

Chairman's Message

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Ross Bullock, MD, PhD

There has been substantial activity within the AANS/CNS Section on Neurotrauma and Critical Care during recent months. By the time this newsletter goes to press, all neurosurgeons in the United States should have received a mailing

containing information intended to facilitate the negotiation of reimbursement contracts for emergency room coverage in their hospitals. The mailing includes background information on this issue, an overview of EMTALA and COBRA laws governing emergency room coverage and the Position Statement of the AANS/CNS on this issue. We have also included a sample of CPT codes for neurotrauma procedures and sample contracts, which may be modified to suit the circumstances of individual physicians.

The Trauma Section Executive Committee believed that this packet would be one of the most powerful measures by which the quality of neurotrauma care for patients with head and spinal injuries could be improved, while at the same time substantially improving the practice circumstances for individual neurosurgeons. The Executive Committee is keen to obtain feedback from neurosurgeons who have practical experience with negotiating such contracts with hospitals and emergency rooms so that useful information can be shared as it becomes available in this rapidly changing area.

We recognize in particular that such contracts will be especially difficult to negotiate within the context of large teaching hospitals. In such environments, residents are usually the first to respond to the emergency room, and residents are frequently paid by the hospitals themselves, rather than by the neurosurgical group practice.

Nevertheless, the demands upon the time of the

academic neurosurgeon to provide optimal neurotrauma care in accordance with federal requirements are considerable. Such commitments include resident supervision, numerous patient care quality audit meetings and teaching commitments to trauma-affiliated groups such as EMS personnel, emergency room staff and trauma surgeons in training, to name but a few.

Furthermore, academic neurosurgeons in large teaching hospitals that provide care for uninsured patients will carry a far larger trauma load than those working in purely private practice. When teaching institutions receive state stipends to cover indigent care, neurosurgeons need to factor this aspect into neurotrauma coverage negotiation.

At the upcoming Congress of Neurological Surgeons Annual Meeting in San Diego, keynote presentations during scientific sessions will focus specifically on economic aspects of providing neurotrauma care. (See page 6 for a preview of the meeting.)

ICP Monitoring

Recent surveys have shown that only 40 to 50 percent of those head-injured patients who would benefit from ICP monitoring are actually being monitored in intensive care units throughout the United States. Although the reasons for this low rate remain unclear, increasing the amount of ICP monitoring would both increase the quality of care for head-injured patients and also improve remuneration for neurosurgeons.

Since the *Guidelines for the Management of Severe Head Injury* recommended ICP monitoring, a variety of other non-neurosurgical groups, such as trauma surgeons and critical care medicine physicians, have expressed interest in performing these procedures. If this were to begin to take place, then neurosurgeons may have their leadership role in the care of the head-injured patient eroded irrevocably. Unfortunately, many neurosurgeons are already fully committed within

continued on back page

Who Wants To Be An EMTALA Surveyor? (With apologies to ABC and Regis Philbin)

By Thomas (don't call me Regis) Hoyt, MD

Welcome, ladies and gentlemen, to “Who Wants to be an EMTALA Surveyor?” This is the game show where some lucky player may win the chance to apply to HCFA* for the job of EMTALA surveyor. If you answer all of the following questions correctly, you may send an application to the HCFA region of your choice. Won't HHS be thrilled to have a neurosurgeon in its employ!

Allow me to remind you of the rules of the game. You will be presented with a series of cases involving the transfer of emergency room patients from one hospital to another. As a neurosurgeon on emergency room call at the receiving hospital, you are to decide whether or not to accept the patients in transfer to your facility. Justifying your decision is very important. A number of possible responses to each scenario will follow. Select the single best answer. Many of these cases are based on genuine EMTALA complaints. Keep in mind HCFA's main criterion for review—“the best interest of the patient”—when answering. The correct answers are derived from existing EMTALA regulations and are based upon actions of HCFA surveyors in prior audits. Are you ready to begin?

Case Number One.

A 28-year-old male victim of a motorcycle accident presents to Elsewhere Community Hospital Emergency Room comatose and decerebrate, with cerebral contusions and a small subdural hematoma on CT scan. There are three neurosurgeons on staff at Elsewhere Community Hospital, but none are on call this night. At 11 p.m. you are called and asked to take this patient in transfer. You are not on staff at Elsewhere Community Hospital, but you are on call for the emergency room tonight at your parent facility.

- A. You accept the patient in transfer.
- B. You refuse to accept the patient because you are not on staff at Elsewhere Community Hospital.
- C. You accept the transfer but plan to file a complaint with HCFA against the three neurosurgeons on staff at Elsewhere Community Hospital for not being available tonight.
- D. You pull the telephone from the wall and throw it across the room.

Case Number Two.

A 33-year-old male victim of an assault with a baseball bat to the head presents to Elsewhere Community Hospital Emergency Room lethargic, with right hemiparesis and a left frontal depressed skull fracture. The patient subscribes to an HMO for which you are not a provider. There is a neurosurgeon on-call at Elsewhere Community Hospital who is on the HMO panel, but after more than an

hour of phone calls and pages, this neurosurgeon still cannot be found by his own emergency room. You receive a call from Elsewhere Community Hospital Emergency Room asking you to accept the patient in transfer.

- A. You accept the patient in transfer.
- B. You refuse to accept the patient in transfer because you are not on the patient's HMO panel.
- C. You accept the patient and report the neurosurgeon at Elsewhere Community Hospital to HCFA as an EMTALA violation.
- D. None of the above.

Case Number Three.

A 75-year-old hypertensive female cardiac patient on Coumadin presents to Marginal Memorial Emergency Room comatose and hemiplegic, with a large intracerebral hemorrhage. Her cardiologist responds to the emergency room and then calls for a neurology consultation. There are no neurosurgeons on staff at Marginal Memorial Hospital. The neurologist advises that the patient be transferred to a hospital with a neurosurgeon. PT and INR reveal the patient to be fully anticoagulated. You have been requested to accept the patient in transfer.

- A. You refuse the transfer, insisting that Marginal Memorial Hospital first reverse the effects of the Coumadin and call you back once the coagulopathy has been corrected. You explain to the E.R. physician that a craniotomy cannot be performed on a fully anticoagulated patient, but you will accept the patient once this problem is corrected.
- B. You accept the patient “as is,” planning to reverse the Coumadin yourself or call in a consultant.
- C. You refuse the transfer altogether, stating to the E.R. physician that you consider the case to be hopeless.
- D. You accept the patient and leave town before the patient arrives.

Case Number Four.

A 22-year-old male victim of a rollover motor vehicle accident is found at the scene, having been ejected from the vehicle. He presents to the emergency room at Elsewhere markedly lethargic, with a Glasgow Coma Scale score of 5 and multiple contusions on head CT scan, as well as a fracture of C4. An Elsewhere Emergency Room physician calls you in a panic. The patient has not changed neurologically while in the E.R. No chest x-ray has been done, hemoglobin is 9, blood pressure is 80/palpable with a heart rate of 120, and the patient is tachypneic. The emergency room physician, obviously inexperienced in neurosurgical trauma, calls you, panic-stricken, screaming that you immediately take the patient in transfer.

- A. You accept the patient in transfer, telling the E.R. physician to expedite the transport as fast as possible.

**HCFA has recently changed its name to CMS. The acronym stand for the “Centers for Medicare and Medicaid Services.” Personally, I prefer the old name, “Hell Can Find Anyone.”*

- B. You refuse the transfer, telling the E.R. physician not to call you again until he is more experienced and better able to control his emotions.
- C. You refuse the transfer until the chest and abdomen have been properly assessed and the patient is stabilized.
- D. The problem with society today is that too few people have proper telephone etiquette.

Is that your final answer?

Case Number Five.

You receive a call from a general surgeon on staff at Marginal Memorial Hospital Emergency Room. He is seeing a 56-year-old male motor vehicle accident victim with compression fractures of T5 and T6. CT scan of the spine reveals simple compression fractures with no retropulsed fragments. The patient is totally normal neurologically, complaining only of localized pain to the thoracic spine. The hospital has three orthopedists on staff but no neurosurgeons on staff. The patient has a dropping hemoglobin and a positive abdominal CT scan and is in obvious shock. The surgeon suspects a ruptured spleen and calls you for advice regarding the thoracic spine fractures. You offer suggestions for management of the thoracic spine and advise the surgeon to proceed with an exploratory laparotomy. Later the surgeon calls you back. He has done the operation, taken out the spleen and successfully stabilized the patient. Now what do you advise him to do?

- A. Offer the surgeon suggestions for treating the patient at Marginal Memorial Hospital, assuring him you will take the patient in transfer if he becomes uncomfortable with management.
- B. Ask the surgeon to send the patient to your office tomorrow.
- C. Suggest that one of the orthopedists at Marginal Memorial Hospital see the patient.
- D. Tell the surgeon to send the patient to you in transfer.

You can call your lifeline now.



Case Number Six.

You are in the operating room of your hospital performing a craniotomy for brain tumor. You are using computer-assisted neuroimaging and plan to use a microscope. Unfortunately for you, you are on call for your own hospital's E.R. You are starting to open the dura when you receive a call from Elsewhere Community Hospital Emergency Room requesting to transfer a patient to you. They have a 19-year-old female victim of a motor vehicle accident who is comatose, decerebrate, with a fixed pupil and obvious epidural hematoma on CT scan. She was initially conscious upon arrival to the Elsewhere Emergency Room. Your partner is out of town, and you have no neurosurgical backup. What do you do?

- A. Accept the patient in transfer despite the fact that you are scrubbed in on another case.
- B. Because this is a true neurosurgical emergency where time is of the essence, direct the E.R. physician to bypass you and call a different hospital.
- C. Have your circulating nurse tell the E.R. physician that you are on a plane to Hawaii.
- D. None of the above.

It may be time to poll the audience.

Case Number Seven.

You are not on call. Your name is not listed on the on-call roster. No neurosurgeon is listed as being on-call for the emergency room today. A call comes from your own emergency room asking you to come and see a 72-year-old female who fell and fractured C2. Her primary physician is a good referring source to you and also happens to be one of your golfing partners. The primary physician asks the emergency room physician to call you about the patient. For various reasons, you decide to respond, see the patient in the emergency room, and subsequently admit the patient to the hospital. Later that night, at 11:30 p.m., the emergency room calls you again. This time they have a 58-year-old, unassigned homeless person, intoxicated, who has been struck by a car while staggering into the street. He has a Glasgow Coma Scale score of 5 and a small subdural hematoma. What do you do?

- A. Get out of bed, dress, and drive to the hospital to admit the patient.
- B. Refuse to go to the emergency room because you are not on call.
- C. Tell the emergency room that they have mistaken you for your twin brother and, in fact, he's really the one they should be calling.
- D. Suggest that Neurology admit the patient.

Do you want to go 50/50 on this one?

Case Number Eight.

You have been on call for the emergency room by yourself for the entire weekend. You have been extremely busy. There have been five neurosurgical admissions to the ICU—three with intracranial pressure monitors—and all five cases are on ventilators. Saturday

continued on page 4

Who Wants To Be An EMTALA Surveyor? (continued from page 3)

night you never went to bed because you were doing emergency surgery all night. It is now 10 a.m. Sunday, and you are dragging yourself through ICU rounds. Marginal Memorial Emergency Room calls, wanting to transfer to you an 80-year-old female with a large hypertensive hemorrhage. She is already intubated and is receiving labetalol to control her hypertension. What do you do?

- A. Accept the patient in transfer.
- B. Refuse to accept the patient because you are not on staff at Marginal Memorial Hospital.
- C. Refuse the patient, stating you are overworked with your present patient load. Make the point that all the patients will suffer, including the transfer, if you accept it.
- D. Call your brother-in-law to come in from home to help you manage these patients (although he sells swimming pools for a living, he is a quick learner).

Is that your final answer?

Change papers with your neighbor and compare his or her responses to the correct answers below.

Answers: 1- A, 2-C, 3-B, 4-C, 5-D, 6-B, 7-A, 8-C.

Each case illustrates a number of important points that are emphasized below.

Case Number One. You are obligated to accept in transfer patients from other emergency rooms when you are on call. However, HCFA requires 24/7 emergency room coverage only when four or more members of a specialty are on staff at a given hospital. If three or fewer neurosurgeons are on staff at a hospital, HCFA allows for gaps in the call schedule. It is allowable, therefore, that no neurosurgeon was on call at Elsewhere Community Hospital the night in question.

Case Number Two. Your obligation to accept patients in transfer extends to all patients regardless of managed care affiliations and ability to pay. If you believe that an EMTALA violation has occurred, you are obligated to report the incident. However, because the best interests of the patient come first, you must accept the transfer.

Case Number Three. A screening examination of the patient must take place at the sending facility, and the patient must be safe enough to transport. It is not required that the patient be stable enough for surgery prior to transfer.

Case Number Four. You probably have had to deal with inexperienced, emotionally charged emergency room physicians in the past. The patients are usually better off in your care. The problem here is that the patient might die en route. Aside from being unstable and in shock, the required screening examination was incomplete. Prior to transfer, the patient

needs to be stabilized, with the chest and abdomen fully evaluated.

Case Number Five. Provided the surgeon is reliable and not interested in filing a complaint, answers A and C would also be correct. However, an audit by a HCFA surveyor was conducted of this case years later. He determined this to be an EMTALA violation despite the fact that no complaints were filed by anyone involved. Remember that when a HCFA surveyor conducts an investigation, he is empowered to research past cases to look for additional violations.

Case Number Six. Considering the best interests of the patient, she should be managed elsewhere. You could be hours in the operating room while the patient herniates in your emergency room. Keep in mind, however, that you will probably be reported to HCFA. The HCFA surveyor will probably examine the hospital operating room log to verify your alibi.

Case Number Seven. This one is a bit tricky. According to EMTALA rules, if you go to the emergency room to see a patient, you have de facto placed yourself on call for the remaining call period. From that point on, you must respond to the emergency room and accept transfers as if your name was on the call roster. Perhaps you should reconsider the way in which you help your golf partners. It might work better if you convince the primary physician to admit the patient, and you consult later. Seeing one of your own patients in the emergency room is an exception to this rule.

Case Number Eight. HCFA will frequently accept physician fatigue as a legitimate reason for refusing a transfer. It is acknowledged that overloading a neurosurgeon with sick patients can adversely affect patient care. To remain consistent, you must cease admitting patients from your own hospital emergency room as well as others. Be prepared to justify your action in the event of an investigation.

When dealing with EMTALA issues, it is largely a “rule of men” rather than the “rule of law.” The HCFA surveyors and OIG investigators have tremendous latitude when judging whether or not a complaint has merit. As such, please consider this article to be a helpful guide, not a detailed review of law and statute.

I apologize to the reader, as well as to ABC, for my poor imitation of a prime-time TV game show. Last month, I contacted the AANS and CNS, asking them to set aside \$1 million in prize money to be awarded to those of you with perfect scores. For some unexplained reason, my letter was not answered.

Those of you with perfect scores are more than qualified to be EMTALA investigators. A job with HCFA is not such a bad consolation prize.

Did Troy Aikman and Steve Young Retire Too Soon?

By Julian E. Bailes, MD

The recent retirement of two of the National Football League's greatest quarterbacks has served to keep the problem of cerebral concussion in the spotlight. Troy Aikman, the six-time Pro Bowler who led the Dallas Cowboys to three Super Bowl victories and holds most of the Cowboys' passing records, announced in April that he will retire from football. After 12 seasons and 10 concussions, including two during an 11-game 2000 season, he decided to end his Cowboy, and presumably professional, career.

As a Pittsburgh Steeler team physician, I, along with Joe Maroon, MD, watched from the sideline as Troy's exceptional intelligence and passing talents methodically dismantled the Steelers to win Super Bowl XXX in 1995. In the 1999 season, Steve Young played in only three games after suffering his fourth concussion in three years. He subsequently retired from the San Francisco 49ers, ending a 13-year career during which he had won numerous awards and accolades, including seven consecutive Pro Bowl appearances, Player of the Year, Most Valuable Player in Super Bowl XXIX and the highest single-season rating for NFL quarterbacks. Because of his series of concussions and their aftermath, it is assumed that the risk of cumulative effects of head injuries was the biggest factor in his decision to retire.

Three Issues to Consider

It has been estimated that approximately 120 concussions occur annually in NFL games, a number which is likely to underestimate the additional head injuries which occur during preseason training camp and in practice sessions during the season. The number of major or catastrophic head injuries has remained relatively small, with an average of four (range 0-7) deaths each year in organized football in the United States. However, the more prevalent brain insult is the minor head injury or concussion, which has been variously estimated to occur in 4 to 19 percent of football players, with a current projection of approximately 5 percent of football players annually sustaining a cerebral concussion (Bailes JE, Cantu RC: "Head injuries in athletes." *Neurosurgery* 48:26-46, 2001).

There are three primary issues involved with head injuries in football players or, for that matter, in any athletes. First, there is always the potential for a life-threatening hematoma causing brain herniation. Though uncommon, this possibility must be considered in every downed athlete.

Second, if return to the game occurs prematurely, there may be significant impact upon the athlete's playing ability, school performance (in the case of a scholar-athlete) and his or her very life. The return to contact sports must occur only after the athlete has become asymptomatic, with a normal neurological examination and normal level of functioning. Numerous ancillary tests are currently at our disposal to assist in making such a return-to-play decision, including MRI scanning, neuropsychological testing, postural assessment and studies of brain metabolism. The second-impact syndrome is a rare but usually fatal phenomenon in which a

second, often relatively minor head impact occurs in a player who has not totally recovered from the effects of an earlier minor head injury, leading to irreversible brain engorgement and edema. This unusual condition must always be kept in mind by those physicians and athletic trainers who attend to athletes participating in contact sports.

The last major issue regarding head injuries in athletes, and perhaps the most difficult one to discern, is the long-term effect on brain functioning and future well-being of the athlete after retirement. Relatively little has been known until recent years. The plights of several professional athletes have shed light upon life after football, including the potential for multiple concussions to have severely deleterious effects. This phenomenon was the subject of a cover story in a recent issue of *Sports Illustrated* (Nack W: "The Wrecking Yard." *Sports Illustrated*, May 7, 2001, pp. 61-75). In this report, postconcussion syndrome was cited as one of the most common and troublesome maladies among former players, many of whom suffered from headaches, forgetfulness, blurred vision and difficulty with mental tracking.

Few studies have attempted to assess the chronic effects of repetitive minor head injuries on long-term cerebral function. Our study of 1,200 retired professional football players, performed in conjunction with the NFL Players Association, showed that, in comparison to age-matched controls, a higher percentage of former players are living with ongoing problems affecting memory, personality, intellectual performance and chronic headaches (Jordan BD, Bailes JE: "Concussion history and current neurological symptoms among retired professional football players." Presented at the 52nd Annual Meeting of the American Academy of Neurology, San Diego, CA, May 2000).

Can't Ice the Brain

Did Troy Aikman and Steve Young retire too soon? From my perspective as a distant but educated observer, the answer is no. Current data, although limited and experiential, seem to indicate that today's players, as the cliché goes, are certainly bigger, stronger and faster, and they inflict ever-increasing impact loads during the course of hitting and tackling. Playing quarterback in the NFL is among the most dangerous positions in all of sports because of the need to constantly and repetitively sustain jarring blows and absorb the kinetic energy of numerous pursuers. If it came down to betting our brains, most of us would probably err on the side of leaving the game perhaps a bit too early, for as we know, you can ice the ankle, but not the brain. I think they made the right decision.

Trauma Section Highlights at the 2001 CNS Annual Meeting in San Diego

Sunday, September 30

Morning half-day courses

8 AM-NOON

PC32 Critical Care for Neurotrauma

Directors: *Alex B. Valadka, Donald W. Marion*
 Faculty: *John H. McVicker, Russ P. Nockels, Randall M. Chesnut, David B. Hoyt*

Monday, October 1

Luncheon Seminars

12:30-2 PM

M04 Management Strategies for Thoracolumbar Fractures

Moderator: *Patrick W. Hitchon*
 Faculty: *Perry A. Ball, Allan D. Levi, Dennis G. Vollmer, Gregory J. Przybylski*

M15 Case Management of Complex Head Trauma

Moderator: *M. Ross Bullock*
 Faculty: *Alex B. Valadka, Jamshid Ghajar, J. Paul Muizelaar, Chi Zhing Zee*

M23 Spinal Cord Injury Management: Standards and New Advances

Moderator: *Charles H. Tator*
 Faculty: *Lawrence F. Marshall, Michael G. Fehlings, Barth A. Green, Daniel K. Resnick, Russ P. Nockels*

M26 Neurotrauma Issues for the Neurosurgeon: Trauma Systems, Standards, and the Roles of Physician Extenders

Moderator: *Jack E. Wilberger, Jr.*
 Faculty: *John H. McVicker, Guy L. Clifton, Graham Teasdale, Kerry E. Brega, W. Bruce Cherny*

Section on Neurotrauma and Critical Care I

Spinal Trauma

2-5:30 PM

- 2-3:30** Open Papers 730-739, Moderator: *M. Ross Bullock*
2-2:09 Synthes Award for Resident Research on Spinal Cord and Spinal Column Injury
2:09-2:18 Synthes Award for Resident Research on Brain and Craniofacial Injury
3:30-4 Refreshments with Exhibitors
4-4:40 Oral Posters 92-104, Moderator: *M. Ross Bullock*
4:40-5:30 Special Symposium, Moderators: *M. Ross Bullock, Peter B. Letarte*
4:40-4:55 The History of Penetrating Brain Injury and Ballistics, *James M. Ecklund*
4:55-5:10 Highlights of the Surgical Management of Penetrating Brain Injury, *Bizzhan Aarabi*
5:10-5:25 Prognostic Indicators of Outcome from Penetrating Brain Injury, *Beverly C. Walters*
5:25-5:30 Questions and Discussion

View of San Diego skyline from Pt. Loma. Photo courtesy of the San Diego Convention & Visitors Bureau. Photo credit: James Blank

Tuesday, October 2

Luncheon Seminars

12:30-2 PM

T44 Contemporary Management of Head Injury

Moderator: *Howard M. Eisenberg*
 Faculty: *John Paul Elliott, G. Alexander West, John Douglas Pickard, Peter B. Letarte*

T53 Diagnosis and Neurosurgical Management of Complex Pediatric Head Injury and Shaken Baby Syndrome

Moderator: *Mark S. Dias*
 Faculty: *Peter B. Dirks, Carolyn Marie Carey, Mark R. Proctor*

Wednesday, October 3

Luncheon Seminars

12:30-2 PM

W55 Odontoid Fractures: Surgical Options

Moderator: *Volker K.H. Sonntag*
 Faculty: *Christopher G. Paramore, John A. Wilson, Jr., Christopher E. Wolfla, William C. Welch, Andrew T. Dailey*

W71 Management of Penetrating CNS Injuries

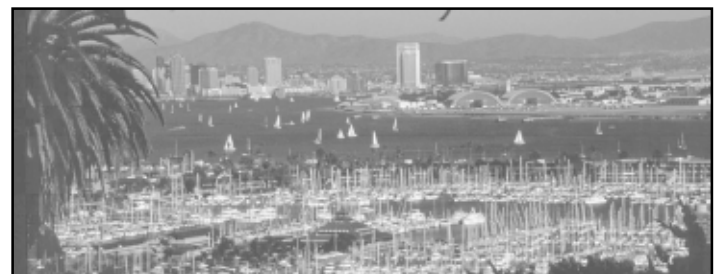
Moderator: *James M. Ecklund*
 Faculty: *Randall M. Chesnut, Brian T. Andrews, Daniel F. Kelly, Bizhan Aarabi, Harold F. Young, Gedeon Mohasseb*

Section on Neurotrauma and Critical Care II

Maximizing Reimbursement from Neurotrauma and Critical Care

2-5:30 PM

- 2-3:30** Open Papers 821-830, Moderators: *Alex B. Valadka, Jamie S. Ullman*
3:30-4 Refreshments with Exhibitors
4-4:40 Oral Posters 105-117, Moderators: *Alex B. Valadka, Jamie S. Ullman*
4:40-4:45 Codman Neurotrauma Fellowship Award Presentation, *John Boockvar*
4:45-5 Codman Neurotrauma Fellowship Lecture: Investigations of the Mechanisms of Hypothermia on TBI in a Rodent Model, *Kevin L. Stevenson*
5:00-5:30 Special Symposium, Moderators: *Alex B. Valadka, Jamie S. Ullman*
5-5:10 What You Did Not Know About Critical Care Coding for the Neurosurgeon, *Mark N. Painter*
5:10-5:20 Coding for Emergency Room and Neurotrauma Care, *Samuel J. Hassenbusch*
5:20-5:30 Questions and Discussion



Thursday, October 4

Reinventing Neurosurgery:

Sports and Spinal Neurosurgery 7:30-11:45 AM

Moderator: *Nelson I. Oyesiku*

Presiding

Officer: *Gerald E. Rodts Jr.*

7:30-7:50 Guidelines for Athletes With Concussion: What Is the Evidence? *Joseph C. Maroon*

7:50-8:10 Honored Guest Presentation, "The Neurosurgeon in the Arena of Sport," *Michael L.J. Apuzzo*

8:10-8:15 Introduction of Special Lecturer, Douglas Kondziolka

8:15-8:45 Special Lecture, "The Player's Perspective," *Steve Young*

8:45-9:00 Kids and Sports—Frequently Asked Questions, *P. David Adelson*

9-9:15 Boxing and the Neurosurgeon, *Julian E. Bailes Jr.*

9:15-9:17 Guidelines: An Introduction, *Paul C. McCormick*

9:17-9:30 Guidelines for the Management of Acute Traumatic Cervical Spine and Cervical Spinal Cord Injuries, *Mark N. Hadley, Beverly C. Walters*

9:30-10 Coffee Break

10-10:30 Special Lecture, "Spinal Surgery for the Athlete," *Robert Watkins*

10:30-10:50 Minimally Invasive Spine Surgery, *Kevin T. Foley*

10:50-11:10 Fractures, Stenosis and Sports: Guidance for Participation, *Regis W. Haid Jr.*

11:10-11:30 Spondylolisthesis in the Competitive Athlete: Conservative Management versus Surgery, *Christopher I. Shaffrey*

11:30-11:45 Sex and Recreation After Spinal Surgery, *T. Glenn Pait*

Open Papers

Monday, October 1

Section on Neurotrauma and Critical Care I

Synthes Award for Resident Research in Spinal Cord and Spinal Column Injury 2 PM-2:09 PM

730 Progressive Lesions Accelerate Functional Axonal Reorganization

Ketan R. Bulsara, Sandra C. Moore, Karl Ruch, Julio J. Ramirez

Synthes Award for Resident Research in Brain and Craniofacial Injury 2:09-2:18 PM

731 Role of the mGluR1 Receptor in Diffuse Axonal Injury after Brain and Spinal Cord Trauma: Potential for a Novel, Clinically Relevant Neuro-protective Strategy

Nicolas Phan, Andrew Baker, Navindra Persaud, Michael Fehlings

2:18-2:27 PM

732 Non-accidental Pediatric Head Trauma: Diffusion-Weighted Imaging Findings

Daniel Y. Suh, Patricia Davis, Kara Hopkins, Nancy Fajman, Timothy Mapstone

2:27-2:36 PM

733 Treatment of Traumatic Brain Injury in Female Rats with Intravenous Administration of Male Bone Marrow Stromal Cells

Asim Mahmood, Dunyue Lu, Yi Li, Michael Chopp



Photo courtesy of the San Diego Convention & Visitors Bureau

2:36-2:45 PM

734 Histological and Functional Analysis of Three Different Human Stem Cell Lineages Following Transplant into the Injured Adult Rat Spinal Cord

Daniel K. Resnick, Brian C. Witwer, Catherine F. Cechvala, Suchun Zhang

2:45-2:54 PM

735 Progress in Clinical Development of Dexanabinol for Traumatic Brain Injury

Anat Biegon, Nachshon Knoller, Nadim Kassem, Lion Levi, Nisim Razon, Eli Reichenthal, Zvi H. Rappaport, Michael Schickler, Igal Shoshan

2:54-3:03 PM

736 Hypertonic Saline in the Treatment of Intracranial Hypertension

Menashe Zaaroor, Gil E. Sviri, Yaron Bar-lavy, M. Krause

3:03-3:12 PM

737 Bicycle-related Head Injury: Analysis of 86 Cases

Bart P. Depreitere, Carl Van Lierde, Christiaan Plets, Remy Van Audekercke, Jos Vander Sloten, George Van der Perre, Jan Goffin

3:12-3:21 PM

738 Early Cerebral Oxygen Desaturation in Traumatic Brain Injury with Normal Intracranial Pressure

Sylvain Palmer, Mary Kay Bader, Jacques J. Palmer, Jeffrey Gross, Thomas Shaver, Connie Stalcup

3:21-3:30 PM

739 Minocycline and Rifampin Impregnated Catheters and Ventriculitis: A Study of 252 Patients

Istvan Takacs, Donald Whiting, Joseph Zabramski, Rabih O. Darouiche, Terry G. Horner, Jeffrey Olson, Allan J. Hamilton

Wednesday, October 3

Section on Neurotrauma and Critical Care II

2:00-2:09 PM

821 Hypothermia on Admission in Patients with Severe Brain Injury

Guy L. Clifton, Emmy R. Miller, Sung C. Choi, Harvey S. Levin, Stephen McCauley, Kenneth R. Smith, Jr., J. Paul Muizelaar, Donald W. Marion, Thomas G. Luerksen

2:09-2:18 PM

822 Dehydration and Outcome from Severe Brain Injury

Guy L. Clifton, Emmy R. Miller, Sung C. Choi, Harvey S.L. Levin

2:18-2:27 PM

823 Spinal Cord Axonal Regeneration is Influenced by Embryonic Proteins

Ketan R. Bulsara, Howard Bomze, Bermans J. Iskandar, J.H. Pate Skene

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Update on Neurotrauma Guidelines

By Jam Ghajar, MD, PhD

There are various neurotrauma guidelines undergoing development and implementation. The following is an update.

Surgical Management of Traumatic Brain Injury: This guideline document will address surgical indications, timing, and methods of treatment for intracranial mass lesions. The authors (Drs. Bullock, Ghajar, Gordon, Hartl, Newell, Servadei, Walters and Wilberger) met June 29-30 in Rome, Italy, to finalize a draft document. Also in attendance were Peter C. Quinn, Executive Director of the Brain Trauma Foundation, and Juan Sahuquillo from Barcelona, representing the Spanish neurosurgical organization. The sections of the surgical guidelines are organized by CT categories: epidural hematoma, subdural hematoma, posterior fossa lesion, depressed skull fracture and parenchymal lesion. The document will be submitted to the Trauma Section this fall for review.

Management and Prognosis of Penetrating Brain Injury: This guideline document was approved by the AANS Board of Directors, and the *Journal of Trauma* is scheduled to publish the entire work as a supplement to its main journal. These guidelines, especially the prognosis section, will be very useful to clinicians who deal with victims of TBI and with their families.

Pediatric Traumatic Brain Injury Guidelines: These will be submitted to the Trauma Section for review upon completion. David Adelson, MD, is the Trauma Section coordinator. Eighteen pediatric topics have been identified, 14 of which are the same as the adult TBI guidelines and four of which are unique to the pediatric age group.

Management and Prognosis of Traumatic Brain Injury: The latest update of the original guidelines, including a new section on

prognosis, was published in the *Journal of Neurotrauma* in the June/July 2000 issue (Volume 17, Numbers 6/7). A hardcover book version is available from the AANS (for American neurosurgeons) and from the Brain Trauma Foundation (for others). Other reviews of TBI, including prehospital, in-hospital, and prognosis guidelines, appeared in the *Lancet* (Ghajar J: *Lancet* 356:923-929, 2000) and in *Neurosurgery* (Marshall LF: *Neurosurgery* 47:546-561, 2000). Implementation of the guidelines is under way in New York state, Eastern Europe and Colombia using an Internet quality assurance database and education programs.

Prehospital Management of Traumatic Brain Injury: Both this document and the in-hospital guidelines can be viewed at www.braintrauma.org. They are available in book form from the Brain Trauma Foundation. The implementation program is under way in 20 U.S. states.

Management of Spinal Injury: Guidelines are being formulated under the leadership of Mark Hadley, MD, from the AANS/CNS Spine Section. Nelson Oyesiku, MD, is representing the Trauma Section.

Emergency Department Management of Mild Traumatic Brain Injury: This guidelines project is being led by Andy Jagoda, MD, an emergency medicine physician from New York. The representative from the Trauma Section is Alex Valadka, MD. A final draft is currently being circulated among the participants. When complete, this document will be submitted to the Trauma Section for review.

Jam Ghajar, MD, PhD, is Chairman, Guidelines Committee, AANS/CNS Section on Neurotrauma and Critical Care.

Trauma Section Highlights (continued from page 7)

2:27-2:36 PM

824 Influence of Cranioplasty on Cerebral Blood Flow and Cardiac Function

Do-Sung Yoo, Dal-Soo Kim, Pil-Woo Huh, Kyung-Suck Cho, Jae-Gun Kim, Chun-Kun Park, Joon-Ki Kang

2:36-2:45 PM

825 Extracellular Glycerol in the Brain after Traumatic Brain Injury Measured by Microdialysis

Oscar L. Alves, Tobias Clausen, Ahmad Khaldi, Alois Zauner, Harold F. Young, Ross Bullock

2:45-2:54 PM

826 L-NAME Reduces Cerebral Edema in LPS-Aggravated Traumatic Brain Injury in the Rat

Joshua H. Petit, Raj Mehta, J. Marc Simard

2:54-3:03 PM

827 Acute Neurological Ski Injuries in Children

John B. Harris

3:03-3:12 PM

828 The Role of Aquaporin-4, a Molecular Water Channel, in Cerebral Edema

Reid C. Thompson, Achilles A. Demetriou, Daniel Inderbitzin, Jody E. Margulies

3:12-3:21 PM

829 The Role of Hypothermia in the Management of Severe Brain Injury: A Meta-analysis

Odette A. Harris, John Colford, Matthew C. Good, Paul G. Matz

3:21-3:30 pm

830 Sex and Age Interact in Determining Outcome of Traumatic Brain Injury (TBI)

Anat Biegon, Azadeh Farinn, Christine Erdmann, Lawrence F. Marshall

The Neurotrauma Aspect of PULSE

By Geoffrey S.F. Ling, MD, PhD, LTC, MC and James M. Ecklund, MD, LTC, MC

Resuscitation of life-threatening conditions, such as acute myocardial infarction or trauma, is often frustratingly futile. In recognition of this fact, leaders of the international scientific community seeking to improve clinical outcome following cardiopulmonary resuscitation began the Post-resuscitative and initial Utility in Life Saving Efforts (PULSE) initiative. The National Institutes of Health and Department of Defense became early supporters of this effort.

The original PULSE group began with very broad objectives: define resuscitation science, stimulate advancement of this discipline and develop a strategic plan. To meet this challenge, working groups were organized to address five areas: basic physiological mechanisms, pharmacology, translational studies, bioengineering and clinical evaluative research. After working independently for almost a year, all groups met in June 2000. By this time, PULSE participants numbered over 100 and represented diverse international medical and scientific disciplines.

From these discussions, a basis for a strategic plan ranging from basic biological, epidemiological and engineering sciences to community implementation was realized, and a summary document was written (Weil MH, Becker L, Budinger B, et al: "Workshop executive summary report: Post-resuscitative and initial utility in life saving efforts (PULSE)." *Circulation* 103: 1182-1184, 2001). Four specific action items were recommended: (1) expand basic, translational and focused applied research and device development, (2) establish an international clinical trials network, (3) improve technology-based methodologies for monitoring and

performing resuscitation, and (4) promote multidisciplinary communication and collaboration.

Shortly after this meeting, it was recognized that trauma should be included as a separate and distinct working group. A leadership council was rapidly convened, and focus areas were identified. Central nervous system (CNS) outcome from traumatic injury was one of these focus areas. The neurotrauma group was given the task of summarizing what is needed to improve resuscitation science as it pertains to neurotrauma.

Five Specific Areas

The group identified five specific areas of neurotrauma: (1) isolated traumatic brain injury (TBI), (2) spinal cord injury (SCI), (3) secondary injury due to complications of other traumatic injuries (including resuscitation efforts), (4) repeated TBI, and (5) spinal column injury. These areas share common research needs: development of appropriate and clinically predictive preclinical models (which include use of animals and studies of penetrating injury) and investigations of basic neurophysiology, advanced technology, therapy and rehabilitation, including psychological coping. Other general areas of research that also require ongoing effort are demographics, gender, age and genetic factors. To efficiently translate the work into clinical practice, clinical centers of excellence are needed that can perform individual focused studies or can organize into national consortia. An effective consortium requires standardization of treatment, centralization of data management, and optimization of patient recruitment.

The goal of PULSE is straightforward: to execute scientifically rigorous basic and clinical studies as efficiently as possible so that meaningful interventions that will benefit patients can be developed rapidly. To do this requires a clear strategic plan that is endorsed by the scientific and clinical communities, supported by major funding agencies and introduced to the public, for whose benefit this work is directed. The PULSE initiative is the first step of this process.

(The opinions expressed in this work are solely those of the authors. They do not imply endorsement by the United States Army, Department of Defense, or U.S. government.)

Geoffrey S.F. Ling, MD, PhD, LTC, MC, is a lieutenant colonel in the United States Army. James M. Ecklund, MD, LTC, MC, is a lieutenant colonel in the United States Army.

Trauma Section Mails Packet on E.R. Coverage

The Trauma Section has compiled an information packet that will help neurosurgeons not only provide the best possible neurotrauma care to patients but also facilitate the negotiation of stipends with their hospitals. In July, all AANS and CNS members in the United States were sent a copy of the packet "Emergency Room Coverage: What Every Neurosurgeon Should Know."

The packet consists of an overview of neurosurgical contracts for trauma coverage, a position statement from the AANS and CNS concerning emergency room coverage, background information on EMTALA, two sample contracts and an abbreviated list of CPT and ICD-9 codes for neurotrauma and critical care procedures. The packet is also available on the Web at <http://www.neurosurgery.org/trauma/emc.pdf>.

Only about one in five U.S. neurosurgeons is paid a stipend for providing emergency room coverage. By partially offsetting the scheduling disruptions and economic losses that often accompany neurosurgical emergencies, the receipt of a guaranteed stipend may make it possible for a neurosurgical practice to increase its involvement in trauma care. The Section hopes that this packet will help neurosurgeons understand the issues surrounding negotiation of contracts for emergency room coverage.

PULSE Group Has Five Members

The members of the PULSE CNS Trauma group are: GSF Ling (chair), Uniformed Services University of the Health Sciences, Bethesda, Md.; ME Cheung, NIH-NINDS, Bethesda, Md.; JE Ecklund, Walter Reed Army Medical Center, Washington, D.C.; CS Robertson, Baylor College of Medicine, Houston, Texas; AB Valadka, Baylor College of Medicine, Houston, Texas.

Resident Research Awards Presented

By Alex B. Valadka, MD

Through the generosity of Synthes, two Resident Research Awards were presented in April at the AANS Annual Meeting in Toronto. The Synthes Award for Resident Research on Brain and Craniofacial Injury was presented to David Michaeli, MD, of Rabin Medical Center, Israel, for his paper “Tissue Resonance Analysis—New Approach to Noninvasive ICP Monitoring and Measurement.”

The Synthes Award for Resident Research on Spinal Cord and Spinal Column Injury was presented to Odette Harris, MD, of Stanford University for her paper “The Use of Modified EAST Practice Parameters in Clearing the Cervical Spine in the Obtunded Trauma Patient: A Prospective Study.”

Each of these Synthes Awards is presented at both the AANS and CNS annual meetings. Young neurosurgeons wishing to obtain additional research training in neurotrauma also are encouraged to

apply for the Codman Neurotrauma and Critical Care Fellowship. For more information about these opportunities, contact Michael Fehlings, MD, PhD, Chair of the Fellowship/Awards Committee of the AANS/CNS Section on Neurotrauma and Critical Care, at michael.fehlings@uhn.on.ca.

Alex B. Valadka, MD, is Secretary/Treasurer, AANS/CNS Section on Neurotrauma and Critical Care.

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The Synthes Award for Resident Research on Spinal Cord and Spinal Column Injury is presented at the 2001 AANS Annual Meeting in Toronto. (From left) Odette Harris, MD, is honored by Ken Sullivan and Paul Gordon of Synthes.



The Synthes Award for Resident Research on Brain and Craniofacial Injury is presented at the 2001 AANS Annual Meeting in Toronto. (From left) Zvi Rappaport, MD, and David Michaeli, MD, of Rabin Medical Center, Israel, receive the award from Ken Sullivan of Synthes; Jamie Ullman, MD, and Michael Fehlings, MD, PhD, of the Trauma Section; and Paul Gordon of Synthes.



American Association of Neurological Surgeons

Application for Membership

AANS/CNS Section on Neurotrauma and Critical Care



Eligibility: Members of the AANS and/or CNS who are actively interested in Neurotrauma.
Note: Adjunct Membership is available to non-neurosurgeons who are not members of the AANS or CNS. Please contact 847-378-0500 for an Adjunct Membership application.

I. Biographical:

- (A) Name: _____
- (B) Home Address: _____
- (C) Office Address: _____

- Phone: _____ Fax: _____
- (D) E-Mail: _____

II. Category of Membership Requested:

- Active Associate International Resident*

III. Membership, Certification and Practice:

- (A) Are you certified by the American Board of Neurological Surgery? Yes No
- (B) For Resident Applicants-Expected Residency Completion Date (month/year) _____
- (C) Are you a member of
1. The American Medical Association? Yes No
 2. A Local or Regional Medical Society? Yes No
 3. A State or Provincial Medical Society? Yes No
 Name: _____
 4. American Association of Neurological Surgeons? Yes No
 5. Congress of Neurological Surgeons? Yes No

 Signature of Applicant

 Date

* Membership dues are waived for applicants currently enrolled in a neurosurgical residency program.

Please return completed application with your membership fee of \$50 to:
AANS/CNS Section on Neurotrauma and Critical Care
Dept. 77-7550
Chicago, Illinois 60678-7550

AANS/CNS Section on Neurotrauma and Critical Care

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Chairman's Message (continued from front page)

their practices and find the prospect of taking on more ICP monitoring to be unappealing.

It is my *personal view* that the logical alternative route for neurosurgeons to take under these circumstances is to train and encourage suitably qualified individuals such as nurse practitioners and physician assistants (in the same way that those of us in academic hospitals train neurosurgical residents). In this way, ICP monitoring will be kept within the province of the neurosurgeon. If we are to move forward in this direction, the AANS and CNS need to show a leadership role in teaching not only insertion of ICP monitors, but also aggressive ICP management for head-injured patients. The Trauma Section is ready to undertake this.

"Supra-Regional" Severe Head Injury Centers

Recent surveys have indicated that of the approximately 900 hospitals throughout the United States that accept severely head-injured patients, about 50 percent refer such patients directly on to other centers and do not manage them. The increasing use of air transfer makes distance between centers a less important factor except in those very few head-injured patients who are acutely deteriorating from acute epidural or subdural hematomas.

It has also been shown in recent surveys that only about 50 percent of Level I trauma centers are fully compliant with the *Guidelines for*

the Management of Severe Head Injury, reflecting the interest and expertise of their staff in the management of these demanding patients. Moreover, outcome has been shown to be better in centers that have residents in training, because severe head injury is highly demanding of resources and time, particularly as management plans become increasingly complex with adjunctive therapies such as decompressive craniectomy, experimental pharmacological therapies and management of other concomitant systemic injury.

Many years ago, a survey of 7,912 head-injured patients in 41 hospitals clearly showed that the outcome of severely head-injured patients varies tremendously from center to center, ranging from 52 percent better than expected to 43 percent worse than expected. Quality of care is thus a major determinant of outcome. Moreover, recent declines in the overall incidence of severe head injury means that each center sees fewer patients. Like myocardial infarction and many other serious, acute medical conditions, severe head injury is managed best in those centers with high volumes of cases.

Collectively, therefore, these factors strongly suggest that neurosurgeons should consider establishment of "supra-regional centers" with a declared interest and special expertise in managing severe head and spinal cord injury. Such centers are relatively easy to identify already around the country. Such centers may need to upgrade their ICU bed availability in order to deal with increased caseloads, and third-party payers will need to be re-educated regarding the justification for longer helicopter flight distances in order to give patients the best possible quality of care.