Ochsner
8:00 a.m.	71	Chemical paralysis reduces energy expenditure in mechanically ventilated trauma patients	R. Barton
8:20 a.m.	73	Nutritional assessment using a PA catheter	R. Cobean

Moderators: Rosemurgy/Thomas — **Session: Trauma Systems**

4:00 p.m.	75	Prehospital procedures in trauma	R. Cobean
4:20 p.m.	77	Circulating hormones & plasma TNF measurements following minor trauma in man	E. DeMaria
4:40 p.m.	79	Impact of the use of paralyzing agents in airway management of trauma system patients in the field	W. Long
5:00 p.m.		**PRESIDENTIAL ADDRESS** "Selected Decontamination of the Digestive Tract" Peter Mucha, Jr., M.D.	

WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING
STEAMBOAT SPRINGS, COLORADO

Friday, March 6, 1992

Session: General Surgery

Moderators: Sharp/Sugerman

Time	Page	Title	Presenter
7:00 a.m.	81	Pitfalls in color-flow duplex ultrasound for screening of suspected arterial injuries in penetrated extremities	J.M. Bergstein
7:20 a.m.	83	Advances in the management of complications following penetrating liver injuries	M. Knudson
7:40 a.m.	85	Long-term followup of unsuccessful traumatic suicides: Risk factors for subsequent attempts	J. Van Aalst
8:00 a.m.	87	The study of the recovery of trauma patients	K. Glancy
8:20 a.m.	89	Analysis of organ procurement failure at an urban trauma center	H. Grewal

Moderators: Esrig/Millikan

Session: Critical Care

4:00 p.m.	91	Pressure controlled-inverse ratio ventilation (PC-IRV) in critically ill surgical patients	G. Rozycki
4:20 p.m.	93	High frequency ventilation in the treatment of right heart failure	T. Scalea
4:40 p.m.	95	Dog Bites in Children	D. Tuggle
5:00 p.m.	97	Mobile surgical transport team (MSTT): A service for the critically ill and injured in the rural hospital	W. Long
6:00 p.m.		**ADJOURN**	

ABSTRACTS

STAGED ABDOMINAL REPAIR (STAR) COMPARES FAVORABLY TO CONVENTIONAL OPERATIVE THERAPY FOR INTRA-ABDOMINAL INFECTIONS WHEN STRATIFIED BY APACHE-II

D.H. Wittmann, C. Aprahamian, J.M. Bergstein, N. Bansal
Medical College of Wisconsin, Marquette University

Presenter: D.H. Wittmann
Senior Sponsor: T. Cogbill
Corresponding Author: D.H. Wittmann

Staged Abdominal Repair (STAR) is a new operative approach for the treatment of diffuse peritonitis. It demands a commitment at the first laparotomy for multiple relaparotomies scheduled at 24-hour intervals, taking into account the pathophysiological impact of increased intra-abdominal pressure on peritoneal blood flow and renal, pulmonary and cardiovascular function. If required, any fascial gap is bridged by use of prosthetic devices to accommodate the edematous peritoneum and distended bowels. This minimizes fistula formation and deters abdominal fascial retraction while permitting definitive abdominal fascial closure without evisceration and hernia formation. 95 patients treated by STAR were stratified according to the APACHE-II score.

APACHE-II	1-10	11-15	16-20	21-25	26-30	>30
Mortality	5%	6%	22%	39%	50%	100%

This series was compared to 271 patients with intra-abdominal infections treated by conventional operative management (STDRD) and entered into a prospective multicenter observation study. Comparing STAR mortality with STDRD mortality by utilizing a two-sample Z test to test difference among population proportions, the following results are found:

	STANDARD			STAR			P-value
	died	all	(%)	died	all	(%)	
APACHE-II <15	20	199	(11)	7	47	(15)	NS
APACHE-II 16-25	31	62	(50)	12	41	(29)	<0.05
APACHE-II >25	7	10	(70)	5	7	(71)	NS
ALL PATIENTS	58	271	(21)	24	95	(25)	

Conclusions: Patients with intra-abdominal infections and an APACHE-II score of 16-25 show significantly higher survival rates when treated by STAR. Patients with an APACHE-II score of less than 16 do not seem to benefit from the new procedure. For patients with an APACHE-II score > 25, insufficient data precludes a definitive statement.

NOTES

(1) Logistic regression excellent way to compare patient population

(2) STAR better over a wide range of patients

THE ROLE OF LAPAROSCOPY IN ABDOMINAL TRAUMA

D. Livingston, B. Tortella, G. Machiedo, B.F. Rush, Jr.
UMD New Jersey Medical School

Presenter: D.H. Livingston
Senior Sponsor: S.R. Ross
Corresponding Author: D.H. Livingston

The role of laparoscopy in the evaluation of patients who have sustained abdominal trauma is yet to be defined. This study prospectively evaluated 33 hemodynamically stable trauma patients with laparoscopy prior to a planned celiotomy. After obtaining informed consent, laparoscopy was performed using a forward-viewing (0°) laparoscope connected to two high resolution color video monitors. There were 28 men and 5 women. The mean age was 28 years (range 16-56 years). The mechanism of injury was blunt trauma in 7, stab wounds (SW) in 11 and gunshot wounds (GSW) to the back or flank in 15. Laparoscopy correctly identified the presence of an intraperitoneal (n=20) or a retroperitoneal (n=7) injury in all cases (sensitivity 100%). The remaining 6 patients had no demonstrable intra- or retroperitoneal injuries and did not undergo celiotomy. These patients had an uneventful recovery and were discharged without morbidity. In comparison to the findings at the time of celiotomy, laparoscopy identified injuries to the liver in 6 of 8 patients, the colon in 2 of 3, the stomach in 3 of 3, kidney in 1 of 1, spleen in 0 of 3 and small bowel in 0 of 4. Splenic injuries were surmised in all 3 patients with blood in the LUQ, but adequate visualization of the spleen was achieved in only 1/33 patient. Laparoscopy underestimated the extent of the hemoperitoneum in all 9 patients with >750 cc of intraperitoneal blood; 4 of which had undetected active bleeding. The identification of specific organ injuries was also more difficult in this group and only possible in 3 (33%). Laparoscopy was performed easily in all patients and there were no complication associated with its use. The time (mean±SD) to perform the laparoscopy was 20±12 minutes. In conclusion, laparoscopy correctly identified the absence of peritoneal penetration in patients following SW and GSW to the back, flank or lower chest and was able to decrease the need for celiotomy six patients. However, the inability to "run the small bowel", visualize the spleen and evacuate clotted and non-clotted blood led to an underestimation of the extent of intraabdominal bleeding and a failure to visualize all splenic and small bowel injuries. These constraints currently limit the usefulness of diagnostic laparoscopy following abdominal trauma. Improvements in instrumentation which would allow more complete abdominal explorations to be done laparoscopically combined with newer techniques in laparoscopic surgery will be necessary before diagnostic and possibly therapeutic laparoscopy will find its niche in the management of abdominal trauma.

NOTES

Useful for determining injury in tangential SW + OSW patients (usual uninsured)

BLUNT COLONIC INJURY--MULTICENTER REVIEW

Sixteen Authors from Eight WTA Member Institutions
Camden, Seattle, San Diego, Nashville, Allentown, Burlington,
New York, LaCrosse

Presenter: S.E. Ross
Senior Sponsor: S.E. Ross
Corresponding Author: S.E. Ross

In order to determine the incidence of blunt colon injury, diagnostic methods, current management (including the use of fecal diversion), and complication rates, a retrospective study at 8 WTA member institutions was performed. During the period 1/1/86 to 12/31/90, 2489 of 45961 victims of blunt trauma underwent laparotomy; 273(11%) of these sustained colon injury. Physical exam led to operation in 57 cases, DPL in 161, chest radiography in 10, CAT scan in 26, and late clinical signs in 19. Mean time from admission to operation was 5.7 hours (0-312 hrs), with delays of more than 8 hours in 23 cases. In only 12 was colon injury suspected preoperatively. Concomitant abdominal organ injury occurred in 219 patients, and major extraabdominal injury in 183. There were 58 deaths. Timing of antibiotic initiation (preop-82 cases,intraop-98,postop-40) did not lead to a significant difference in infection rates. Partial thickness wounds were present in 185; 120 underwent simple repair, and 11 required resection, with no deaths due to colon injury. Full thickness injury was demonstrated in 88 patients, with 22 operative repairs, and 62 resections. Eight colon injury related deaths occured in this group.

Repair of full thickness injury or resection was required in 99 patients. Diversion was performed in 57 patients and repair without diversion in 42. Fecal contamination was gross in 14, moderate in 12, minimal in 11, and nil in 62. Abdominal complications occurred in 41, and systemic complications in 37 of these patients, and increased with the extent of contamination regardless of operative therapy. There was no significant difference in abdominal or systemic complication rates among survivors of operation, based on location of injury (R vs L colon), diversion, timing of operation, presence of other abdominal injuries, or shock.

This review reveals that blunt colonic injury remains relatively rare (0.6%), and preop identification uncommon. The timing of antibiotic administration does not appear to impact on septic complications. It further suggests that diversion is not superior to primary repair/resection in the management of full thickness colon injury.

NOTES

Difficult to diagnose preoperatively

gross contamination (↑ odds of injuries)

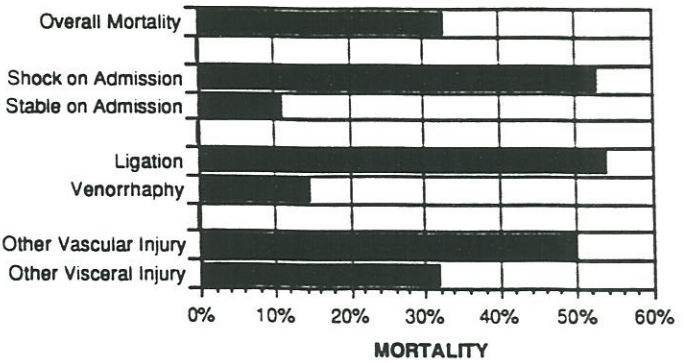
Discourage 1° repair

INFRAHEPATIC VENA CAVA INJURY: PREDICTORS OF MORTALITY

J. Constant, C. Chansmorn, W.P. Schecter, J.R. Macho
University of California-San Francisco

Presenter: J. Constant
Senior Sponsor: W. Schecter
Corresponding Author: J.R. Macho

We reviewed the records of 60 consecutive patients admitted between 1980 and 1991 with injury to the infrahepatic vena cava or proximal renal veins in order to determine the factors which correlate with outcome. Eighty-five percent (51) of the injuries were due to penetrating trauma and 15% (9) were due to blunt trauma. Thirteen percent (8) of the injuries were suprarenal, 38% (23) were at the level of the renal veins, 27% (16) were infrarenal and 22% (13) involved the common iliac veins. On admission, the mean ISS was 20.8 ± 10.2 and the mean RTS was 5.5 ± 2.9. The presence of shock on admission, operative procedure and associated injuries were correlated with mortality:



Probability of survival was determined by the TRISS methodology utilizing coefficients from the Major Trauma Outcome Study. Of the patients who had a probability of survival < 50%, only 1/18 survived. Three of 42 patients died who had a probability of survival > 50%. Two of these patients had associated vascular injuries and one had a major head injury.

Conclusions: 1) the overall mortality for injuries to the infrahepatic vena cava is high; 2) mortality is increased in patients presenting with shock, in those requiring ligation of the cava and in those with associated vascular injuries; 3) The TRISS method is a reliable predictor of outcome for the patients in this study.

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NOTES

Blunt bar 80%
Shock .. 50%
Weather wrote the repair but was applied
720 units
late as repair failed

CHEST TUBE REMOVAL METHODS: SUCTION VS. WATER-SEAL

J.W. Davis, R.C. Mackersie, D.B. Hoyt, J. Garcia
University of California - San Diego Medical Center

Presenter: J.W. Davis
Senior Sponsor: J.W. Davis
Corresponding Author: J.W. Davis

Tube thoracostomies are frequently used in trauma in the treatment of hemo- and pneumothorax. Although numerous techniques have been described for insertion and securing chest tubes, the best method for chest tube removal has not determined. This prospective study was done to compare chest tube removal on suction versus water-seal protocols.

METHODS: Eighty patients were randomly assigned to the water-seal or suction protocols. The injury severity score (ISS), amount of pleural drainage (DRAIN), chest tube weaning time (defined as time from resolution of the air-leak to chest tube removal, WEAN) chest tube duration (total time chest tube in place, DURATION), and occurrence of pneumothorax (PTX) after chest tube removal were recorded for each patient and the groups compared by T-test.

RESULTS:

GROUP	N	ISS	DRAIN	WEAN	DURATION	PTX
SUCTION	41	15.6	400 cc	25 hr	71 hr	2*
WATER-SEAL	39	15.4	427 cc	34 hr	92 hr	1
p value		NS	NS	.056	.009	NS

(* error in technique at time of tube removal)

CONCLUSIONS: Chest tubes can be safely and effectively removed using either a suction or water-seal protocol with a small risk (3.8%) of recurrent pneumothorax. The use of a suction protocol may slightly decrease the length of hospital stay in those patients with isolated hemo- or pneumothorax.

NOTES

AN EVALUATION OF PROVIDER AND DISEASE RELATED MORBIDITY IN A LEVEL I TRAUMA SERVICE - DIRECTIONS FOR QUALITY IMPROVEMENT

D.B. Hoyt, P. Fridlund, J.W. Davis, R.C. Mackersie, D. Fortlage
University of California

Presenter: D.B. Hoyt
Senior Sponsor: D.B. Hoyt
Corresponding Author: D.B. Hoyt

INTRODUCTION: As preventable trauma related mortality plateaus with trauma system development, quality improvement in trauma care must be directed by analyzing morbidity with standardized methods to establish thresholds for provider and disease specific complications.

METHODS: All trauma patients who died, were admitted to the ICU, or hospitalized greater than 3 days to an academic trauma service were concurrently evaluated for one year. All complication events were defined, reviewed, tabulated, and classified using fifty provider and disease specific categories. Provider complications were classified as justified (just) or unjustified (unjust) to allow identification of events with potential for improvement.

RESULTS: 1,100 patients were admitted (x ISS 17) with 97 deaths. Three potentially salvageable were identified (3%). 857 complication events were identified.

Provider Related Events

	#	Just	Unjust
Prehospital	15	15	0
Delay Team Act	69	62	7
Delay Dispos	20	20	0
Delay Surgery	35	29	6
Delay Dx	45	35	10
Error Dx	2	0	2
Error Tech	77	65	12
Error Judge	22	0	22
	285		59

Disease Related Events

	N	% Pts
Infectious	244	22.0
Pulmonary	84	7.6
Organ Failure	24	2.0
Cardiovasc.	44	4.0
Neurologic	37	3.4
GI	45	4.1
Hematologic	17	2.0
Skin	31	2.8
Other	46	4.2
	572	

CONCLUSION: Provider complications were responsible for errors with potential for improvement in 5.4% of patients (21% of provider events). Disease specific morbidity was primarily infection related. Pneumonia accounted for 36% and systemic infection only 8.6% of all infectious complications. Organ failure and other major systemic complications occurred in only 2-8% of patients. This type of analysis forms the basis to determine thresholds of provider and disease related morbidity in a trauma system and serves as a guide to direct efforts toward quality improvement.

NOTES

1 cost

PERCUTANEOUS TRACHEOSTOMY/GASTROSTOMY IN THE BRAIN INJURED PATIENT - A MINIMALLY INVASIVE ALTERNATIVE

F.A. Moore, J.B. Haenel, E.E. Moore, R.A. Read
Denver General Hospital

Presenter: F.A. Moore
Senior Sponsor: F.A. Moore
Corresponding Author: F.A. Moore

Tracheostomy and gastrostomy are frequent adjunctive procedures required in the severe brain injured (BI) patient to facilitate neurorehabilitation. We, therefore, evaluated the use of two minimally invasive surgical procedures, percutaneous tracheostomy (PT) and percutaneous endoscopic gastrostomy (PEG), in 23 BI patients. Ages ranged from 17 to 79 yrs (mean ± SEM, 42.7 ± 3.6) and 18 (78%) were males. All patients were intubated, 17 (73%) required full mechanical ventilator support (minute ventilation = 14.5 ± .8 L/min). The endotracheal tube had been in place for 1 to 21 days (8.8 ± .9). All patients were stable from their acute brain injury, seven had intracranial pressure monitors in place. During the procedure, pulse oximetry and end tidal CO_2 monitoring were routinely employed. The procedures were performed by the rotating general surgical resident housestaff. The Seldinger technique for PT as described by Ciaglia was utilized to sequentially dilate the trachea between the first and second tracheal ring using graduated (12 fr - 36 fr) plastic dilators (Cook Inc.). The trachea was then cannulated with a size 6 Shiley tube (7.0 mm inner, 10 mm outer diameter) in 15 patients and a size 8 Portex (8 mm inner, 11 mm outer diameter) in 8. Following PT, a PEG was inserted by the pull technique as described by Gauderer et al using a 29 fr Bard PEG tube. A portable chest x-ray was obtained at the conclusion of the procedures. 3 patients had a transient increase in intracranial pressure, while one patient was noted to have a small amount of supraclavicular subcutaneous air. There were no complications with the PEG. In conclusion, PT and PEG are simply learned, minimally invasive procedures. In our experience with BI patients combined PT/PEG is a safe and successful alternative to gain long term airway and gut access.

NOTES

no comps
surgeon should do

THE UTILITY OF CT SCANNING IN PATIENTS WITH MINOR HEAD INJURY

S.R. Shackford, S.L. Wald, D.B. Hoyt, S.E. Ross, P. Mucha, Jr.,
J.A. Morris,Jr., T.P. Cogbill, H.J. Sugerman, H.L. Pachter
WTA Multicenter

Presenter: S.R. Shackford
Senior Sponsor: S.R. Shackford
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The evaluation and management of patients with minor head injury (MHI: history of loss of consciousness or post-traumatic amnesia and a GCS>12) remain controversial. Recommendations vary from routine admission *without* CT scanning to mandatory CT scanning and admission to CT scanning *without* admission for selected patients. Previous work examining this issue has included patients with associated nonCNS injuries which confound the data and impact outcome. We hypothesized that patients with MHI and no other reason for admission who have a normal neurologic exam and a normal CT scan would have no risk of neurologic deterioration requiring surgical intervention. To validate this hypothesis we studied 2766 patients with only a MHI admitted to 7 trauma centers between 1/1/88 and 12/31/91. There were 1898 males and 868 females; injury was blunt in 99%. 2166 had a neurologic exam *and* a CT scan.

	N	+CT (%)	OPS (%)
GCS=13	200	83 (42)	24 (12)
GCS=14	512	142 (28)	25 (5)
GCS=15	1454	426 (29)	63 (4)
TOTAL	2166	651 (.30)	112 (5)

933 patients had a normal neurologic exam and a normal CT scan and none required craniotomy. 1170 patients had a normal CT scan and none required craniotomy; 2112 patients had a normal neurologic exam and 59 required craniotomy. The sensitivity of the CT was 100% with a positive predictive value of 17%, a negative predictive value of 100% and a specificity of 68%. The use of CT alone as a diagnostic modality would have saved 2524 hospital days, including 361 ICU days, and $2,009,800 in hospital charges. Based on this data we believe that CT scanning is essential in patients with MHI and if the scan is negative patients can be safely discharged from the emergency department.

NOTES

all should have CT
1/5 have acute lesion

MHI + GCS - CT mandatory
abnormal NEX - admit
abnormal CT - admit

both → ICU

normal NEX + neg CT - 1/50 require Ex
+ never clandestine

DIAGNOSTIC PERITONEAL LAVAGE (DPL) PLUS COMPUTED TOMOGRAPHY (CT) IN THE EVALUATION OF BLUNT ABDOMINAL TRAUMA (BAT)

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Presenter: B. Baron
Senior Sponsor: T.M. Scalea
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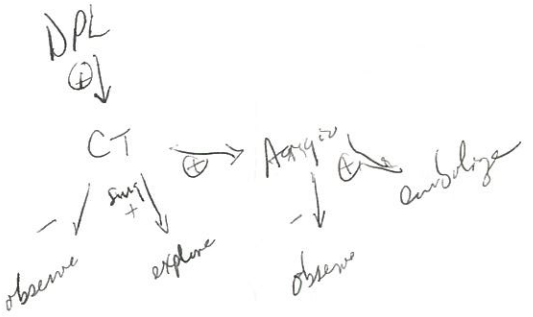
DPL is usually compared to CT in the evaluation of BAT. DPL is rapid, and extremely sensitive, but operation based solely on a positive DPL yields an excessive rate of nontherapeutic laparotomies. CT is more specific but is expensive, labor intense and time consuming. In July 1986, we began using DPL as our initial screening test for patients with BAT. We then performed abdominal CT on all stable patients with a DPL positive for red cells. Patients with peritonitis or a DPL positive for white blood cells were explored. If CT demonstrated a significant organ injury, it was followed by angiography. Bleeding was controlled by trans-catheter embolization, when possible. To date, we have treated 52 patients with this protocol.

Fifteen patients had negative CT scans and were successfully observed. In the other 37 patients, CT identified 17 liver, 16 splenic and 8 kidney injuries, 8 extraperitoneal bleeds and 1 mesenteric hematoma. Eight of these patients were observed without problem. The other 29 underwent diagnostic angiograms. Eleven had no active bleeding seen and all were successfully observed. Sixteen underwent successful embolization of the bleeding site(s). Two had injuries not controllable by embolization and required exploration. Five patients required laparotomy later in their course, but none had intraabdominal bleeding or a missed intestinal injury. Despite being performed after DPL, CT did not miss any injury. There was one complication, delayed recognition of a diaphragmatic injury. Three patients died, two from multiple organ failure and one from a pelvic fracture; none was felt to be related to this technique. With our algorhythm, forty five patients (87%) were spared laparotomy.

DPL and CT are complementary when evaluating BAT. DPL is an effective screening tool. CT may be reserved for stable patients with a positive DPL to specify the organs injured. Bleeding often may be treated by embolization limiting the rate of unnecessary surgery.

Stable pt

NOTES



MORTALITY IN GERIATRIC TRAUMA VICTIMS: THE LINK BETWEEN PREVENTABLE COMPLICATIONS AND DEATH FROM ORGAN FAILURE

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Past work has shown that nonsurvival in elderly trauma victims is related to untreatable factors such as age and injury severity as well as the frequency of post-injury complications. Complications result from the disease process or from management errors which may be avoidable. While early ICU treatment may decrease mortality, criteria defining geriatric victims at greater risk are poorly defined. We reviewed 374 trauma patients $\geq$ age 65 to determine: 1) if the ER Trauma Score (TS; 0-16) correlates with mortality and 2) the frequency of preventable complications in patients who died (n=31).

Table 1. *TS and mortality.* p<0.01 vs. TS 15-16 group by chi-square(†) or t-test(*)

	n=	*ISS*	*Age*	*Hospital stay*	*deaths*
TS 15-16	303	8.3±0.5	75.2±0.4	10.9±0.6 days	15 (5%)
TS 12-14	17	26.8±3*	73.2±2.1	19.4±5.0 days*	5 (30%)†
TS < 12	17	25.4±4.7*	73.5±1.5	24.6±9.3 days*	11 (65%)†

Table 2. *Cause of death and incidence of preventable complications in 31 deaths.*

	n=	TS15-16	TS<15	Preventable Complications
Failed ER resusc.	5	1	4	0
MOF / S	13	10	3	8
Head injury	7	0	7	0
Sudden arrest	6	4	2	2

Fifteen deaths (48%) occurred in patients with TS15-16. Multiple organ failure/sepsis (MOF/S) was the most common cause of death (42%) and was also the most frequent cause of death in TS15-16 patients (67%). Patients who died in the TS15-16 group were older (79.6±2.1 vs. 74.9±0.5 yrs, p=.02) and had greater ISS (15.8±3.7 vs. 8±0.4, p=.001) than those that survived. The majority (77%) of patients who died of MOF/S had ER TS 15-16 suggesting that geriatric trauma patients who present without obvious physiologic derangement are still at risk for developing organ dysfunction which may remain occult until advanced. Patients with TS<15 suffered high mortality. Of all patients in the TS 15-16 group, those with advanced age or moderate ISS appear to be at the highest risk for death. Complications, particularly those deemed potentially preventable on review by the authors (e.g. 5 pts with major tube feeding aspirations and 2 with critical care errors), contributed significantly to MOF/S mortality in this group (7 of 10). Overall, preventable complications contributed to mortality in 32% of all geriatric trauma deaths and in 62% of MOF/S deaths. Aggressive care to prevent complications may improve survival in elderly trauma victims.

NOTES

In spite of trauma score 15-16 if older / ↑ more injuries than mortality ↑

33% had preventable complications (aspiration (tube feeding) leading cause

MONOETHYLGLYCINEXYLIDIDE (MEGX) PRODUCTION PARALLELS CHANGES IN HEPATIC BLOOD FLOW AND OXYGEN DELIVERY IN LUNG INJURY MANAGED WITH PEEP VENTILATION

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Presenter: P.N. Purcell
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Mechanical ventilation with high levels of PEEP decreases hepatic blood flow (HBF) and hepatic oxygen delivery (HO_2D). Non-invasive methods of detecting decreased HBF might prevent hepatic ischemia and subsequent dysfunction. MEGX is a hepatic metabolite of lidocaine, used clinically to determine graft function following hepatic transplantation. In order to evaluate the use of MEGX production in other types of critical illness, twelve canines were instrumented with femoral and pulmonary artery catheters. Splenectomy was performed and the portal and hepatic veins cannulated. The hepatic artery and portal vein were encircled with flow probes. Lung Injury (LI) was induced in six animals (INJURY Group) with oleic acid (0.08 ml/kg) and 10 cmH_2O PEEP was added to correct subsequent shunt. MEGX production was measured fifteen minutes after injection of intravenous lidocaine (1mg/kg). HBF, HO_2D and MEGX levels were measured at BASELINE, after lung injury (T=1), and after addition of PEEP (T=2). Control animals (n=6) were studied at the same time points but without lung injury or PEEP. Selected results are shown below (mean±SEM; *$p<0.05$ compared to BASELINE by paired t-test):

	INJURY		CONTROL	
	BASELINE	T=2	BASELINE	T=2
HBF (ml/min/kg)	30.0±3.3	15.2±2.0*	33.5±5.7	33.3±3.8
HO2D (ml/min/kg)	5.5±.8	2.4±.5*	6.9±1.2	6.9±.8
MEGX (ng/ml)	91.5±6.9	53.2±8.7*	96.0±9.3	99.7±4.9

HBF and HO_2D were significantly decreased by LI and further decreased by PEEP. MEGX levels were unchanged in the CONTROL Group but were significantly reduced by PEEP in the INJURY Group. Lidocaine metabolism is flow dependent, therefore MEGX production may be a useful clinical indicator of reduced hepatic flow and O_2 supply in critical illness.

NOTES

2 specimens
cheap
20 min test

EFFECT OF IBUPROFEN ON BACTERIAL TRANSLOCATION

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Cook County Hospital and University of Illinois

Presenter: R. Toyos
Senior Sponsor: J. Barrett
Corresponding Author: R. Toyos

Bacterial translocation (BT) occurs in rats following hemorrhagic shock. The macrophages translocate the bacteria through the epithelial lining of the gut releasing the bacteria through the lymphatics. Depression of macrophage function after shock is directly related to the increase in prostaglandin (PGE2) production. Ibuprofen decreases PGE2, increasing macrophage function. Our laboratory has demonstrated that the incidence of BT in the mesenteric lymph nodes is reduced after resuscitation with blood and Ibuprofen.

46 Sprague-Dawley rats were anesthetized and subjected to 60 min of hemorrhagic shock (systolic BP 30-40mmHg). Resuscitation was performed with shed blood (B), plus or minus Ibuprofen (1.0mg/kg body weight). Mesenteric lymph nodes were sent for quantitative culture 24 hrs later. BT occurred if enteric organisms were cultured from the node. Statistical analysis utilized the Fisher-Exact Test, with $p < 0.05$ being statistically significant. Results are shown below.

Resuscitation	+BT	-BT	%BT	p
No shock	0	9	0	
Blood	4	14	22	
Blood and Ibuprofen	0	19	0	.046

Ibuprofen prevents BT in the mesenteric lymph nodes after 60 min of hemorrhagic shock.

NOTES

IMPACT OF MINIMAL INJURY ON A LEVEL I TRAUMA CENTER

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Presenter: W. S. Hoff
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INTRODUCTION: Over-triage has been accepted as appropriate and necessary to avoid missing significant injuries. The impact of over-triage of the minimally injured patient is unknown.

METHODS: Three hundred forty-four patients with ISS≤4 were admitted to the Trauma Service of a Level I Trauma Center during a 2 year period, representing 13% of all Trauma Service patients. Trauma team was activated in 209 (TA), and emergency department referrals accounted for 135 (ER). Pre-hospital, trauma registry and cost data were reviewed.

RESULTS: Of the 344 patients, 173 (50%; TA = 64%, ER = 36%) met ACS-COT field triage criteria (FTC). Mechanism of injury, especially ejection from a motor vehicle, was the most frequently utilized FTC indicator. 171 patients (50%: TA = 46%, ER = 54%) satisfied none of the FTC. For 96 (56%, TA = 69%, ER = 31%) of these, the trauma center was not the closest hospital for EMS transport. This group represents 28% of the minimally injured sample. No differences could be shown between the TA and ER groups relative to TS, GCS, ISS, AIS, LOS or ICU days. TA patients were subjected to more invasive and significant procedures than ER patients (TA = 4.0, ER = 2.5, $p < .0001$). Mean total costs were higher in the TA group than in the ER group (TA = $3837, ER = $1566, $p < .0001$). Higher nursing acuity level was associated with the TA group relative to the ER group ($p < .005$). Estimated nursing acuity for the TA group was 7.0 pt-hrs/day vs. 5.7 pt-hrs/day for the ER group.

CONCLUSION: Compliance with FTC yields an inherent over-triage of the minimally injured patient. Non-compliance with FTC compounds the over-triage rate. Failure to comply with FTC is costly, is labor intensive, and represents a misuse of the trauma system. We propose 1) continual re-education of pre-hospital personnel, 2) increased responsibility of all hospitals in the trauma center catchment area and 3) protocols for "downstaging" trauma resuscitation in the minimally injured patient.

NOTES

helicopters need better control
seat belts & airbags may be
changing mech of injury indications ↓

ROUTINE PELVIC X-RAY IN THE AWAKE BLUNT TRAUMA PATIENT: IS IT A SENSIBLE POLICY?

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Presenter: C. Salvino
Senior Sponsor: G. Jurkovich
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To evaluate the utility of a routine pelvic x-ray in the resuscitation of blunt trauma victims, 1395 adult patients were prospectively evaluated over a 13 month period. Of these, 810 (58.1%) were awake with a Glasscow Coma Scale $\geq$ 13 and enrolled into the study. Mechanism of injury included: 472 (58.3%) motor vehicle collisions, 131 (16.2%) falls, 90 (11.1%) pedestrians struck, 62 (7.7%) motorcycle collisions and 55 (6.7%) assaults. An anterior-posterior pelvic x-ray (APPX); history, with directed questions regarding pelvic pain and clinical exam of the pelvis were obtained on each patient. 39 patients with fractures (4.8%) were identified by x-ray. 37 (95%) were identified by APPX alone, two (5%) were identified after further diagnostic radiographic imaging. Of the patients with radiographically identified fractures, 34 (87.2%) complained of pain and had a positive clinical exam, 2 (5.1%) either complained of pain or had a positive exam, and 3 (7.7%) had neither complaint of pain or a positive exam. 743 (96.4%) of 771 patients without fractures lacked pain complaints or positive exam. The likelihood of fracture was greatest in patients with complaint of pain and positive exam (65%) followed by patients with either complaint of pain or positive exam (16%). Only 3 (0.4%) of the 743 patients having no complaints of pain and a negative clinical exam had fractures diagnosed radiographically. These were all minor fractures which did not impact clinical course. Total charges incurred to diagnose pelvic fractures in this patient group was $88,028.

We conclude that the practice of obtaining a screening AP pelvic film is not a necessary or cost effective tool in the awake blunt trauma patient who does not complain of pain and has a normal physical exam of the pelvis.

NOTES

FLUID AND SODIUM ADMINISTRATION DURING THE FIRST 72 HOURS AFTER HEAD INJURY HAVE NO EFFECT ON INTRACRANIAL PRESSURE

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Presenter: J.D. Schmoker
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Head injury is the leading cause of traumatic death. When combined with hypotension, the mortality of severe head injury (SHI) doubles. The use of asanguinous salt solutions to restore blood pressure may contribute to cerebral swelling and intracranial hypertension and thus increase the risk of adverse outcome. For this reason, fluid (FLD) and sodium (Na) restriction have been advocated to lessen edema formation and reduce intracranial pressure (ICP). The rationale is that Na will retain FLD, increasing the capillary hydrostatic pressure and FLD filtration, leading to edema. There are, however, no clinical or laboratory data to support this recommendation. We hypothesized that in adult patients sustaining SHI [Glasgow Coma Score (GCS)≤8] with or without associated injury: 1) FLD balance (BAL) and total Na administered during the first 72 hours (H) of hospital admission are positively and significantly correlated with each other, and 2) FLD BAL and total Na administration during the first 72H are significantly and positively correlated with changes in the ICP. We studied 57 adult trauma patients for 72H after admission with SHI, admitted between 1980 and 1985.

N=57 (males 47, females 10)

	Mean	SEM	Range
Age (years)	30	±1.7	18 - 72
GCS	5.3	±0.2	3 - 8
Total FLD (cc)	10,931	±248	3731 - 32,760
FLD BAL (cc)	2211	±612	-4967 - 22,195
Total Na (meq)	919	±86	0 - 3320
Maximum ICP (torr)	32	±3.5	2 - 89

Linear regression analysis revealed no correlation between FLD BAL and total Na administration (R^2=0.023), total FLD and ICP (R^2=0.009), or FLD BAL and ICP (R^2=0.025). There was only a weak correlation between total Na and ICP (R^2=0.175, $p<0.05$). We conclude that the amount of Na administered after SHI has no effect on FLD BAL, and that Na and FLD administration are not independent determinants of ICP. FLD and salt restriction could result in hypovolemia and a decrease in cerebral perfusion pressure (CPP) leading to adverse outcome. These data imply that parameters directly contributing to CPP (i.e., CVP, MAP) are more indicative of volume status than the amount of FLD and Na administered.

NOTES

ADEQUATE RESUSCITATION WITH 3% HYPERTONIC SALINE: A MECHANISM OF PROTECTION AGAINST BACTERIAL TRANSLOCATION IN HEMORRHAGIC SHOCK

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Presenter: M. Hochman
Senior Sponsor: J. Barrett
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A decrease in bacterial translocation with hypertonic saline in resuscitation of rats subjected to hemorrhagic shock has been previously described (1). The question is the adequacy of resuscitation using blood as a control. Lactate and pH were used as indicators of adequate resuscitation in this study.

55 Sprague-Dawley rats were subjected to 30 minutes of hemorrhagic shock and then divided into three groups by the method of resuscitation: 1. Sham shock (SS) 2. Blood (B) and 3. 3% Hypertonic saline (HS*). Lactate and pH were measured 15 minutes into shock and then 15 and 45 minutes after fluid replacement.

	15 min. into shock		15 min. after resusc.		45 min. after resusc.	
	pH	Lactate	pH	Lactate	pH	Lactate
SS	7.39±.05	1.2±0.4	7.38±.05	0.9±0.7	7.42±.05	1.0±0.4
B	7.28±.06	5.4±1.9	7.20±.08	3.1±1.4	7.33±.10	2.2±1.4
HS*	7.34±.03	5.7±1.6	7.29±.06	3.1±2.0	7.42±.04	1.2±0.6

Comparison of blood to sham shock 45 minutes after resuscitation revealed a significant difference in both pH and lactate ($p<.05$ and $p<.05$). In contrast, comparison of hypertonic saline to sham shock 45 minutes after resuscitation did not reveal a significant difference in either pH or lactate ($p>.05$ and $p>.05$).

Results illustrate that the blood group is still in shock 45 minutes after fluid replacement. In comparison, the hypertonic saline group is similar to the sham shock group with respect to pH and lactate 45 minutes after fluid replacement, suggesting adequate resuscitation. Since bacterial translocation in the blood group was 32.0% vs. 4.7% in the hypertonic saline group (1), adequate resuscitation is a contributing factor in the mechanism of preventing bacterial translocation.

*HS = ½HS + ½B resuscitation

1. Reed, L., Manglano, R., Martin, M., et. al., The effect of hypertonic saline resuscitation on bacterial translocation after hemorrhagic shock in rats. Surgery. 1991; 110:685-690.

NOTES

LAPAROSCOPIC INJECTION OF FIBRIN GLUE TO ARREST MAJOR INTRAPARENCHYMAL ABDOMINAL HEMORRHAGE

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Presenter: C. Salvino
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The topical application of fibrin glue (FG) to arrest superficial hemorrhage has become increasingly popular. The success of this application has prompted its use by direct intraparenchymal injection in cases of significant hemorrhage following trauma. The resurgence of laparoscopy as a diagnostic and therapeutic surgical modality has stimulated investigation of its role in trauma. The laparoscope offers a novel avenue for the diagnosis of hemorrhage and use of FG as a treatment for hemorrhage in the trauma patient. This study was undertaken to assess the practicality and effectiveness of FG injection under laparoscopic direction to arrest major solid visceral hemorrhage. 20 dogs were randomized into a control group (CG) and treatment group (TG). All animals underwent laparotomy to surgically induce uniform injuries to the liver and splenic parenchyma. Injuries were made by excising a 4x4x4cm wedge of tissue from both the right lobe of the liver and the anterior/superior portion of the spleen. The abdomen was then closed. TG animals (n=12) were allowed to hemorrhage for 30 minutes. Standard laparoscopic cameras and trocars were then placed into the peritoneal cavity. The injuries were visualized and FG injected intraparenchymally. An average of 40 ml (range 35-45) of FG per animal was required to achieve adequate hemostasis. Average time for procedures was 25 minutes (range 15-50). No interventions were performed on the CG animals (n=8). Both groups were resuscitated with Lactated Ringers solution at 3ml/kg/hr until death or return to normal p.o. intake. Mortality in the CG was 63%(5/8). There were no deaths prior to elective sacrifice in the TG. Preoperative and serial postoperative hemoglobin levels were obtained for both groups. Four of 8 CG animals died of blood loss within 1 hour of injury. The remaining CG and TG hemoglobin levels were not significantly different at 1 hour and 6 hour determinations nor during the rest of the follow up period. Animals in the TG were sacrificed at 48 hours (n=4), 1 week (n=4) and 1 month (n=4). Autopsy revealed progressively healing liver and spleen injuries and no gross evidence of pulmonary FG emboli. No complications were noted. This study demonstrates that hemorrhage from the liver and spleen can be successfully controlled using the laparoscope to direct the intraparenchymal injection of FG. In this model, the procedure can be performed expeditiously. It is associated with reduction of mortality to zero when compared to controls, no complications and no evidence of FG pulmonary embolism. This technique may have implications for the management of stable patients with suspected hemoperitoneum or manifesting evidence of intraperitoneal hemorrhage by positive diagnostic peritoneal lavage.

NOTES

Fibrin glue can cause
significant hypotension (15% of patients - ~~Rutherford~~)
Rutherford suggests combination of suture & glue

DELETERIOUS EFFECTS OF INTRAOPERATIVE HYPOTENSION ON OUTCOME IN PATIENTS WITH SEVERE HEAD INJURY

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Recent work has shown that hypoxia or hypotension in the prehospital phase of care doubles the mortality of severe head injury (SHI, GCS<8). Patients with SHI often have injuries that require early operation (OP≤72 hours after admission). To determine the incidence and outcome of intraoperative hypotension (IH=systolic blood pressure,SBP,<90 torr) after SHI, we studied 53 consecutive patients with SHI and OP under general anesthesia. All patients were normotensive (NT:SBP >90 torr)preoperatively. There were 8 females and 45 males. Those patients who developed IH were compared to those who remained NT throughout OP. (Data, mean±SEM; *p<0.01; +p<0.001).

PARAMETER	INTRAOPERATIVE HYPOTENSION	INTRAOPERATIVE NORMOTENSION
N (%)	17 (32%)	36 (68%)
AGE	32±4	28±2
ADMISSION GCS	4.3±0.3	5.6±0.3*
ISS	24.3±2	17±1*
TOTAL FLUID	9415±1602	4708±333*
FlUID BALANCE	5906±2434	609±331*
MORTALITY (%)	14 (82%)	9 (25%)+

The duration of IH was inversely correlated with Glascow Outcome Scale using linear regression ($R=-0.30$, $R^2=0.09$, $F=5.2$, $p=0.02$). Only 32% of the IH patients received intraoperative pharmacologic support (IPS). These data suggest that patients with SHI and IH have a significantly higher mortality than patients with SHI who are NT during operation. This difference in mortality is due, in part, to the severity of associated injuries, but the contribution of IH can't be ignored. These data indicate that IH is frequent after SHI (32%) and has a significant impact on outcome. Further, when IH does occur it should be vigorously treated with fluid and pharmacologic support as needed.

NOTES

5 min seems to be the cut off

ADMISSION BASE DEFICIT REFLECTS PREHOSPITAL O_2 DEBT AND PREDICTS OUTCOME

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Objective: To determine the utility of the base deficit as measured by blood gas analysis.

Design: Retrospective review.

Setting: Tertiary care Center.

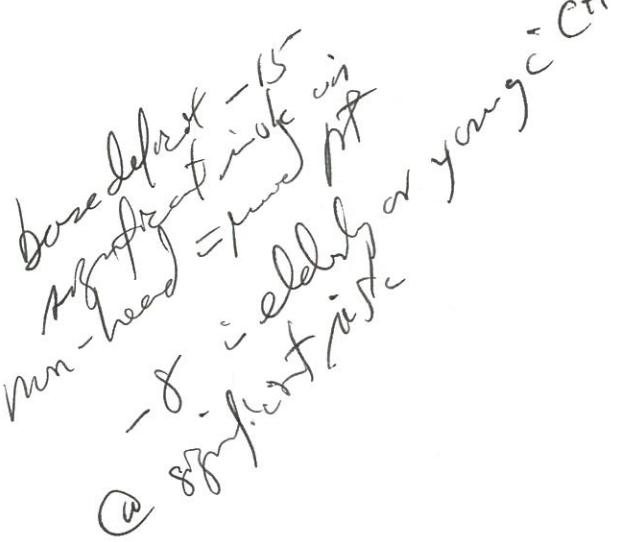
Participants: Consecutive sample of 4,180 trauma admissions with an arterial blood gas drawn in the first 24 hours.

Main Outcome Measures: Shock (systolic blood pressure < 90mm Hg), transfusion requirements, presence of a coagulopathy, probability of survival P(s), and mortality were analyzed, using the trauma registry.

Results: 3,370 patients (80.6%) exhibited a base deficit. Of these, 2,870 patients (85.2%) had a base deficit between 0 and -10 mmol/L, 393 (11.6%) had a base deficit between -10 and -20 mmol/L, and 107 (3.2%) had a base deficit more negative than -20 mmol/L. A worsening base deficit was statistically associated with the presence of shock, transfusion requirements, presence of a coagulopathy, probability of survival and mortality and was independent of shock. In the total population of 3,370 patients, a base deficit of -15 mmol/L was associated with a 50% mortality (LD_{50}).

Conclusion: The base deficit is an expedient and sensitive measure of both inadequate perfusion and subsequent resuscitation requirements. A large base deficit mandates early monitoring and preparation of blood products.

NOTES



THE ETIOLOGY OF MISSED CERVICAL SPINE INJURIES

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Presenter: J.W. Davis
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Missed or delayed diagnosis of cervical spine injuries can lead to extension of those injuries and subsequent preventable mortality and morbidity. This study was undertaken to determine the incidence of delayed or missed diagnosis of cervical spine (c-spine) injuries in a trauma system and the common errors leading to the delays.

METHODS: All trauma patients admitted between 8/85 and 2/91 were included, with data collected concurrently with hospitalization and reviewed retrospectively. Delayed or missed diagnosis of c-spine injuries (spinal precautions discontinued prior to diagnosis) were identified and the errors classified. Complications were attributed to the missed/delayed diagnosis by quality assurance review.

RESULTS: During the study period, 32,117 trauma patients were admitted, 740 patients (2.3%) had c-spine injuries. Delays or missed diagnoses of the cervical injuries occurred in 34 of the 740 patients (4.6%).

		ATTRIBUTED COMPLICATION			
ERROR	**NUMBER**	**DEATH**	**QUAD/HEMIPLEGIA**	**DEFICIT**	**NONE**
INADEQUATE XRAYS	17	1	1	2	13
MISREAD XRAYS	14	1	2	1	10
JUDGEMENT ERROR	1	0	1	0	1
INDETERMINABLE	2	0	0	1	1
TOTALS:	34	2	4	4	25

CONCLUSIONS: The incidence of delayed or missed diagnosis of c-spine injury was 4.6%. The single most common error was failure to obtain an adequate c-spine series. 32/34 injuries could have been diagnosed with a standard 3-view c-spine series and careful interpretation of those radiographs. Physicians caring for trauma patients should obtain at least a 3-view c-spine series on those patients needing radiographic evaluation and be skilled at interpretation of those films.

NOTES

Miss) 34/740
4.6 %

ACUTE STABILIZATION OF THE CERVICAL SPINE BY HALO/VEST APPLICATION FACILITATES EVALUATION AND TREATMENT OF THE MULTIPLE TRAUMA VICTIM

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Presenter: R.F. Heary
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The management of acute cervical spine injuries has traditionally used bed-based skeletal traction (i.e. tongs) until all non-neurologic injuries have been evaluated. This method of treatment significantly hinders the ability to transport and to perform imaging studies and surgical procedures on these patients. In contrast, early application of a halo/vest apparatus provides immediate cervical stabilization and facilitates the diagnostic work-up and treatment of the multiple trauma victim.

The records of all 78 patients admitted between 1988-1991 who had acute cervical spine fractures and/or subluxations with risk of instability were reviewed. All patients were treated with halo/vests and no patient deteriorated neurologically following halo/vest application. Twenty nine patients (37%) had a total of 55 associated injuries including long bone/pelvic fractures in 17, thoracic injuries in 13, closed head injuries in 11, facial fractures in 6, non-contiguous spinal fractures in 5, and abdominal injuries in 3. The mean injury severity score (ISS) was 18 (range 9-54). While in the halo/vest, 43 patients (55%) had a total of 99 diagnostic studies completed and 46 patients (59%) had a total of 76 surgical procedures performed. There were 35 neurosurgical procedures on 32 patients and 41 non-neurosurgical surgical procedures on 24 patients. Over the past year, 20 of 21 patients (95%) had their halo/vests placed in the emergency department.

These data confirm that a significant number of diagnostic and surgical procedures need to be performed in patients with unstable cervical spine injuries. We recognize that a number of these multi-trauma patients (41% in this series) will not achieve long term healing with the halo alone and will require open stabilization. These patients should not be considered "halo failures" since acute placement of the halo/vest both stabilized their neurological status and facilitated the expeditious diagnosis and treatment of potentially life-threatening associated injuries.

NOTES

modified
open ̄ back
Not useful ̄ obese, most elderly
those ̄ spinal deformation i.e. scoliosis, spondylolisthesis

TREATMENT OF SUPRACONDYLAR FEMORAL FRACTURES USING THE SUPRACONDYLAR INTRAMEDULLARY NAIL

W.M. Iannacone, W.G. DeLong, C.T. Born, R.M. Dalsey
Cooper Hospital/UMC, UMDNJ - Robert Wood Johnson Medical School

Presenter: W.M. Iannacone
Senior Sponsor: W.M. Iannacone
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Supracondylar fractures of the femur are commonly seen in trauma patients. These fractures may be simple transverse or may be accompanied by significant intercondylar comminution. Traditional treatment has included traction, casting, cast bracing, and open reduction internal fixation. In multiple trauma patients, rigid internal fixation is preferable to cast or traction treatment. The most common operative treatment has been antegrade intramedullary (IM) nailing or open reduction internal fixation with a supracondylar plate and screws. Antegrade IM nailing requires use of a fracture table and is applicable only to more proximal supracondylar fractures without severe intercondylar comminution. The laterally applied supracondylar plate requires a large dissection of the lateral soft tissues and achievement of full range of motion is difficult even with many weeks of aggressive physical therapy. The purpose of this study is to evaluate the supracondylar IM nail in the treatment of distal femoral fractures. The supracondylar IM nail combines the advantages of IM fixation with the ability to treat complex comminuted fractures of the distal femur without an extensive dissection of the lateral thigh.

From March 1990 to August 1991, 30 patients presented to Cooper Hospital/University Medical Center with 32 supracondylar injuries of the femur. There were 15 open fractures, 15 closed fractures, 1 pathologic lesion, and 1 fractured supracondylar plate in 12 females and 18 males aged 16 to 74 years. Four patients had ipsilateral fractures of the tibial shaft which were treated with a tibial IM nail. Open fractures were treated with irrigation and debridement followed by immediate or delayed supracondylar IM nailing. The supracondylar IM nail is inserted into the intercondylar notch through a median parapatellar incision with the patient supine on an x-ray table. This device is a fully cannulated 11, 12, or 13 mm diameter nail with multiple interlocking screw holes for 5.0 or 6.4 mm screws. It is available in 150, 200, and 250 mm lengths.

At 2 to 20 month follow-up, 22 fractures have healed with active knee range of motion 0-90° or greater. There are no infections, and one patient died secondary to massive head trauma. Five 11 mm nails failed, requiring revision to a larger diameter IM nail. The 11 mm nail has been withdrawn from use. Three fractures required bone grafting, and the pathologic lesion is stable.

The advantages of the supracondylar IM nail are ease of insertion without the use of the fracture table, less x-ray exposure for the surgeon without the need for sighting of interlocking screws, and avoidance of lateral dissection of the thigh. Excluding the five 11 mm nail failures, the overall healing rate of supracondylar femur fractures treated with the supracondylar IM nail is 88%. Our data supports continued use of this device in the treatment of fractures of the distal femur.

NOTES

Now using larger
Neil ? 12mm vs 13 mm = 5mm screws
Non weight bearing 6-8 wks
can treat floating knee this one
incision

OPEN FRACTURES OF THE CALCANEUS

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Mayo Clinic

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Purpose: Determination of the outcome of open calcaneal fractures which has not previously been reported.

Conclusion: One-third of fractures became infected. Final functional outcomes were worsened by the presence of an intra-articular fracture.

Significance: Aggressive treatment of open intra-articular fractures could potentially improve the final functional outcome, however, the effect of rigid internal fixation may also change the incidence of infection in this group of patients.

Between November 1977 and August 1990, we treated 23 acute open fractures of the calcaneus in 22 patients. Eighty-two percent of these patients were multiply injured. With one exception, all patients were followed longer than one year with follow-up averaging 39 months (range: 4-105). Wounds were classified by the Gustilo-Anderson classification with distribution of Type I (four); Type II (eight), Type IIIA (six); Type IIIB (four) and one Type IIIC injury. There were 11 extra-articular and 12 intra-articular fractures. The most common mechanism of injury was a motorcycle accident or a fall.

Treatment was variable depending upon surgeon preference and fracture type. Patients averaged six surgical procedures (range: 2-15) with final wound closure occuring at eight days (range: 1-28). Final functional results were performed according to the system of Lance.

Infection occurred in seven patients (32.8%). The incidence of infection correlated with the severity of the original wound as follows: Type I (0%); II (25%); IIIA (33%); IIIB (50%) and the only Type IIIC also became infected. One of the extra-articular fractures (9.1%) became infected whereas six intra-articular fractures (50%) became infected.

There were 10 (92%) good or excellent results in the extra-articular fracture group compared with 2 (15%) good or excellent results in the intra-articular group. Because of the small numbers, the effect of infection versus the effect of an intra-articular fracture was difficult to assess. Intra-articular fractures with infection uniformly had a poor result.

NOTES

ARTERIAL INJURIES ASSOCIATED WITH THE FLOATING KNEE

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Cooper Hospital/University Medical Center

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A "Floating Knee" resulting from simultaneous fractures of the diaphysis or adjacent metaphysis of the femur and tibia is not a common injury. It is the result of an unusual combination of high energy forces, and is often complicated by concomitant multisystem injury. Compared to traumatic dislocation of the knee, where arterial injury may occur in up to 40% of cases, the incidence of vascular trauma associated with a Flotating Knee has not been previously reported.

A retrospective review of 35 patients with 36 simultaneous ipsilateral femur and tibia fractures, who are admitted to a level one trauma center over a 6 year period was performed. All were due to blunt trauma, most commonly, a motor vehicle collision. Five patients were under the age of 15 and skeletally immature. 77% had associated injuries. 48% of these fractures were open, which included 10 patients with femur, 24 with open tibia, and 4 with open femur and tibia. One patient had bilateral Floating Knees. Four patients had no distal pulses on admission and underwent angiograms; only 2 sustained arterial injuries. Clinical signs of extremity ischemia were absent in the other 31 patients, and no delayed vascular complications were observed on follow-up after hospital discharge.

Although severe traumatic forces are required to produce major skeletal injury and soft tissue damage, there is a low incidence of concomitant major arterial injuries in patients with a Floating Knee. In contrast to patients with knee dislocations, angiography is reserved only for Floating Knees presenting with clinical signs of extremity ischemia. Close clinical observation and adequate follow-up of those without signs of ischemia is mandatory.

NOTES

low incidence
discussion centered around
picking up early

ABI < 0.9 = significant art. dz
until proven otherwise

THE EFFECTS OF DOPEXAMINE HYDROCHLORIDE ON TISSUE OXYGENATION (GUT, LIVER AND MUSCLE) IN SEPTICEMIA

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In septic patients one of the major factors determining the outcome is the ability to increase oxygen consumption (1). Thus, it is of paramount importance to be able to increase oxygen delivery to the tissues. Global oxygen transport can be evaluated with a PA-catheter, however, this monitoring technique and different modalities of treatment have not improved survival of these patients during the past 20 years (2,3). We, therefore, studied the effects of a new vasoactive drug, dopexamine hydrochloride, on tissue oxygenation in the normal state and in septicemia.

Twenty-three anesthetized rabbits were tracheotomized, and arterial, venous and PA-catheters were placed intravascularly. An inner thigh muscle surface was carefully exposed. A small laparotomy exposed the liver and the stomach. On each of these tissue surfaces an 8-channel MDO tissue surface oxygen electrode was placed (4). During sampling 120 individual tissue pO_2's (p_tO_2) were collected from each electrode. Data collected were: arterial blood gases, hematocrits, mean arterial pressures, hemodynamics and p_tO_2 distributions.

Experimental protocol: 1) control; 2) infusion of either 0.5, 1.0, 2.0 or 4.0 mcg/kg/min dopexamine HCL, respectively; infusion stopped; 3) infusion of E coli endotoxin; 4) infusion of the same dose of dopexamine HCL as used initially. Data were collected during each of 1) - 4).

Results: During septicemia acidosis developed, mean arterial pressure, systemic vascular resistance, and cardiac output all decreased. During infusion of dopexamine HCL in the normal animals 0.5 mcg/kg/min decreased muscle p_tO_2, 2.0 and 4.0 increased muscle pO_2. In the other organs p_tO_2 increased in a dose dependent fashion. During septicemia tissue oxygenation of all organs increased with increasing dose of dopexamine HCL. However, tissue pO_2's never reached control levels in the normal animals.

Conclusions: Vasoactive drugs will have effects in individual organs which cannot be evaluated from centrally obtained hemodynamic numbers. We have also studied the effects of dopamine, dobutamine and amrinone on tissue oxygenation (5, and unpublished data). Neither of these drugs increased tissue oxygenation in normal animals. Till now only dopexamine hydrochloride has been found to increase tissue oxygenation in gut, liver and muscle in both normal and septic animals.

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5. Lund N, de Asla RJ, Guccione AL, Papadakos PJ. Circ Shock 1991;33:164.

NOTES

ELECTROPHRENIC RESPIRATION IN SPINAL CORD INJURY PATIENTS

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Baylor College of Medicine

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Electrophrenic respiration (EPR) can replace mechanical ventilation in some apneic patients including those who are apneic from spinal cord injuries. The system is comprised of: (1) bilateral stimulating electrodes implanted surgically in the neck or chest, (2) electrode leads tunneled subcutaneously to power receiving devices implanted in the subcostal area, (3) power transmitting antennas placed on the skin over these receivers which are attached to the programmable stimulus generator. The signals are transmitted transcutaneously to provide stimulation of the diaphragm. Criteria for this treatment includes: (1) a stable and capable family support system (2) a minimum of 3 months post injury (3) absence of active pulmonary disease, (4) ability to sit (5) stability on FIO2 of 21% (6) normal airways by endoscopy (7) absence of esophageal dysfunction or gastroesophagel reflux producing aspiration and (8) quantitatively viable phrenic nerves on electrodiagnostic testing. From 1968 to 1981, 23 patients have been treated with EPR. There were 13 male and 10 female patients ranging in age from 4-54 years with a mean of 20 years. There were no (0%) operative mortalities. There are currently 14/23 (61%) of patients living with an average of 8 yr of EPR in this group. Among those who died (9/23 or 39%), EPR was utilized for an average of 4 years. Percent time of use of EPR per day in the surviving group of 14 was 100% in 7, 50% in two and variable in the remainder. Complications observed have included: (1) development of high stimulation thresholds in cervical electrodes over time requiring new placement of thoracic leads (2) pain with stimulation of cervical leads, (3) stimulation of the brachial plexus with resultant shoulder and arm muscle contraction with cervical leads and (4) internal equipment malfunction after years of use (requiring replacement). EPR provides excellent and safe ventilation, partially replacing the need for positive pressure respirators ~~in~~ suitable patients. The advantages of EPR over mechanical ventilators are: (1) more physiologic respiration, (2) safety, (3) convenience (4) increased mobility and (5) improved cosmesis.

Can talk as opposed to track dependent

NOTES

EMERGENCY PERCUTANEOUS TRANSLARYNGEAL VENTILATION IN MULTIPLE TRAUMA: AN ELEVEN YEAR EXPERIENCE

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PURPOSE

To review an Emergency Department experience with the use of percutaneous translaryngeal catheter jet ventilation (PTV) in multiple trauma.

METHOD

Retrospective chart review.

RESULTS

Thirty-five multiple trauma patients underwent PTV during the period 1980-1990. PTV was the first airway maneuver in 25 patients for indications of airway compromise with potential C-spine injury (20 patients) and massive facial injury (5 patients). Thirteen of these patients were apneic or had agonal respirations. Indications for PTV when other methods failed were airway compromise with potential C-spine injury (five), inability to intubate (two), failed cricothyrotomy (two), and clenched teeth with vomiting (one). PTV was successful in 26 patients (74%). Failures resulted from inadequate ventilation in five patients (14%), catheter kinking in two patients (6%), and inability to place the catheter in two patients (6%). In most cases, efficacy of PTV was assessed clinically, though arterial blood gases during PTV were available in six patients. Mean values ($\pm$ SD) for pH, p02, pC02 in this group were 7.25 $\pm$ 0.17, 359 $\pm$ 107 torr, and 35 $\pm$ 14 torr, respectively.

PTV was used as a temporary airway technique. The average duration of use was 16 $\pm$ 14 minutes. Definitive airways following successful PTV were established using orotracheal intubation (twelve patients), cricothyrotomy (eight patients), and nasotracheal intubation in two patients. In three patients with successful PTV, the patient was declared dead and no further airway management was used. Definitive airways following failed PTV were cricothyroidotomy in seven patients and orotracheal and nasotracheal intubation with one patient each.

The only clinically significant complication solely attributable to PTV was pneumoperitoneum in one patient (3%). The patient underwent negative exploratory laparotomy on the basis of this finding. Two other patients had pneumothoraces without obvious chest wall injury or rib fractures. These may have resulted from PTV, but no chest x-ray was obtained prior to PTV to determine a causal relationship.

CONCLUSION

PTV is an effective temporary airway technique in multiple trauma patients. Arterial blood gas data, although limited, indicate adequate oxygenation and ventilation in the presence of pulmonary contusion and head injury. PTV did not complicate the securement of a definitive airway in any patients. Pneumoperitoneum is an uncommon but major complication of PTV and may result in unnecessary laparotomy.

NOTES

50 psi

Cook Inc
for catheter

Bear pressure ventilator

DECISIONS IN MANDIBULAR FRACTURES MANAGEMENT

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The management of mandibular fractures has evolved over the past several decades and controversies exist as to the ideal approach for each individual fracture. The choices for treatment include closed versus open techniques, followed by method of reduction and repair and the decision for or against intermaxillary fixation. A number of factors impact these choices including both patient and fracture characteristics. Patient factors include age, mandibular bone quality, dentition, patient reliability, and associated injuries. Fracture characteristics include favorability vs. unfavorability, single vs. multiple, location, and presence of infection. The purpose of this study was to develop and test a management alogrithm to assist in the decision-making process for the best treatment of mandible fractures. Multiple decision-making factors were considered. Sixty-seven patients were managed at the Grady Memorial Hospital otolaryngology service for this study. The ages ranged from 3 years to 68 years of age and included 55 males and 12 females. Forty-three patients had multiple fractures, while 24 had single fractures. Overall 64 patients were successfully managed and felt to have normal or near-normal function at follow-up. Complications were seen in 13 patients (19%). These included 5 infections, 1 malunions and 2 malocclusions, 5 marginal nerve paresis. Multiple fractures did not have a higher incidence of complication. The treatment algorithm and its application is presented in detail. This protocol allows an orderly approach to the successful outcome of mandibular fractures.

NOTES

CANDIDA ANTIGEN TITER DILUTION AND DEATH AFTER INJURY

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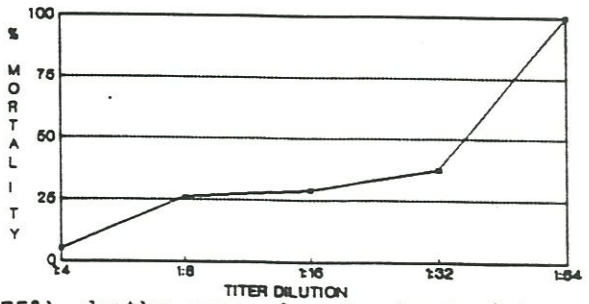
This study was undertaken in severely injured adults to determine the relationship between mortality and positive candida antigen titers drawn for set indications: clinically apparent candida source(s) or unexplained clinical deterioration. Positive titers were defined as $\geq$1:4.

69 severely injured (ISS=28$\pm$2 SEM) adults (41 yrs$\pm$3) developed positive candida antigen titers while hospitalized. Prior to developing positive candida antigen titers all suffered bacterial infections which were generally multiple and often polymicrobial. All received antibiotics prior to developing positive candida antigen titers, generally receiving prolonged multiple antibiotic therapy (average antibiotic days=48$\pm$6).

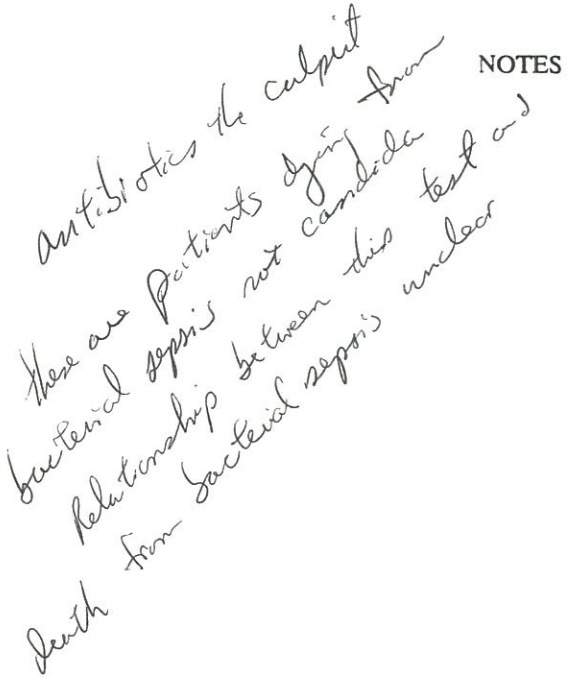
Titer	1:4	1:8	1:16	1:32	1:64
Mortality	1/27	6/20	4/12	4/9	1/1
% Mortality	4%	30%	33%	44%	100%



12 (75%) deaths were due to bacterial sepsis; none were apparently due to candidosis.

Severely injured adults that developed positive candida antigen titers suffered bacterial infections and received prolonged broad spectrum antibiotic therapy prior to developing positive candida antigen titers. Positive candida antigen titers have an unexplained association with septic death. Mortality increases with increasing titer dilution.

NOTES


antibiotics the culprit
these are patients dying from
bacterial sepsis not candida
relationship between this test and
death from bacterial sepsis unclear

THE DISPARITY BETWEEN HYPOTHERMIC COAGULOPATHY AND CLOTTING STUDIES

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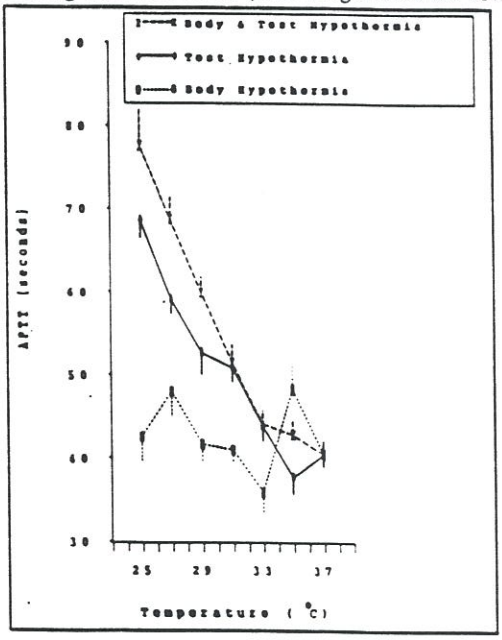
Hypothermic trauma patients commonly develop coagulopathy, but the effects of hypothermia on coagulation remain unclear because clinical laboratories routinely perform clotting tests at 37°C only. At issue in this study is whether hypothermia alters circulating clotting factor levels (indicating a need for factor replacement) or whether it alters enzymatic clotting factor activities (indicating a need for rewarming).



Activated partial thromboplastin times (APTT), prothrombin times (PT), and thrombin times (TT) were performed at a range of temperatures (25°-37°C) on plasma from normothermic (37°C) and hypothermic (25-35°C) rats. Three groups of 42 rats each (6 at each of 7 temperatures) were studied: 1) body normothermia (37°C) with clotting test hypothermia (25-35°C), reflecting effects on kinetics alone; 2) body hypothermia (25-35°C) with clotting test normothermia (37°C), reflecting effects on circulating clotting factor levels alone; and 3) body and test hypothermia (25°-35°C), representing interactive effects between altered enzyme kinetics and circulating levels. Data analysis used 1- and 2-way ANOVA, and post-hoc testing with Bonferroni's correction. Data for APTT are shown (Figure). A significantly greater impairment of coagulation was seen with test hypothermia than with body hypothermia ($p<0.005$). The combined effect of hypothermia of both body and test was no greater than with test hypothermia alone, indicating no interactive effects. Statistically significant changes were seen at clotting test temperatures of ≤ 33°C for the PT, ≤ 31°C for the PTT, and ≤ 33°C for the TT ($p < 0.001$). These data indicate that the major effect of hypothermia upon plasma clotting factors is on their kinetic enzymatic activity and not on their circulating clotting factor levels. Thus, corrective measures to treat coagulopathy during hypothermia should be focused on rewarming rather than on clotting factor replacement.

NOTES

Restore not replace

AORTIC RUPTURE - PELVIC FRACTURE COMPLEX: AN ALERT FOR ORTHOPEDIC AND GENERAL SURGEONS

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Traumatic rupture of the thoracic aorta can be lethal if not diagnosed and treated promptly. Diagnosis can be difficult and has been facilitated by identification of radiological findings and associated injuries which correlate with an increased incidence of aortic rupture. Blunt trauma patients with pelvic fracture have been found to have a 2 to 5 fold increased risk of aortic rupture when compared to the overall blunt trauma population.(1) Pelvic fractures have been classified by mechanism of injury (Tile) and the objective of this study was to determine whether or not the increased incidence of aortic rupture in patients with pelvic fracture could be further quantified based on mechanism of injury.

We retrospectively reviewed 4,588 blunt trauma patients admitted to a level I trauma center over 3 years, 405 had pelvic fracture and 35 aortic rupture. Admission pelvic x-rays were available for 368 patients with pelvic fracture; these were reviewed and classified by an orthopedic surgeon blinded to clinical diagnosis. The numbers of aortic injuries associated with each type of pelvic fracture in the study population are presented in the following table.

Fracture Type	Number	Aortic Ruptures	Percent
Anterior Compression	106	8	7.5
Lateral Compression	148	0	0.0
Sheer	16	1	0.06
Combination	35	3*	8.6
Acetabular	63	1	0.02

*All included an anterior compression vector as one of the component vectors.

One third (13/35) of aortic injuries occurred among the 368 patients with confirmed pelvic fracture. The proportion of pelvic fracture patients with aortic injuries was 3.5% (13/368), which was four times greater than that of all blunt trauma patients (0.8%). More importantly there was a statistically greater incidence of aortic rupture among patients with anterior compressive (A-C) vector of injury when compared to other types of pelvic fracture (11/13; $p<.005$). There was a ten-fold increase in the probability of aortic rupture among patients with A-C pelvic fractures when compared to the overall population and the incidence of aortic rupture in patients with pelvic fracture and no A-C vector was the same as the overall trauma population.

We conclude that patients who sustain pelvic fracture as a result of an anterior compressive vector of force have a tenfold increased risk of aortic rupture when compared to the overall blunt trauma population. Clearly, these injuries occur as a result of similar biomechanical forces yet are managed by different subspecialties. General and orthopedic surgeons should be aware of this injury complex and aggressively evaluate the thoracic aorta in patients with A-C pelvic fracture.

(1)Ochsner, M.G., Champion, H.R. et al: Pelvic fracture as an indicator of increased risk of thoracic aortic rupture. J. Trauma 29:1976, 1989.

NOTES

A-P vector
trans. esophageal echo
a Dx method also

CHEMICAL PARALYSIS REDUCES ENERGY EXPENDITURE IN MECHANICALLY VENTILATED TRAUMA PATIENTS

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It has been demonstrated that standard formulas for predicting energy requirements in burn and trauma patients often overestimate needs. This may lead to significant overfeeding of these patients, particularly when additional "stress factors" are used to further increase estimates. Chemical paralysis and mechanical ventilation reduce energy expenditure, but the magnitude of this reduction is unknown. This study was performed to examine the effect of chemical paralysis on energy expenditure in mechanically ventilated patients suffering trauma or burns.

Eleven patients with major burns or trauma who required mechanical ventilation for respiratory failure were paralyzed with vecuronium to reduce inspiratory pressures and/or improve oxygenation. In each patient, oxygen consumption (VO_2) and CO_2 production (VCO_2) were measured by indirect calorimetry before, during, and after paralysis. Patients were sedated with morphine and lorazepam during all three periods. All measurements were performed on FiO_2 of 0.5 or less, within a seven day interval. Measured energy expenditure (MEE) was compared to basal energy expenditure (BEE) calculated by the Harris-Benedict equations. The respiratory quotient (RQ = VO_2/VCO_2) was calculated for each patient. Results are summarized below

Period	MEE (Kcal/Kg/)	BEE (Kcal/Kg/)	BEE / MEE	No. Pts with RQ > 1
Preparalysis	26.7 + 6.9	27.6	1.08	4/11
Paralysis	20.4 + 6.6 *	27.6	1.45 **	9/11
Postparalysis	29.2 + 9.3	27.6	0.95	4/11

*p<0.05 vs postparalysis; **p<0.05 vs pre and postparalysis, by one-way ANOVA

These data demonstrate a 24% and 28% decrease in MEE with paralysis compared to the pre and post paralysis states, respectively. In these sedated, mechanically ventilated trauma patients, energy expenditure estimated by the Harris-Benedict equations, even without added stress or activity factors, closely approximated MEE. When patients were also paralyzed however, BEE overestimated energy expenditure by 45%, and 9 of 11 patients (82%) demonstrated an RQ greater than one, suggesting overfeeding and net fat synthesis. Indirect calorimetry should be used to guide nutritional support in trauma patients, in order to avoid the complications of overfeeding, particularly with the use of chemical paralysis.

NOTES

25-35 kcal/kg/d

NUTRITIONAL ASSESSMENT USING A PA CATHETER

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Introduction: Assessment of energy expenditure (EE) is important so that caloric intake can be adjusted appropriately. Since EE results from oxidative processes, it is proportional to oxygen uptake (VO_2). The inability of commonly used formulas to predict the EE of critically ill patients has led to the use of measurements of VO_2 via indirect calorimetry (IC) as a means of determining EE. If a pulmonary artery catheter (PAC) is in place, the Fick method can also be used to determine VO_2. We postulated that 1.) EE could be reliably estimated using VO_2 derived by the Fick method. 2.) Since studies show significant daily variation in EE in critically ill patients, daily estimates of EE using the Fick method would be a more reliable means of estimating EE than the standard practice of using a single IC measurement to predict EE on subsequent days.

Method: Twenty measurements of EE using IC were performed on 15 critically ill, mechanically ventilated patients with an indwelling PAC. The group included 13 males and two females, with a mean age of 48 +/- 5 yrs. Twelve were trauma victims, with a mean ISS of 28 +/- 3.3. During IC, VO_2 was derived from the Fick equation by averaging the results of three cardiac output determinations (thermodilution), and multiplying the result by the difference in 0_2 content of a concurrent arterial and mixed venous blood sample. EE was then estimated by multiplying VO_2 by the heat equivalent of 0_2 combustion: kcal/hr = 0.303 (VO_2 ml/min). In five patients, EE measurements were repeated within one week, prior to removal of the PAC. Patients also had EE estimated using the Harris-Benedict equation with Long's correction factors.

RESULTS

	IC	Fick Method	H-Benedict
EE (kcal/day +/- SE)	2486 +/- 132	2394 +/- 190	2735 +/- 129
difference vs. IC (kcals)		93 +/- 100	248 +/- 65
p value vs. IC (t-test)		0.37	0.001
r value vs. IC		0.87	0.88

In the five patients in whom EE assessment was repeated, the mean difference between initial and follow-up IC was 416 +/- 116 kcals, which is greater than the mean difference in EE as determined by simultaneous performance of IC and the Fick method.

Conclusion: The Fick method can be used to estimate EE in critically ill patients requiring a PAC. Because of day to day variations in EE, daily use of the Fick method may be a more accurate means of estimating EE than infrequent, periodic performance of IC.

NOTES

PRE-HOSPITAL PROCEDURES IN TRAUMA

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Presenter: R. Cobean
Senior Sponsor: G.J. Jurkovich
Corresponding Author: G.J. Jurkovich

The development of Emergency Medical Systems has reduced the incidence of preventable deaths following trauma. The extent to which potential lifesaving procedures are performed in the field has been limited, in part, by concerns regarding the safety of invasive maneuvers performed by paramedics. We reviewed the indications for and complications of pre-hospital tracheal intubation, cricothyroidotomy, pleural decompression, and central venous catheterization by paramedics transporting trauma patients to an urban Level I trauma center.

933 trauma patients were transported to Harborview Medical Center during 1989 by paramedics trained in advanced procedures. This represents 86% of all trauma patients transported to this center by EMT-P. 75% were transported by ambulance, 25% by helicopter. The population had a mean age of 32.5 years, mean ISS of 13.1, and was 74% male. 35 patients died in the ER, 893 were admitted, and 5 were discharged home from the ER. 265 patients (28%) were orally intubated in the field: 50% for altered level of consciousness, 30% for respiratory distress, 11% for combativeness, 9% for facial burns and other reasons. 23 endotracheal tubes (9%) required repositioning following chest x-ray in the ER. Six cricothyroidotomies were performed in the field: 4 following failed oral intubation, 2 for facial trauma and upper airway obstruction. One cricothyroidotomy resulted in tracheal injury. 35 intrapleural flutter valves were placed (4%): 25 for absent breath sounds, 6 for hypotension, 3 for obvious chest trauma, 1 for tracheal deviation. 26 of these (74%) were replaced by chest tubes in the ER, where 21 hemo- or pneumothoraces and 5 air leaks were recognized; these chest tubes remained in place for a median 4.0 days. The remaining 9 flutter valves were simply removed. Superficial infection occurred at the flutter valve site. Subclavian central venous catheters were placed in 15 patients. 10 for hypotension, 5 for inadequate peripheral access or other reasons. Ten catheters were intact upon arrival to the emergency department. 7 of which were properly positioned. The catheter had sheared in 3 patients.

This descriptive review supports the safety of pre-hospital orotracheal intubation, cricothyroidotomy, and percutaneous pleural decompression by paramedics trained in their performance. The 20% complication rate seen with subclavian catheter placement raises concern about its use in the field.

2000 hr of training + extensive animal work

CIRCULATING HORMONES AND PLASMA TNF MEASUREMENTS FOLLOWING MINOR TRAUMA IN MAN

E.J. DeMaria, H.D. Reines, J. Keitz, T. Gehr
Medical College of Virginia

Presenter: E.J. DeMaria
Senior Sponsor: H.J. Sugerman
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Minor trauma characterized by pain, anxiety, and tissue injury without significant blood loss may be sufficient to increase the levels of several circulating stress hormones but the cytokine response to these injury-related stimuli has not been defined in humans. We measured plasma cytokine levels to determine if trauma without major tissue injury or hemodynamic compromise provokes an increase in circulating Tumor Necrosis Factor(TNF). Other stress hormone responses were measured to allow correlation with past works in the minimal trauma setting. Twelve trauma victims with Trauma Score(TS, 0-16) $\geq$ 14 underwent collection of urine(U) and blood in the ER and again at 12, 24, and 48 hours and 7 days post-injury. The mean age was 34 years, the mean TS was 15.5, and the mean ISS was 4.9. All patients were treated according to standard trauma protocols and received iv lines, bloodwork, x-rays, and a urinary catheter. Five patients underwent peritoneal lavage. Data collected were compared to Day 7 values as well as values found in 5 non-traumatized volunteers(controls).

	TNF(ELISA)	NE(HPLC)	Cortisol(RIA)	U PGE2
	pg/ml	ng/dl	µg/dl	(ng/gmCr)
ER	27.0±47.2	381±251	32.2±21.3 *	
12 hr	34.8±40	291±234	14.5±8.8	367±107
24 hr	26.4±35.4	266±138	8.7±7.5	242±97
48 hr	29.3±32.3	291±115	12.3±9.7	
7 day	25.2±38	245±105	16.1±7.4	
controls	<12	258±67	11.9±10.5	<750

data are means±standard deviation, * $p<0.05$ vs day 7 and control (t-test)

Norepinephrine(NE), growth hormone, glucagon, and insulin levels were not elevated at any time point. Cortisol was elevated only at the initial time point. Plasma TNF was not elevated significantly at any time point. The data suggest that minor trauma provokes an increase in circulating cortisol without a concomitant increase in other stress hormones. Plasma TNF did not increase following minor trauma. In light of past work showing variable increases in TNF following major trauma, the data support a graded response to injury for TNF reminiscent of graded neuroendocrine responses which are well-described

NOTES

IMPACT OF THE USE OF PARALYZING AGENTS IN AIRWAY MANAGEMENT OF TRAUMA SYSTEM PATIENTS IN THE FIELD

W. Long, S. Shidner, Life Flight Personnel, J. Zeiko
Emanuel Hospital and Health Center

Presenter: W. Long
Senior Sponsor: M. Metzdorff
Corresponding Author: W. Long

On scene intubation of the severely injured trauma patient may be difficult because of a patient's combative behavior, clenched teeth, bloody secretions, or oro-maxillofacial trauma. An audit of intubation success rates in trauma system patients by pre-hospital care providers in the Portland Metropolitan area showed 50% intubation success for EMT's and 62% for Life Flight (LF) nurses and EMT's. This report describes the impact of a specialized training program.

LF implemented an intensive operating room training program to develop skills and experience with intubation using neuromuscular blocking agents (NMBA) on elective surgery patients. Following a six month training period (9/89-02/90), LF implemented a protocol for field intubation with NMBA of trauma patients aged six or older. We compared intubation success rates pre-NMBA training with post-training and trauma patient scene times before and after training.

Over 17 post-training months, LF successfully intubated 95 of 108 patients (88%), a 26% improvement over pre-training rates ($P < 0.05$). NMBA were used with intubation in 84 patients, 75 (89%) were intubated successfully. Experience improved success rates: 83% over the first six months post-training, 95% for the most recent six months ($P < 0.05$).

Intubation with NMBA increased average scene times significantly over pre-NMBA study period, 19.7 minutes vs. 13.7 minutes ($P < 0.05$). Excluding unusual circumstances for prolonged scene calls, pre-training average scene times were 11.4 minutes vs. post-training 16.7 minutes ($P < 0.05$). Increasing experience with NMBA decreased the average scene times significantly from the first six months,19.5 minutes, to the most recent six months, 15.4 minutes ($P < 0.05$).

There were ten complications associated with field intubations with NMBA during the study period. One posterior pharyngeal tear, four mainstem bronchial intubations, and five induced emesis.

NMBA and training facilitate intubation of trauma patients in the field and improve success rates, but prolong scene times.

NOTES

PITFALLS IN COLOR-FLOW DUPLEX ULTRASOUND FOR SCREENING OF SUSPECTED ARTERIAL INJURIES IN PENETRATED EXTREMITIES

J.M. Bergstein, J.F. Blair, J. Edwards,
J.B. Towne, D.H. Wittmann, C. Aprahamin
Medical College of Wisconsin

Presenter: J.M. Bergstein
Senior Sponsor: T. Cogbill
Corresponding Author: J.M. Bergstein

In a 28 month period, we studied 196 patients who sustained 216 penetrating extremity injuries without obvious signs of arterial injury, including 178 gunshot wounds, 27 stab wounds, and 11 shotgun wounds. All underwent angiography, with 202 negative, and 14 (6.5%) surgically confirmed positive studies. 75 also underwent color-flow duplex ultrasound scanning, using vessel contour, wall integrity, spectral broadening, and flow characteristics to detect injury, with 72 negative, and 3 (4.0%) positive studies. Duplex scanning was successful in 100% of attempts, and results agreed with arteriogram in 96% of studies. With arteriography defined as "gold standard", duplex had a specificity of 99% and a sensitivity of 50%, a positive predictive value of 66% and a negative predictive value of 97%. There were two false-negatives (small pseudoaneurysms were missed in an axillary and an aberrant radial artery) and one false-positive (a genicular artery pseudoaneurysm was misread as originating from the popliteal artery).

While technical difficulties may explain all of these missed injuries, cautious interpretation of negative studies appears warranted, particularly in the axilla and in bifurcated arteries. Complete imaging of extremity arteries should be achieved to rule out aberrant anatomy. Questionable and technically suboptimal studies should be confirmed with arteriography.

We conclude that color-flow duplex scanning may be useful as a first-line screening tool for penetrating extremity injuries thought to harbor occult arterial injuries.

may be useful in
c̄ femoral & brachial artery areas
essentially looking for AV fistulas &
pseudoaneurysm

NOTES

ADVANCES IN THE MANAGEMENT OF COMPLICATIONS FOLLOWING PENETRATING LIVER INJURIES

M.M. Knudson, R.C. Lim
University of California

Presenter: M.M. Knudson
Senior Sponsor: M.M. Knudson
Corresponding Author: M.M. Knudson

Major penetrating liver injuries continue to challenge trauma surgeons. Recent trends toward more conservative operative therapy for these injuries have decreased operative morbidity, but could also result in major postoperative complications. This report reviews our recent experience with major penetrating liver injuries. METHODS: The authors have kept concurrent records on several patients with complications following liver injuries. These records and those of other patients with major penetrating liver injuries were reviewed for the following data: demographics, nature of the wounding instrument, initial physiologic status of the patient, operative management, grade of liver injury, blood requirements, associated injuries, length of intensive care stay and hospitalization, and the nature and treatment of all complications. RESULTS: During the three year period from 1988-1991, 171 patients with penetrating liver injuries were admitted to our hospital. The overall mortality in this group was 10%, but only 4 of the 19 deaths could be attributed to the liver injury itself. Operative procedures on the 40 patients with major liver injuries included debridement, wedge resections, use of hemostatic agents, or simple drainage. No major resections were performed. There were no late deaths in this series, but 9 patients experienced major complications including biliary fistula in 6 patients and hemobilia in one. Two patients with severe coagulopathy required a second operative procedure, but many of the complications were managed by interventional radiologic techniques. CONCLUSION: Our experience supports a conservative operative approach to major penetrating liver injuries. Major resections or hepatotomies are rarely required and complications following these injuries can generally be managed successfully without major surgical intervention.

NOTES

pack - desire - wait

LONG-TERM FOLLOWUP OF UNSUCCESSFUL TRAUMATIC SUICIDES: RISK FACTORS FOR SUBSEQUENT ATTEMPTS

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Vanderbilt University School of Medicine

Presenter: J. Van Aalst
Senior Sponsor: J.A. Morris, Jr.
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Study Population: Of 9,046 consecutive Trauma admissions, all traumatic suicide attempts (N = 156) were identified: 38 (24%) died in-hospital, 118 (76%) were discharged and received long-term follow-up (mean = 2.8 years). Assess- ments included suicidal ideation and planning, reason for attempts; numbers, methods, dates of prior and subsequent attempts; psychiatric diagnoses, substance abuse history, treatment and medication compliance, hospitalizations, family depression and suicide, education level, job history and living conditions.

Results: 104 (88%) patients were interviewed and 14 (12%) were lost to follow-up. Seven percent had subsequent attempts (All unsuccessful). Late mortality was 7% (One death due to index suicide, 5 to chronic illness). Most patients (89%) had psychiatric diagnoses at discharge, 84% of whom had depression. Sixty-nine percent had histories of alcohol abuse, 42% histories of drug abuse. One-half were non-compliant with psychiatric follow-up and 85% non-compliant with alcohol treatment.

	Mean Age	%Prior Attempts	%Hx.Fam Suicide	%Diag. Schizo.	%Nonhome Condit.
Disch.(N=118)	35	41	20	6	26
Subseq.(N=7)	29**	71*	57*	50**	57*
No.Subseq.(N=92)	37	43	17	3	20

* p<.05, ** p<.005

Conclusions: 1) Subsequent attempts are rare (7%) among failed traumatic suicide attempts, , 2) No late deaths resulted from subsequent suicides; 3) Risk factors associated with subsequent attempt are younger age (p = .002), family history of suicide (p = .03), Schizophrenia (p = .005) and non-home living conditions (p = .04).
4) Identifying these patients and helping them maintain home environments may prevent repeat suicide attempts.

NOTES

THE STUDY OF THE RECOVERY OF TRAUMA PATIENTS

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Lehigh Valley Hospital Center

Presenter: K.E. Glancy
Senior Sponsor: P. Mucha
Corresponding Author: K. E. Glancy

Although the majority of trauma patients are discharged home rather than to a rehabilitation facility, the timeliness of their return to function (RTF) has received little study. The present prospective study attempted to identify those factors in trauma patients discharged home that would predict delayed RTF. The study group consisted of patients admitted to a Level I Trauma Center for at least 24 hours, were of working age (18-64 years), passed a cognitive screening exam, and were discharged home. Demographic data and psychological profiles were collected on all participants. Patients were followed up by telephone approximately one and one-half, three and six months after discharge. 566 patients were entered into the study of which 441 had complete follow-up. Proportional hazards multiple regression was used to identify variables prognostic of RTF time. Injury Severity Score (ISS) and age were found to be associated with RTF ($p<0.0001$ and $p<0.0001$, respectively). After correcting for ISS and age, additional factors found to be associated with RTF were: higher educational level with faster RTF ($p<0.0001$), living in a non-family household with faster RTF ($p<0.002$), augmented pre-injury hostility with slower RTF ($p<0.027$), and work related injury with slower RTF ($p<0.050$). There were a number of other demographic, work-related and psycho-social factors that were not related with RTF. We conclude that we have identified four risk factors in addition to ISS and age that can be recognized before hospital discharge which may affect RTF. These data may suggest interventions directed at enhancing RTF.

NOTES

ANALYSIS OF ORGAN PROCUREMENT FAILURE AT AN URBAN TRAUMA CENTER

R. Ivatury, H. Grewal, W. Saunders, R. Simon, W. Stahl
Lincoln Hospital - New York Medical College

Presenter: H. Grewal
Senior Sponsor: D. Feliciano
Corresponding Author: R. Ivatury

Fatal head injuries generate the largest number of donors for vascular organs in many centers. A 42-month experience with 100 patients with fatal head injuries was studied to identify areas of procurement failure. In addition, rejection of potential organ donors due to HIV risk was evaluated.

38 patients sustained GSW of the head and 62 patients received blunt trauma, mostly from falls (37 patients). The mean GCS on admission was 5.5. 36% of the patients were ineligible for organ donation due to sepsis (16), advanced age (7), Hepatitis (1), other systemic illnesses (3) and HIV infection or confirmed IV drug addiction (9). 17 died within a mean period of 8 hours after admission from resuscitation failure. 8 of these patients had isolated GSW of the head and possibly could have been resuscitated for potential donation. 16 patients died within 3.6 days (mean) from failure of physiologic support. 17 of the remaining 31 patients (36%, 13 with fatal GSW of the head) were solid organ donors. Annual consent rates were 25%, 72%, 75% and 66% respectively.

To assess the impact of HIV infection or risk as a cause of procurement failure, 2119 referrals from our regional transplantation center from 14 Trauma Centers (TC) and 77 Non-Trauma Centers (NTC) were reviewed. During a recent two-year period, 78 of 640 (12.7%) referrals from TC were rejected due to HIV risk, as compared to 5.1% of 554 referrals from NTC ($p < 0.001$). A similar difference was noted between metropolitan and suburban hospitals. Hepatitis positivity was comparable in the TC and NTC groups (2.7% vs. 2.3%).

Our data suggest that efforts to improve organ procurement should focus on resuscitation and physiologic support of potential donors. The presence of or the risk for HIV infection is emerging as a limiting factor in donor organ availability at urban trauma centers. Non-trauma centers and non-urban trauma centers, where exclusions from HIV are infrequent, should critically examine and enhance their referral patterns to contribute to organ procurement.

NOTES

PRESSURE CONTROLLED - INVERSE RATIO VENTILATION (PC-IRV) IN CRITICALLY ILL SURGICAL PATIENTS

G.S. Rozycki, H.R. Champion, F. Cole
Washington Hospital Center

Presenter: G.S. Rozycki
Senior Sponsor: H.R. Champion
Corresponding Author: G.S. Rozycki

A major problem in management of patients with severe ARDS is maintenance of oxygenation while minimizing barotrauma from high ventilatory pressures. Although complex, discriminate use of PC-IRV addresses this issue and has not been fully studied.

METHODS: PC-IRV was used in 22 patients, 12 Trauma, (mean ISS 30.4, RTS 5.7), 7 Cardiothoracic, 2 General Surgical, 1 Neurosurgical, when conventional Intermittent Positive Pressure Ventilation (IPPV) failed. Failure with IPPV was defined as presence of ARDS (diffuse bilateral radiographic infiltrates, refractory hypoxemia, marked reduction in compliance) and 2 of these criteria: Peak Inspiratory Pressures (PIP) >50cm H_2O, FIO_2>0.6, PEEP>10cm H_2O, and PaO_2<60 Torr. All patients were sedated, paralyzed, and volume loaded prior to starting PC-IRV. Respiratory and hemodynamic parameters were monitored before and after initiating PC-IRV. The oscilloscope was interfaced with the ventilator to monitor gas flow wave patterns.

RESULTS:
After starting PC-IRV:

- PIP significantly decreased ($p<.001$) in 21/22 (95%) patients within 1 hour.
- Mean PIP decreased from 63cm H_2O to 45cm H_2O and mean PEEP from 14cm H_2O to 8cm H_2O.
- PaO_2 improved (mean 20Torr) in 1 hr with constant FIO_2 in 12 patients
- PaO_2 improved (mean 158Torr) in 1 hr with increased FIO_2 in 3 patients
- PaO_2 improved within 12 hours in 20/22 (91%) patients.
- 32% of patients survived. (Phase IV ARDS expected survival is 20%).

CONCLUSIONS:
- PC-IRV reduces PIP and PEEP and improves oxygenation in patients with severe ARDS.
- PC-IRV may improve survival in this high risk patient population.

Specification of the best timing for PC-IRV is needed.

NOTES

HIGH FREQUENCY VENTILATION IN THE TREATMENT OF RIGHT HEART FAILURE

T. Scalea, F. Garzia, S. Henry
Kings County Hospital, SUNY Health Science Center at Brooklyn

Presenter: T.M. Scalea
Senior Sponsor: T.M. Scalea
Corresponding Author: T.M. Scalea

The hemodynamic consequences of the combination of acute respiratory failure (ARF) and right heart failure may precipitate multiple organ failure and/or death. Recently, we used HFV in 13 patients with ARF and right heart dysfunction refractory to standard support. The etiology of ARF was sepsis in 5 patients, amniotic fluid embolus in 1 patient and trauma in 7 patients. All patients required an Fio_2 of 90-100%, >15 cm of PEEP and maximal inotropes before HFV. Students one tail t test was used for evaluation. Hemodynamic values are expressed as pre/post HFV.

	CO L/min	CVP mmHg	PCWP mmHg	PVR d.sec/cm^5	SVR d.sec/cm^5	VO_2 cc/min
1	2.8/6.0	35/26	26/18	580/260	2150/1200	110/340
2	3.5/5.6	35/25	25/20	450/350	800/960	160/280
3	4.5/6.6	26/25	24/28	606/328	1288/922	175/272
4	6.6/6.4	20/20	22/19	192/198	935/850	230/350
5	7.2/12.4	18/10	32/26	210/140	1373/736	325/485
6	4.7/8.2	18/15	35/20	135/150	703/730	160/205
7	3.4/8.6	16/19	18/18	216/138	1584/608	220/270
8	4.8/10.7	30/35	25/30	440/74	1034/376	170/320
9	6.0/10.3	20/16	13/15	67/31	618/406	305/365
10	5.6/5.9	28/26	20/18	240/200	860/800	240/260
11	5.6/8.1	19/26	20/24	204/160	700/680	300/365
12	7.9/9.1	31/14	14/15	290/110	627/550	220/280
13	4.1/7.3	30/20	21/23	254/200	900/1005	310/420
mean	5.1/8.1	25/21	22/20	299/180	690/725	205/325

Patients #4 & #10 did not respond. They both had an undrained septic focus and died early from cardiogenic shock. All others responded within 1 hour requiring less inotropes and and were quickly weaned to an Fio_2 of 40-60%. Patient #5 developed air trapping and was returned to conventional ventilation. All others tolerated HFV.

In the setting of ARF and right heart failure, HFV allows for ventilatory and hemodynamic manipulations that lower PVR ($p<.05$), and augment cardiac output ($p<.001$) and oxygen consumption ($p<.005$). It should be considered when standard support fails.

NOTES

All pts died
? begin tx earlier

DOG BITES IN CHILDREN

D.W. Tuggle, D.V. Taylor, R.J. Stevens
Children's Hospital of Oklahoma

Presenter: D. Tuggle
Senior Sponsor: D. Tuggle
Corresponding Author: D. Tuggle

Dog bites are common pediatric injuries. In our state, several thousand dog bites are reported each year, at least half of which are in children. While most dog bites involve skin and subcutaneous injuries that can be dealt with in the emergency room, more serious injuries are not uncommon in the child.

Over the past ten years, one child has died and 12 have required major surgical procedures at our children's hospital. The records of these patients were reviewed. Four girls and nine boys sustained multiple injuries. The child who died succumbed to subdural hematoma, and cerebral and tracheal injuries. Seven patients had bites of the head and neck, three patients had extremity bites, two female patients had perineal wounds, and one patient had thoracic wounds with a diaphragmatic laceration and open pneumothorax. There were five fractures, two of which were cervical vertebrae with CSF leak. There were two vertebral, one brachial, and two carotid artery injuries. Both carotid artery injuries caused strokes. Two peripheral nerve injuries resulted in long-term upper extremity disability. Twelve of 13 patients had injury patterns consistent with crush injury and penetrating injury in combination. Three patients suffered additional morbidity (two strokes, one dysfunctional arm) when therapy for the penetrating injury component was delayed an average of six hours due to nonrecognition. Children five years of age and older averaged two injuries per child; children under the age of five averaged 3.3 injuries per child.

Three dogs were chow breeds, four were pit bulls, and the remainder were large dogs of various breeds. Six were neighbor's dogs and seven were family dogs. Not all animals were destroyed. None were found to be rabies positive.

Although uncommon, serious dog bites in children tend to be more severe in patients less than five years old. Mechanisms of injury are usually crushing and penetrating. The penetrating component of injury should be considered in every child with severe dog bite and underlying structures should be rapidly evaluated to prevent long-term morbidity.

NOTES

MOBILE SURGICAL TRANSPORT TEAM (MSTT): A SERVICE FOR THE CRITICALLY ILL AND INJURED IN THE RURAL HOSPITAL

W. Long, M. Haun, J. Hill, A. Burnett, B. Bachulis,
S. Galeski, M. Metzdorff
Emanuel Hospital and Health Center

Presenter: J. Hill/W. Long
Senior Sponsor: M. Metzdorff
Corresponding Author: W. Long

Rural states have higher trauma mortality rates than urban states. Delays in discovery of the accident, activation of the EMS system, transport times, and lack of experience and skills among many rural EMT's and surgeons coupled with rural hospital's limited resources, blood bank capacity, and surgical instrumentation take their toll on patients with potentially survivable injuries.

Aeromedical transport plays an important role in overcoming long distances for transporting critically ill and injured patients between rural hospitals and a level I trauma center. Some of these patients will not survive the delay in definitive surgery for transport to a higher level of care because they have developed advanced hemorrhagic shock, hypothermia, metabolic acidosis, and disseminated intravascular coagulation.

To overcome these problems, a Level I Trauma Center developed a Mobile Surgical Transport Team (MSTT) consisting of a surgeon, operating room nurse, critical care nurse, and a Life Flight nurse, taking 40 units of blood products, surgical instruments, monitoring equipment, and if necessary, an intraaortic balloon pump (IABP) or a mobile cardiopulmonary bypass system (CPS). Transport vehicles include an ICU ambulance, an MBB BK 117 helicopter, and a Mitsubishi fixed wing aircraft.

From May 1985 to present, the MSTT has responded to fourteen requests. The nine trauma patients had a mean ISS of 35, four (44%) survived. Seven of nine trauma patients had profound shock, hypothermia, DIC at time of MSTT intervention and two (29%) lived. Two survived transport to the level I trauma center and had brain death several days later. One had a preventable death. Five patients had non-trauma catastrophes (massive pulmonary embolism, dehisced mitral valve with pulmonary edema, inadvertent portal vein injury during cholecystectomy, diabetic ketoacidosis complicated by profound hypothermia, and extensive small bowel infarction). Three patients (60%) survived.

The MSTT transported one trauma patient and three non-trauma patients on CPS. Two (50%) survived. The average one-way distance for the MSTT was 90 miles with a maximum distance of 200 miles.

MSTT has a limited, but beneficial role in resuscitating and stabilizing critically ill and injured patients in rural hospitals. This paper outlines the organization of the MSTT and patient experiences.

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 tota 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 hav 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 60, members in good standing may voluntarily accept the position of senior membership in the Western Trauma Association. A senior member must pay dues annually, but does not have to attend the meetings or submit an abstract once every three years.

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
1991 - 1992
MEMBERSHIP LISTING

AMADIO, Peter C. (Bari)	Mayo Clinic 200 First Street, SW Rochester, MN 55905	O: 507-284-2806 H: 507-281-3772 Orthopedics/Hand
AMMONS, Mark A. (Lee Anne)	2005 Franklin Midtown II, Ste. 410 Denver, CO 80205	O: 303-832-6165 H: 303-355-5709 General/Thoracic Surgery
BAHNSON, David H. (Peggy)	3 Albert Cree Drive Rutland, VT 05701	O: 802-775-2937 H: 802-773-4143 Orthopedics
BEAL, Sandra L. (Steve Smith)	655 East 11th Eugene, OR 97401	O: 503-485-8331 General Surgery
BENJAMIN, James (Laurie)	Univ. Medical Center Room 4318 Tucson, AZ 85724	O: 602-626-4024 H: 602-795-7015 Orthopedics
BROECKER, Bruce H.	1901 Century Blvd. Atlanta, GA 30345	O: 404-322-9179 H: 404-325-2297 Urology
BURCH, Jon M. (Rita)	Baylor College of Medicine Surgery Department 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 Surgery
CARVETH, Stephen (Kay)	6200 Old Cheney Road Lincoln, NE 68516	O: 402-489-6553 H: 402-423-1768 Thoracic/Cardiovascular Surgery
CHAMPION, Howard R. (Maria)	1900 Quincy St., NW Washington, D.C. 20010	O: 202-541-7257 H: 202-829-3486 General/Trauma Surgery
***CHANG, Frederic C.** (Jan)	14809 Willowbend Circle Wichita, KS 67230	O: 316-268-0296 H: 316-753-0627 General Surgery
COGBILL, Thomas H. (Jan)	1836 South Avenue LaCrosse, WI 54601	O: 608-782-7300 H: 608-788-7808 General Surgery

*COIL, James A., Jr. (Sharon)	Conemaugh Valley Memorial Hospital 1086 Franklin Johnstown, PA 15905	O: 515-283-6076 H: 515-224-4745 General Surgery
DAVIS, James W.	Department of Surgery Valley Medical Center 445 South Cedar Fresno, CA 93701	O: 619-294-6287 H: 619-295-8552 General/Trauma Surgery
*EDMONDSON, Robert C. (Ann)	1207 Fairchild Court Woodland, CA 95695	O: 916-666-1631 H: 916-662-7856 Internal Medicine (Oncology)
EDNEY, James A. (Patricia)	U. of Nebraska Med. Ctr. 42nd & Dewey Omaha, NE 68150	O: 402-559-4075 H: 402-592-4335 General Surgery
ESRIG, Barry C. (Ann)	50 Bellefontaine St. Ste. 403 Pasadena, CA 91105	O: 818-793-1135 H: 818-355-1883 Thoracic Surgery
FELICIANO, David V.	Dept of Surgery, Glenn Bldg. Grady Memoral Hospital 69 Butler Street, SE Atlanta, GA 30303	O: 404-659-8612 General/Thoracic Surgery
FERRIS, Bruce C. (Joan)	825 N. Hillside Wichita, KS 67214	O: 316-688-7500 H: 316-733-1241 Plastic Surgery
FISCHER, Ronald P. (Nancy)	UTHSC @ Houston 6431 Fannin, #4.284 Houston, TX 76508	O: 713-792-5407 H: 713-827-7925 General/Trauma Surgery
FRAZEE, Richard C. (Debbie)	2401 S. 31st St. 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/Cardiovascular Surgery
GENTILELLO, Larry M. (Olivia)	Harborview Medical Center 325 Ninth 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
HANSSEN, Arlen D.	200 First Street, SW Rochester, MN 55905	O: 507-284-2884 H: 507-281-3511 Orthopedic Surgery

HARRISON, Paul B. (Carolyn)	3243 E. Murdock, #404 Wichita, KS 67208	O: 316-685-6222 H: 316-686-3075 General Surgery
HELLING, Thomas C. (Linda)	4320 Wornell, #308 Kansas City, MO 64111	O: 816-753-7460 H: 913-649-6164 General Surgery
HOYT, David B. (Beth)	Division of Trauma, H-640B UC San Diego Medical Center 225 Dickinson Street San Diego, CA 92103	O: 619-294-6400 H: 619-272-5893 Surgery
IANNACONE, William M. (Jane)	Three Cooper Plaza Camden, NJ 08103	O: 609-342-3253 H: 215-664-4786 Orthopedic Surgery
JOHNSON, James H., Jr. (Lynn)	1145 North 29th Billings, MT 59101	O: 406-252-7115 H: 406-652-2401 Neurosurgery
JURKOVICH, Gregory (Deanne)	Harborview Medical Center 325 9th Ave., ZA-16 Seattle, WA 98104	O: 206-223-5912 H: 206-232-2153 General/Trauma Surgery
KAPPEL, David A. (Charl)	Professional Bldg. IV Ste. 200, Medical Park Wheeling, WV 26003	O: 304-242-0590 H: 304-277-3018 Plastic Surgery
KEARNEY, Robert E. (Cathy)	Tampa, FL	General Surgery
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)	San Francisco Gen. Hosp. Ward 3A, 1001 Potrero San Francisco, CA 94110	O: 415-821-8820 H: 415-948-3419 General/Trauma Surgery
LANDERCASPER, Jeffrey (Betty)	1836 South Avenue LaCrosse, 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 & Maxillofacial Surg
LAU, Jeffery M. (Diane)	1329 Lusitana Street Suite 108 Honolulu, HI 96813	O: 808-537-1974 H: 808-595-7039 Thoracic/Cardiovascular Surgery

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***LINDSCHEID**, Ronald L. (Carol)	200 First Street, SW Rochester, MN 55905	O: 507-282-2511 H: 507-282-5598 Orthopedics (Hand)
LUCIE, Stephen R. (Sharon)	3804 McGirts Blvd. Jacksonville, FL 32210	O: 904-399-3604 H: 904-387-3604 Orthopedics
MACCOLLUM, M.S. (Biff) (Fran)	126 E. Desert Park Ln. Phoenix, AZ 85004	O: 602-234-0540 H: 602-944-3873 Orthopedics/Plastic Surgery
MACKERSIE, Robert C.	4185 Front St., #1 San Diego, CA 92103	O: 619-294-6287 H: 619-563-7723 General Surgery
MCCROSKEY, Brian L. (Betsy)	6910 W. 67th First St. Overland Park, KS 66202	General/Vascular Surgery
MCGILL, John W.	Hennepin County Med. Ctr. Emergency Department 701 Park Avenue South Minneapolis, MN 55415	O: 612-347-5683 H: 612-825-4281 Emergency Medicine
MCGUIRE, Arthur M., LTC. MC (Peggy) (Inactive)	USA MEDDAX NUREMBERG, GERMANY APO New York 09105	
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MOORE, Fred (Paula)	Denver General Hospital 777 Bannock St. Denver, CO 80204	O: 303-893-7045 H: 303-741-1210 General/Trauma Surgery
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***TAWES**, Roy L. (Joyce)	117 N. San Mateo Drive San Mateo, CA 94401	O: 415-342-4113 H: 415-347-4319 Vascular Surgery
TEAL, Peter V. (Annie)	1232 N. 30th St. Billings, MT 59101	O: 406-245-3149 H: 406-245-6565 Orthopedics
THOMAS, Herbert, III	8015 W. Alameda, #210 Denver, CO 80223	O: 303-237-2663 H: 303-696-7057 Orthopedics

TUGGLE, David W. (Judy)	940 NE 13th St., #2B204 Oklahoma City, OK 73126	O: 405-271-5922 H: 405-271-5922 Pediatric Surgery
***VOLZ**, Robert G. (Anne)	1501 N. Campbell Tucson, AZ 85724	O: 602-626-6110 H: 602-299-3634 Orthopedics
***WALDRON**, John F. (Helen)	104 Medical Office Bldg. 2545 Chicago Ave. S. Minneapolis, MN 55404	O: 612-871-4551 H: 612-941-3796 Pediatric Surgery
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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 General/Thoracic/ Cardiovascular Surgery
WRAY, R. Chris (Rockeye)	601 Elmwood Avenue Box 661 Rochester, NY 14642	O: 716-275-5818 H: 716-385-3454 Plastic Surgery
YAMUCHI, Hiroshi (Anna)	1200 Rancho Way Woodland, CA 95695	O: 916-666-1631 H: 916-662-0730 Internal Medicine (Nephrology)
YAUN, Hansen	550 Harrison Center Syracuse, NY 13202	O: 315-473-4472 H: 315-446-6921 Orthopedics

* Senior Members

GEOGRAPHICAL ROSTER

Arizona

Phoenix
MacCollum, M.S.
Petersen, Scott R.
Tucson
Benjamin, James
McIntyre, Kenneth E.
Volz, Robert G.

California

Davis
Metheny, Jeffrey
Fresno
Davis, James W.
Pasadena
Esrig, Barry C.
San Diego
Hoyt, David B.
Mackersie, Robert C.
San Francisco
Knudson, Mary Margaret
Phillips, Thomas F.
Schecter, William P.
San Mateo
Tawes, Roy L.
Woodland
Edmondson, Robert C.
Yamuchi, Hiroshi

Colorado

Denver
Ammons, Peter C.
Moore, E. Eugene
Moore, Fred
Rutherford, Robert B.
Thomas, Herbert, III
Englewood
Carter, Donald R.
Littleton
Ratzer, Erick R.
Seibert, Charles E.
Wheat Ridge
Moore, John B.
Rosenberger, Alan

District of Columbia

Champion, Howard R.
Neviaser, Robert J.
Ochsner, M. Gage

Florida

Jacksonville
Lucie, Stephen R.
Tampa
Rosemurgy, Alexander S.
Kearney, Robert

Georgia

Atlanta
Broecker, Bruce H.
Feliciano, David V.
Gussack, Gerald S.

Hawaii

Honolulu
Lau, Jeffrey M.

Kansas

Kansas City
Pierce, George
Overland Park
McCroskey, Brian L.
Wichita
Chang, Frederic C.
Ferris, Bruce C.
Harrison, Paul B.
Nelson, Gerald D.
Street, David E.

Michigan

Frankfort
Olsen, William E.
Bloomfield Hills
Wilson, Robert F.

Minnesota

Minneapolis
McGill, John W.
Olfelt, Paul C.
Seymour, John
Waldron, John F.
Rochester
Amadio, Peter C.
Cabanela, Miguel E.
Hanssen, Arlen D.
Klassen, Rudolph A.
Lindscheid, Ronald L.
Lewallen, David G.

Missouri

Kansas City
Helling, Thomas C.
Augusta
McKinley, C. Richard

Montana

Billings
Johnson, James H., Jr.
Millikan, J. Scott
Teal, Peter V.

Nebraska

Lincoln
Carveth, Stephen
Omaha
Edney, James A.

New Jersey

Camden
Iannacone, William M.
O'Malley, Keith F.
Ross, Steven E.
Haddonfield
Lanzi, Guy L.

New York

Brooklyn
Scalea, Tom M.
New York City
Pachter, H. Leon
Rochester, NY
Wray, R. Chris
Syracuse, NY
Palmer, Andrew K.
Webster, Dwight, A.
Yaun, Hansen

North Carolina

Durham
Reed, R. Lawrence, III

Oklahoma

Oklahoma City
Tuggle, David W.

Oregon

Eugene
Beal, Sandra L.
Portland
Metzdorff, Mark T.

Pennsylvania

Allentown
Mucha, Peter Jr.
Johnstown
Coil, James A. Jr.
Pittsburgh
Sherman, Harold

Tennessee

Nashville
Morris, John A., Jr.
Sharp, Kenneth W.

Texas

Galveston
Stothert, Joseph C.
Houston
Burch, Jon M.
Fischer, Ronald P.
Pickard, Laurens
Lackland
Roettger, Richard
Temple
Frazee, Richard C.

Utah

Salt Lake City
Saffle, Jeffrey R.

Vermont

Burlington
Shackford, Steven R.
Rutland
Bahnson, David H.

Virginia

Richmond
Mehrhof, Austin I., Jr.
Sugerman, Harvey J.
Whitley, Ronald

Washington

Seattle
Gentilello, Larry M.
Jurkovich, Gregory
Tacoma
Osborne, Robert W., Jr.

West Virginia

Wheeling
Kappel, David A.
Polack, Edward P.

Wisconsin

LaCrosse
Cogbill, Thomas H.
Landercasper, Jeffrey
Madison
Gall, Warren

Germany

McGuire, Arthur M.

WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING

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Gundersen Clinic
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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. Neviaser, 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

****The 1993 WESTERN TRAUMA ASSOCIATION MEETING will be:
February 27- March 6, 1993
Snowbird, Utah

WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING
SHERATON STEAMBOAT RESORT AND CONFERENCE CENTER

SCHEDULE

Sunday, March 1, 1992	
4:00 - 7:00 p.m.	Registration and Welcoming Reception
Monday, March 2, 1992	
6:30 - 7:00 a.m.	Breakfast
7:00 - 9:00 a.m.	First Scientific Session
4:00 - 5:00 p.m.	Second Scientific Session
5:00 - 6:00 p.m.	Invited Lecture-"Cerebral Trauma" Thomas A. Gennarelli, M.D.
6:00 p.m.	Board of Directors Meeting
Tuesday, March 3, 1992	
6:30 - 7:00 a.m.	Breakfast
7:00 - 9:00 a.m.	Third Scientific Session-Earl Young Competition
10:00 a.m.	NASTAR Race
12:00 noon	Picnic and Picture - Bashore
4:00 - 6:00 p.m.	Fourth Scientific Session-Earl Young Competition
6:00 - 8:00 p.m.	Western Trauma Association Business Meeting
Wednesday, March 4, 1992	
6:30 - 7:00 a.m.	Breakfast
7:00 - 9:00 a.m.	Fifth Scientific Session
4:00 - 5:00 p.m.	Sixth Scientific Session
5:00 - 6:00 p.m.	Guest Presentation - "Skiing Injuries" Richard J. Steadman, M.D. Richard J. Hawkins, M.D.
6:30 p.m.	Reception - Cash Bar
8:00 p.m.	Annual Banquet Awards
9:00 - 12:00 Midnight	Band - Dancing
Thursday, March 5, 1992	
6:30 - 7:00 a.m.	Breakfast
7:00 - 9:00 a.m.	Seventh Scientific Session
4:00 - 5:00 p.m.	Eighth Scientific Session
5:00 p.m.	Presidential Address "Selected Decontamination of the Digestive Tract" Peter Mucha, Jr., M.D.
Friday, March 6, 1992	
6:30 - 7:00 a.m.	Breakfast
7:00 - 9:00 a.m.	Ninth Scientific Session
4:00 - 6:00 p.m.	Tenth Scientific Session
6:00 p.m.	Adjourn
Spouse's Breakfast	Monday thru Friday 8:00 - 9:00 A.M.

WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING
STEAMBOAT SPRINGS, COLORADO

Tuesday, March 3, 1992

Session: Earl Young Prize

Moderators: Cogbill/Wray

Time	Page	Title	Presenter
7:00 a.m.	25	Diagnostic peritoneal lavage (DPL) plus computed tomography (CT) in the evaluation of blunt abdominal trauma (BAT)	B. Baron
7:20 a.m.	27	Mortality in geriatric trauma victims: The link between preventable complications & death from organ failure	J. Pellicane
7:40 a.m.	29	Monoethylglycinexylidide (MEGX) production parallels changes in hepatic blood flow & oxygen delivery in lung injury managed with PEEP ventilation	P. Purcell
8:00 a.m.	31	Effect of ibuprofen on bacterial translocation	R. Toyos
8:20 a.m.	33	Impact of minimal injury on a Level I trauma center	W. Hoff

Moderators: Ross/Feliciano

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4:20 p.m.	37	Fluid and sodium administration during the first 72 hours after head injury have no effect on intracranial pressure	J. Schmoker
4:40 p.m.	39	Adequate resuscitation with 3% hypertonic saline: A mechanism of protection against bacterial translocation in hemorrhagic shock	M. Hochman
5:00 p.m.	41	Laparoscopic injection of fibrin glue to arrest major intraparenchymal abdominal hemorrhage	C. Salvino
5:20 p.m.	43	Deleterious effects of intraoperative hypotension on outcome in patients with severe head injury	J. Pietropaoli
5:40 p.m.	45	Admission base deficit reflects prehospital O_2 debt and predicts outcome	E. Rutherford
6:00 p.m.		Western Trauma Association Business Meeting	

WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING
STEAMBOAT SPRINGS, COLORADO

Thursday, March 5, 1992 — **Session: Critical Care**

Moderators: Scalea/Benjamin

Time	Page	Title	Presenter
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7:20 a.m.	67	The disparity between hypothermic coagulopathy and clotting studies	L. Reed
7:40 a.m.	69	Aortic rupture-pelvic fracture complex: An alert for orthopedic and general surgeons	M. Ochsner
8:00 a.m.	71	Chemical paralysis reduces energy expenditure in mechanically ventilated trauma patients	R. Barton
8:20 a.m.	73	Nutritional assessment using a PA catheter	R. Cobean

Moderators: Rosemurgy/Thomas — **Session: Trauma Systems**

4:00 p.m.	75	Prehospital procedures in trauma	R. Cobean
4:20 p.m.	77	Circulating hormones & plasma TNF measurements following minor trauma in man	E. DeMaria
4:40 p.m.	79	Impact of the use of paralyzing agents in airway management of trauma system patients in the field	W. Long
5:00 p.m.		**PRESIDENTIAL ADDRESS** "Selected Decontamination of the Digestive Tract" Peter Mucha, Jr., M.D.	

ABSTRACTS

WESTERN TRAUMA ASSOCIATION
1991 - 1992
MEMBERSHIP LISTING

AMADIO, Peter C. (Bari)	Mayo Clinic 200 First Street, SW Rochester, MN 55905	O: 507-284-2806 H: 507-281-3772 Orthopedics/Hand
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***SEIBERT**, Charles E. (Mary)	1 Cimmaron Drive Littleton, CO 80121	O: 303-761-9190 H: 303-781-7760 Radiology
***SEYMOUR**, John (Joan)	825 E. 8th St., #1106 Minneapolis, MN 55404	O: 612-336-1653 H: 612-245-2458 Neurosurgery
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***TAWES**, Roy L. (Joyce)	117 N. San Mateo Drive San Mateo, CA 94401	O: 415-342-4113 H: 415-347-4319 Vascular Surgery
TEAL, Peter V. (Annie)	1232 N. 30th St. Billings, MT 59101	O: 406-245-3149 H: 406-245-6565 Orthopedics
THOMAS, Herbert, III	8015 W. Alameda, #210 Denver, CO 80223	O: 303-237-2663 H: 303-696-7057 Orthopedics

GEOGRAPHICAL ROSTER

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McIntyre, Kenneth E.
Volz, Robert G.

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Moore, Fred
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Ochsner, M. Gage

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Lucie, Stephen R.
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Kearney, Robert

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Feliciano, David V.
Gussack, Gerald S.

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Olfelt, Paul C.
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Waldron, John F.
Rochester
Amadio, Peter C.
Cabanela, Miguel E.
Hanssen, Arlen D.
Klassen, Rudolph A.
Lindscheid, Ronald L.
Lewallen, David G.

Missouri

Kansas City
Helling, Thomas C.
Augusta
McKinley, C. Richard

Montana

Billings
Johnson, James H., Jr.
Millikan, J. Scott
Teal, Peter V.

WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING

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TWENTY-SECOND ANNUAL MEETING
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6:00 p.m.	Adjourn
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WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING
STEAMBOAT SPRINGS, COLORADO

Tuesday, March 3, 1992

Session: Earl Young Prize

Moderators: Cogbill/Wray

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TWENTY-SECOND ANNUAL MEETING
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Moderators: Scalea/Benjamin

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ABSTRACTS

NOTES

(1) Logistic regression excellent way to compare patient population

(2) STAR better over a wide range of patients

NOTES

Useful for determining injury in tangential SW + OSW patients (usual uninsured)

NOTES

Difficult to diagnose preoperatively

gross contamination (↑ odds of injuries)

Discourage 1° repair

Steamboat Resorts

(303) 879–8000

Brother Tony

Vessel bypass

- 353

Unit

304-624-2621 Room

304-622-2474 Home

For Real Estate Information Call

Steamboat Real Estate

EXCHANGE

(303) 879–5000

NOTES

Blunt bar 80%
Shock .. 50%
Weather wrote the repair but was applied
720 units
late as repair failed

NOTES

NOTES

1 cost

NOTES

no comps
surgeon should do

NOTES

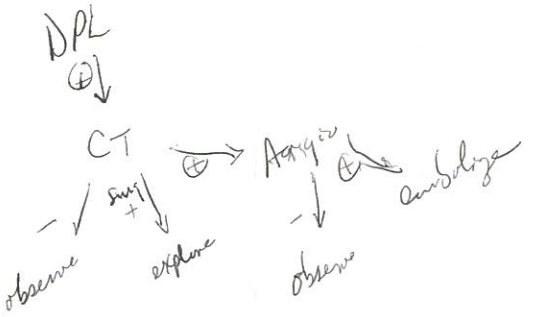
all should have CT
9/5 have acute lesion

MHI ↓GCS - CT mandatory
abnormal NEX - admit
abnormal CT - admit
both ⇒ ICU

normal NEX & neg CT - 1/50 require Ex
& never craniotomy

Stable pt

NOTES



NOTES

In spite of trauma score 15-16 if older / ↑ more injuries than mortality ↑

33% had preventable complications (aspiration (tube feeding) leading cause

NOTES

2 specimens
cheap
20 min test

NOTES

NOTES

helicopters need better control
seat belts & air bags may be
changing mech of injury indications ↓

NOTES

NOTES

NOTES

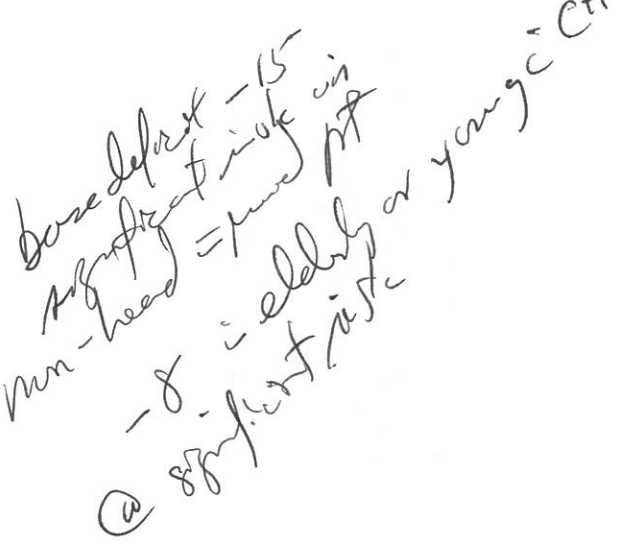
NOTES

Fibrin glue can cause significant hypotension (15% of patients - Rutherford) Rutherford suggests combination of suture & glue

NOTES

5 min seems to be the cut off

NOTES



NOTES

Miss) 34/740
4.6 %

NOTES

modified
open – back

Not useful – obese, most elderly
those – spinal deformities ie scoliosis, spondylolisthesis

NOTES

Now using larger
Neil ? 12mm vs 13 mm = 5mm screws
Non weight bearing 6-8 wks
can treat floating knee this one
incision

NOTES

NOTES

low incidence
discussion centered around
picking up early

ABI < 0.9 = significant art. dz
until proven otherwise

NOTES

NOTES

NOTES

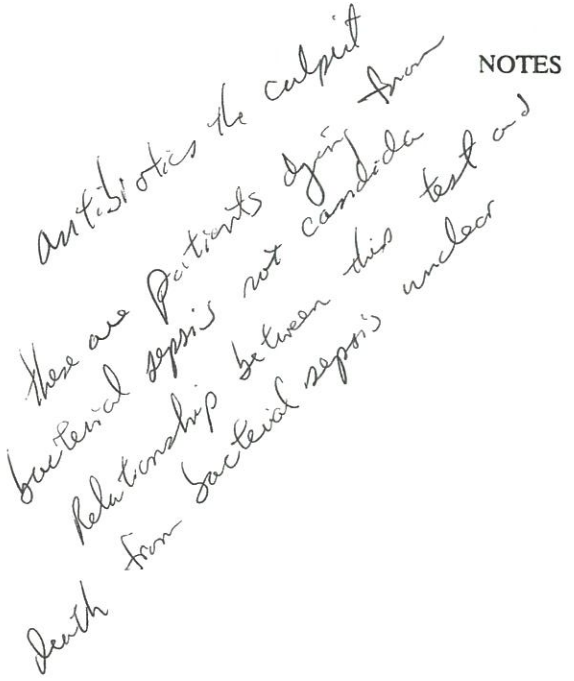
50 psi

Cook Inc
for catheter

Bear pressure ventilator

NOTES

NOTES


antibiotics the culprit
these are patients dying from
bacterial sepsis not candida
relationship between this test and
death from bacterial sepsis unclear

NOTES

Restore not replace

NOTES

A-P vector
tran. esophageal echo
a Dx method also

NOTES

25-35 kcal/kg/d

NOTES

2000 hr of training + extensive animal work

NOTES

NOTES

NOTES

may be useful in femoral & brachial artery areas essentially looking for AV fistulas & pseudoaneurysm

NOTES

pack - desire - wait

NOTES

NOTES

NOTES

NOTES

NOTES

All pts died
? begin tx earlier

NOTES

(1) Logistic regression excellent way to compare patient population

(2) STAR better over a wide range of patients

NOTES

Useful for determining injury in tangential SW + OSW patients (usual uninsured)

NOTES

Difficult to diagnose preoperatively

gross contamination (↑ odds of injuries)

Discourage 1° repair

Steamboat Resorts

(303) 879–8000

Brother Tony

Vessel bypass

- 353

Unit

304-624-2621 Room

304-622-2474 Home

For Real Estate Information Call

Steamboat Real Estate

EXCHANGE

(303) 879–5000

NOTES

Blunt bar 80%
Shock .. 50%
Weather wrote the repair but was applied
720 units
late as repair failed

NOTES

NOTES

1 cost

NOTES

no comps
surgeon should do

NOTES

all should have CT
1/5 have acute lesion

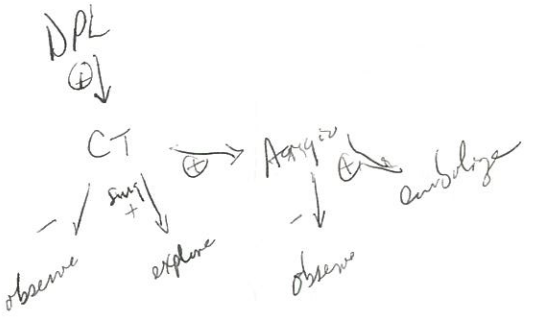
MHI & GCS - CT mandatory
abnormal NEX - admit
abnormal CT - admit

both ⇒ ICU

normal NEX & neg CT - 1/50 require Ex
& never craniotomy

Stable pt

NOTES



NOTES

In spite of trauma score 15-16 if older / ↑ more injuries than mortality ↑

33% had preventable complications (aspiration (tube feeding) leading cause

NOTES

2 specimens
cheap
20 min test

NOTES

NOTES

helicopters need better control
seat belts & air bags may be
changing mech of injury indications ↓

NOTES

NOTES

NOTES

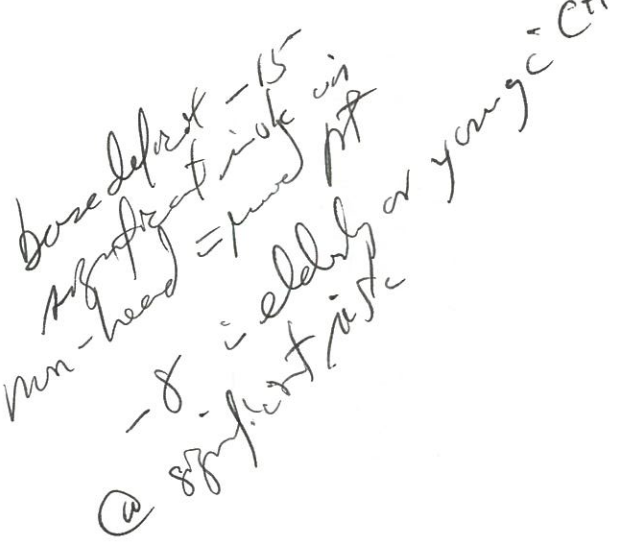
NOTES

Fibrin glue can cause significant hypotension (15% of patients - ~~Rutherford~~)
~~Rutherford~~ suggests combination of suture & glue

NOTES

5 min seems to be the cut off

NOTES



NOTES

Miss) 34/740
4.6 %

NOTES

modified
open = back
Not useful = obese, most elderly
those c spinal deformatie ie scoliosis, spondylolisthesis

NOTES

Now using larger
Neil ? 12mm vs 13 mm = 5mm screws
Non weight bearing 6-8 wks
can treat floating knee this one
incision

NOTES

NOTES

low incidence
discussion centered around
picking up early

ABI < 0.9 = significant art. dz
until proven otherwise

NOTES

NOTES

NOTES

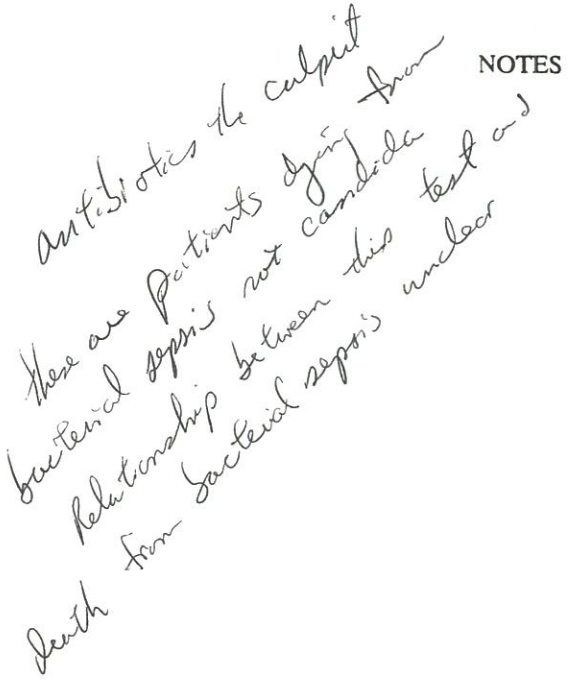
50 psi

Cook Inc
for catheter

Bear pressure ventilator

NOTES

NOTES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? begin tx earlier

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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 tota 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 hav 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

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

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.

MEMBERSHIP

WESTERN TRAUMA ASSOCIATION
1991 - 1992
MEMBERSHIP LISTING

AMADIO, Peter C. (Bari)	Mayo Clinic 200 First Street, SW Rochester, MN 55905	O: 507-284-2806 H: 507-281-3772 Orthopedics/Hand
AMMONS, Mark A. (Lee Anne)	2005 Franklin Midtown II, Ste. 410 Denver, CO 80205	O: 303-832-6165 H: 303-355-5709 General/Thoracic Surgery
BAHNSON, David H. (Peggy)	3 Albert Cree Drive Rutland, VT 05701	O: 802-775-2937 H: 802-773-4143 Orthopedics
BEAL, Sandra L. (Steve Smith)	655 East 11th Eugene, OR 97401	O: 503-485-8331 General Surgery
BENJAMIN, James (Laurie)	Univ. Medical Center Room 4318 Tucson, AZ 85724	O: 602-626-4024 H: 602-795-7015 Orthopedics
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BURCH, Jon M. (Rita)	Baylor College of Medicine Surgery Department Houston, TX 77030	O: 713-798-3432 H: 713-666-3569 Surgery/Vascular
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CARTER, Donald R.	8200 E. Belleview, #400 Englewood, CO 80111-2807	O: 303-740-7760 H: 303-671-0250 Head & Neck Surgery
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CHAMPION, Howard R. (Maria)	1900 Quincy St., NW Washington, D.C. 20010	O: 202-541-7257 H: 202-829-3486 General/Trauma Surgery
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HARRISON, Paul B. (Carolyn)	3243 E. Murdock, #404 Wichita, KS 67208	O: 316-685-6222 H: 316-686-3075 General Surgery
HELLING, Thomas C. (Linda)	4320 Wornell, #308 Kansas City, MO 64111	O: 816-753-7460 H: 913-649-6164 General Surgery
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JOHNSON, James H., Jr. (Lynn)	1145 North 29th Billings, MT 59101	O: 406-252-7115 H: 406-652-2401 Neurosurgery
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KAPPEL, David A. (Charl)	Professional Bldg. IV Ste. 200, Medical Park Wheeling, WV 26003	O: 304-242-0590 H: 304-277-3018 Plastic Surgery
KEARNEY, Robert E. (Cathy)	Tampa, FL	General Surgery
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)	San Francisco Gen. Hosp. Ward 3A, 1001 Potrero San Francisco, CA 94110	O: 415-821-8820 H: 415-948-3419 General/Trauma Surgery
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LANZI, Guy L. (Maureen) (Associate Member)	15 E. Euclid Avenue Haddonfield, NJ 08033	O: 609-429-1711 H: 609-427-0722 Oral & Maxillofacial Surg
LAU, Jeffery M. (Diane)	1329 Lusitana Street Suite 108 Honolulu, HI 96813	O: 808-537-1974 H: 808-595-7039 Thoracic/Cardiovascular Surgery

MOORE, E. Eugene (Sarah)	Denver General Hospital 777 Bannock St. Denver, CO 80204	O: 303-893-7045 H: 303-831-4102 General/Trauma Surgery
MOORE, Fred (Paula)	Denver General Hospital 777 Bannock St. Denver, CO 80204	O: 303-893-7045 H: 303-741-1210 General/Trauma Surgery
MOORE, John B. (Debbie)	4045 Wadsworth Wheat Ridge, CO 80033	O: 303-467-1243 H: 303-232-4050 General Surgery
MORRIS, John A., Jr. (Julia)	Division of Trauma Vanderbilt University 243 MCS, 2100 Pierce Ave. Nashville, TN 37212	O: 615-322-6580 H: 615-292-0483 General/Trauma Surgery
MUCHA, Peter Jr. (Sonja)	Allentown Hospital Lehigh Valley Hosp. Ctr. 1200 S. Cedar Cresent Blvd. Allentown, PA 18105	O: 215-776-8334 H: 215-867-9916 General/Trauma Surgery
NELSON, Gerald D. (Doris)	825 N. Hillside St. 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: 202-676-4386 H: 301-869-1919 Orthopedics (Hand)
OCHSNER, M. Gage (Judy)	110 Irving Street, NW Washington, DC 20010	O: 202-877-6424 H: 703-329-0828 General/Trauma Surgery
***OLFELT**, Paul C. (Helen)	2206 Parkland Lane Minneapolis, MN 55416	O: 612-932-5000 H: 612-922-1735 Radiology
OLSEN, William E. (Joan)	3387 Herron Road Frankfort, MI 49635	O: 313-434-4200 H: 313-994-0382 General/Vascular Surgery
O'MALLEY, Keith F. (Lynn)	Three Cooper Plaza Suite 411 Camden, NJ 08103	O: 609-342-3013 H: 609-234-0253 General/Trauma Surgery
OSBORNE, Robert W., Jr. (Martha)	1802 S. Yakima, #204 Tacoma, WA 98405	O: 206-383-3325 H: 206-754-7858 Vascular Surgery
PACHTER, H. Leon (Rena)	530 First Avenue, NY/6C New York, NY 10016	O: 212-340-7302 H: 212-679-9633 General/Trauma Surgery

SAFFLE, Jeffrey R. (Susan)	50 N. Medical Drive #3B-306 Salt Lake City, UT 84132	O: 801-581-3595 H: 801-582-6603 General Surgery/Burns
SCALEA, Tom M.	116 Willow St., #2 Brooklyn, NY 11201	O: 718-735-3416 H: 718-402-0924 General/Trauma Surgery
SCHECTER, William P.	1001 Potrero Ave., Ward 3A San Francisco, CA 94110	O: 415-821-8817 H: 415-726-1339 Anesthesia/Surgery
***SEIBERT**, Charles E. (Mary)	1 Cimmaron Drive Littleton, CO 80121	O: 303-761-9190 H: 303-781-7760 Radiology
***SEYMOUR**, John (Joan)	825 E. 8th St., #1106 Minneapolis, MN 55404	O: 612-336-1653 H: 612-245-2458 Neurosurgery
SHACKFORD, Steven R. (Ellen)	301 Fletcher House, MCHV Burlington, VT 05401	O: 802-656-5354 General/Trauma Surgery
SHARP, Kenneth W. (Eileen)	Vanderbilt University TVC 3662 Nashville, TN 37232	O: 615-322-0259 H: 615-377-1978 General/Trauma Surgery
SHERMAN, Harold	Div. Multisystem Trauma Mercy Hospital of Pittsburgh 1400 Locust St. Pittsburgh, PA 15219	O: 412-232-7786 H: 412-683-7744 General/Trauma Surgery
STOTHERT, Joseph C., Jr. (Jean)	Dept. of Surgery, E45 U. 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, MCVA 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
TEAL, Peter V. (Annie)	1232 N. 30th St. Billings, MT 59101	O: 406-245-3149 H: 406-245-6565 Orthopedics
THOMAS, Herbert, III	8015 W. Alameda, #210 Denver, CO 80223	O: 303-237-2663 H: 303-696-7057 Orthopedics

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Fresno
Davis, James W.
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Helling, Thomas C.
Augusta
McKinley, C. Richard

Montana

Billings
Johnson, James H., Jr.
Millikan, J. Scott
Teal, Peter V.

WESTERN TRAUMA ASSOCIATION
TWENTY-SECOND ANNUAL MEETING

CHANGE OF ADDRESS FORM

NAME _____

SPOUSE NAME _____

MAILING ADDRESS _____

CITY _____ STATE _____

OFFICE PHONE _____ HOME PHONE _____

SPECIALTY _____

Return form to:

Thomas H. Cogbill, M.D.
Secretary, WTA
Gundersen Clinic
1836 South Avenue
LaCrosse, WI 54601

-country race 5K - 10K
-ideas for questions

wrap rate ski tickets - adequate i/o ahead of time

to check on hotel group rate might drive it down?
contract = not greater than but float against lower current rate

program consider membership basing by reality - also

1st mailing July 1

Cocktail party
Banquet
Breakfasts $2000/d
picnic $2000

Feb 27 - March 6 '93

Room Rates

Airline Rates

c Hugo @ Jackson

Discussion:
↑ rates for guests, late registrants
? limit guests of member
"residents presenting not guests"

Algorithm for tailed mandible for

t_x –