

Fact and Fiction of Emergency Surgical Care in America: A Neurosurgical Perspective

Alex B. Valadka, M.D.

The theme of this session of the Congress of Neurological Surgeons 2006 Annual Meeting was the growing challenge of neurotrauma care in America. The session was cosponsored by the American College of Surgeons, and several leaders in trauma care participated on behalf of the College.

This particular presentation investigated several common misperceptions and overlooked truths regarding neurotrauma care. Along these lines, the reader is asked to decide whether the following statements are fact or fiction. Answers and discussion follow below:

1. Neurosurgeons Don't Do Emergency Work

Answer: fiction. A 2006 survey of Board-certified neurosurgeons by the American Association of Neurological Surgeons found that 94% take emergency call.¹¹ Almost 80% take call at least twice a week. Similar results have been reported by others.

2. General Surgeons Like Emergency Work More Than Neurosurgeons

Answer: fiction. A recent review found that 26% of general surgeons participating in trauma care prefer not to treat trauma, as opposed to 20% each for orthopedic surgeons and neurosurgeons. Fifty percent of trauma surgeons would abandon trauma call if it were not required, but only 40% of orthopedic surgeons and 31% of neurosurgeons would do so.³

3. General Surgeons Like To Do Neurosurgical Procedures

Answer: fiction. In a survey of "ideal practice characteristics" for trauma surgeons, the ability to perform selected neurosurgical and orthopedic procedures was ranked at the bottom.² The highest-ranking features were guaranteed salary, guaranteed time off, and subsidized benefits.

4. General Surgeons Can Perform Neurosurgical Procedures With Good Results

Answer: fiction. A 1998 paper by Rinker et al.⁸ is often cited in support of this claim. Although the word "craniot-

omy" appears in the title of that paper, a careful reading indicates that the procedure performed was only a burr hole that was sometimes "expanded." This intervention was performed on only 13% of the closed head injury patients (Glasgow Coma Scale score 13 or less) seen at the authors' institution during the reporting period. It is unlikely that meaningful decompression of an acute subdural hematoma can be achieved through a burr hole. This approach was initiated by the authors only after the local general surgeons and orthopedic surgeon had been trained on cadavers by the nearest neurosurgeon. The hospital radiologist would assist in identifying the site for placement of the burr hole. The neurosurgeon would be contacted by phone. Although the efforts of these surgeons are laudable, this model does not seem to be efficient enough for widespread use.

Wester et al.^{13,14} in Norway report results that are less favorable when non-neurosurgeons attempt evacuation of epidural hematomas. In many cases, the hematoma was evacuated incompletely or was even missed altogether. These authors concluded that the time lost when non-neurosurgeons attempt cranial surgeries would be better spent transporting patients to a neurosurgeon without delay.

What about simpler procedures, such as insertion of ventriculostomies or parenchymal intracranial pressure (ICP) monitors? Published reports describe the successful technical placement of these devices by non-neurosurgeons. Less clear, however, are whether the indications were always appropriate and whether the information gathered was used as effectively as a neurosurgeon would apply it.

Appropriate follow-up is a topic that has been overlooked in many discussions that advocate the performance of neurosurgical procedures by acute care surgeons. Who would perform repeat surgeries for postoperative hematomas, delayed hydrocephalus, calvarial defects, refractory intracranial hypertension, and other common sequelae of trauma?

WHAT IS ACUTE CARE SURGERY?

The catalyst that has stimulated discussions like those above is the proposal to create a new specialty called acute care surgery. Simply put, acute care surgery is an attempt by trauma surgeons to reinvent and reinvigorate their specialty.

For many years, trauma surgeons have voiced concern regarding the declining interest in their field among surgical trainees.⁷ Reasons include the growing frequency of nonoperative management of trauma patients and the lifestyle demands of a career in trauma surgery.

Trauma surgeons must acknowledge that many of the problems confronting their specialty are a direct result of their own previous decisions. While trauma surgery was carving out an identity as a separate discipline several decades ago, trauma surgeons declared that they were best qualified to treat the multiply injured patient. In many hospitals, patients with multiple injuries that included central nervous system trauma were automatically assigned to the trauma service. At some places, even patients with isolated central nervous system injuries were taken by the trauma service. The aggressiveness with which many trauma services historically pursued these patients at many hospitals is often overlooked by those trauma surgeons who choose to characterize the past as an “abandonment” of trauma patients by specialty services. Reimbursement levels for physician services made such arrangements financially viable for trauma surgeons, especially because many patients with blunt abdominal trauma underwent laparotomies and other billable procedures.

As the aphorism teaches, we should be careful what we wish for, because we may get it. After trauma surgeons had made it clear that they wanted to be the providers of care for trauma patients, they saw a sharp drop in their numbers of surgeries as improved imaging techniques and refined management strategies permitted successful nonoperative management of many types of injuries that previously would have gone to the operating room. This low operative caseload undoubtedly contributes to lack of interest in careers in trauma.

To combat this lack of interest, some leaders in trauma surgery have proposed the transformation of trauma surgery into a new specialty that would perform all emergency surgery, both trauma and nontrauma.¹⁰ Critical care would remain a major component of this training and practice. These new practitioners would work defined shifts, during which they would function as “surgical hospitalists.” Theoretically, medical students and surgical residents would be drawn to this specialty because, in comparison with modern-day trauma surgeons, they would operate more, treat a wider variety of patients, and work only for a defined shift, e.g., 8 hours or 12 hours.

Some proponents of this new specialty think that its practitioners should also perform procedures that are learned in other residency programs, including orthopedic and neurosurgical training programs. The official acute care surgery training curriculum (still being finalized at the time of this writing) will probably include ventriculostomy and parenchymal ICP monitors as “desirable” but not “essential” proce-

dures. Some call for the addition of “limited craniotomy” as part of the training.

Given the fact that a neurosurgery rotation for these trainees would last only one or possibly two months, it is difficult to see how competence in these procedures can be acquired and maintained. For patient safety reasons, organized neurosurgery has opposed the inclusion of these procedures in the acute care surgery curriculum and their performance by non-neurosurgeons.

MOTIVATIONS FOR DEVELOPING AN ACUTE CARE SURGERY SPECIALTY

Undoubtedly, opportunism was a factor in the conceptualization of a new specialty of acute care surgery. Several reports have documented the significant and growing difficulties that many hospitals experience in securing specialty coverage for their emergency departments. Neurosurgery appears at or near the top of most such lists, but those lists are long, and by no means do neurosurgeons enjoy a monopoly. Of note, leaders in trauma care have decried the widespread lack of interest among general surgeons in taking emergency call.¹² Thus, the lack of desirability of emergency work cuts across many fields of medicine. Into this void would step the acute care surgeon, who would not only pick up the slack in terms of trauma and other surgical emergencies, but would also address perceived deficiencies in availability of other specialties as well.

Another catalyst for the development of acute care surgery, at least among older surgeons, has been the romantic idea of harkening back to the “glory days” when trauma surgeons were respected for their ability to perform a variety of complex cases with skill and confidence.⁶ Such fondness for the “good old days” is a normal human reaction to looking back at the past while we are faced with uncertainties of the future, especially when the pace of change is accelerating at a rate that is sometimes disquieting. Although we can learn a great deal by studying the past, the comfort of returning to the ways of the past cannot blind us to the opportunities of the future. Younger general surgeons have pointed out that nostalgia can often be the enemy of progress, not the source of wisdom that guides that progress.¹

The “European model” is often cited as an example of how a general surgeon with some advanced training can successfully perform neurosurgical and orthopedic procedures. However, discussions with European neurosurgeons reveal that this model is used in only a few areas that collectively serve less than 1% of the population of Europe. Anecdotes describe the difficulties experienced by non-neurosurgeons when they encounter intraoperative problems that must be fixed by neurosurgeons. Overall, the “European model” is a myth, at least as far as neurosurgery care is concerned.

UNCERTAINTIES REGARDING ACUTE CARE SURGERY

Although discussions between acute care surgery proponents and neurosurgeons (and between those proponents and orthopedic surgeons) have occupied much of the spotlight, a more contentious issue is likely to be the relationships between acute care surgeons and other surgical subspecialists. Who should treat a patient who arrives at the emergency department with lower limb ischemia from acute arterial occlusion? Would an acute care surgeon with some vascular experience be better qualified than a fellowship-trained vascular surgeon who performs vascular procedures on an almost daily basis? What about patients with acute, complex problems of the hepatobiliary system, endocrine system, etc.?

Similar questions surround the future role of the vascular surgeon, hepatobiliary surgeon, etc. in the emergency care network. If these practitioners have not gone through an acute care fellowship, will they be credentialed and insured to provide emergency work? If they will continue to do so, then what will be the exact role of the acute care surgeon?

Questions also surround the anticipated practice locale of acute care surgeons. Will they practice in large academic centers or small rural hospitals? As far as neurosurgical care is concerned, neither location would make sense. By definition, Level I and Level II trauma centers already have neurosurgeons available. Otherwise, the American College of Surgeons Committee on Trauma would not have verified them as trauma centers. On the other hand, rural hospitals may not have the institutional resources to care for patients with complex central nervous system injuries, regardless of the expertise of the physicians on their medical staffs. It may be true that patients with a high level of neurological functioning but minor acute abnormalities on their computed tomographic (CT) scans can often be observed at outlying facilities, but this observation can be conducted by many different types of physicians. Specialized training in acute care surgery is not needed.

Proponents of acute care surgery must also recognize that the separation of trauma from other neurosurgical emergencies represents an artificial distinction. Even if a hospital wished to employ an acute care surgeon to care for some neurotrauma cases, it would still need a neurosurgeon to be on call for the many emergency conditions that would be beyond such a person's capabilities, such as aneurysmal subarachnoid hemorrhage, spontaneous intracerebral hemorrhage, acute hydrocephalus, ventriculoperitoneal shunt failure or infection, acute spinal cord compression, etc. Not much would be gained by the duplication of effort that would result from the call schedule including both a neurosurgeon and an acute care surgeon who wanted to perform neurosurgical procedures.

Undoubtedly, creation of a new specialty in acute care surgery would change the type of personality that is drawn into this field. The traditional surgical mentality of doing whatever it takes for as long as it takes would be replaced by a shift-worker mindset. The pride that surgeons take in achieving mastery in numerous procedures would be replaced by an acceptance that they are often the "second best" at what they do, e.g., not as good as vascular surgeons in vascular cases, not as good as colorectal surgeons in large bowel cases, etc.

IMPORTANCE OF ELECTIVE PRACTICE

Almost all of the emphasis on saving the specialty of trauma surgery has focused on a 2-year acute care surgery fellowship. Less discussion has centered on what to do with the 30 or 40 years of a practitioner's career that would follow the completion of this training program. Even the most carefully planned fellowship training systems will fail if the job market does not offer those trainees attractive opportunities that are sustainable over the long run.

Acute care surgeons would be dependent for their livelihood on whatever patients happen to come through the emergency department, the hospital transfer center, or the inpatient consultation service. Opportunities for expansion and growth would be limited. Currently, most of the general surgeons and specialists who provide emergency care also have elective practices that they have built over months and years. For both the individual practitioner and the hospital, the revenue generated by those elective practices is used to cross-subsidize uncompensated work, which includes much emergency work. Remember that the Emergency Medical Treatment and Labor Act (EMTALA) made emergency care the only type of health care to which everyone in this country is legally entitled, regardless of ability to pay. The surgical skills that are learned and maintained in a busy elective practice are largely transferable to many types of emergency cases. Moreover, the satisfaction and pride that go along with building a successful practice help to balance the frustration and burnout that may affect those whose practice is devoted to the hectic and uncontrollable world of emergency care, especially when one's work schedule, practice routines, compensation, and other patterns are determined by negotiation with a hospital, not by one's own effort and work.

The sheer volume and widespread geographic distribution of emergency surgical cases, as well as the frequent need for prompt intervention, lend further support to the concept that a relatively small group of hard-core emergency surgeons will not be able to provide all of the emergency surgery that this country needs. Instead, most emergency surgery will be performed (as it is currently being performed) by those who also maintain elective practices. The emergency practitioner's continued participation in an elective practice has been recommended by those who champion the cause of acute care

surgery.¹⁰ However, this component seems to have been overlooked in discussions that are more recent.

Another reason to focus more on an elective practice, as opposed to including emergency procedures from different specialties, is practice income. Several analyses have suggested that expanding a trauma surgery practice to include emergencies or procedures that have traditionally been performed by other specialties will not improve the practice's bottom line. However, adding elective procedures may do so.⁹ Some readers may be put off by the discussion of financial issues in this review, but even the most altruistic individual or organization must generate enough revenue to remain financially viable. The old saying "no money, no mission" applies just as well to the challenges of maintaining a surgical practice that includes emergency care as to the financial realities that impact charitable organizations.

REGIONALIZATION

The number of hospitals in this country is so large that it is physically impossible for each hospital to have a neurosurgeon on call 24 hours a day, 365 days a year. Adding other physicians to try to pick up the neurosurgical care for the sickest patients is not realistic in terms of patient safety and quality of care and would still not succeed in distributing physicians to all of the hospitals that desire in-house neurosurgical coverage. Should we provide emergency neurosurgical care at every hospital that desires it? If the answer is yes, then who will pay for the duplication of resources, the procurement of expensive resources at many facilities that will use them only occasionally, and similar costly and inefficient measures that would be needed to reach that goal?

A much more reasonable approach is regionalization of care. This strategy was proposed by the Institute of Medicine in its June 2006 report on the status of the emergency care system in this country.⁴ Improvement of outcomes as a result of regionalization has been shown for several different disease conditions, including trauma.⁵

Note that regionalization does not equate to centralization. In a truly regionalized system, patients with minor injuries could remain at outlying hospitals, thus freeing up beds at major regional referral centers for patients with more severe injuries. A great deal of planning and organization is needed if such systems are to be effective. These efforts must consider manpower needs and availability, telemedicine and communications access, agreements to ensure EMTALA compliance, coordination with regional emergency medical systems agencies, and other concerns. Although such work is

difficult, these efforts are well worth it because they represent the best and most efficient way to optimize patient care in a current climate of limited and ever-shrinking healthcare dollars.

CONCLUSION

In the middle of all these discussions stands the specialist who provides emergency care. Finding ways to balance one's practice with one's emergency care duties is a challenge that will become only more difficult in the future. Addressing this need is the best way to ensure that all physicians, including general and trauma surgeons, remain engaged in the system. This approach is more logical than creating a new specialty that may appeal to some, but may also disenfranchise the many practitioners who currently provide the majority of emergency care. Fact or fiction? Only time will tell.

REFERENCES

1. Cutter CS: Nostalgia-the enemy of progress in the new era of surgery. **Bull Am Coll Surg** 91:11-12, 2006.
2. Esposito TJ, Leon L, Jurkovich GJ: The shape of things to come: Results from a national survey of trauma surgeons on issues concerning their future. **J Trauma** 60:8-16, 2006.
3. Esposito TJ, Rotondo M, Barie PS, Reilly P, Pasquale MD: Making the case for a paradigm shift in trauma surgery. **J Am Coll Surg** 202:655-667, 2006.
4. Institute of Medicine. *Hospital-Based Emergency Care: At the Breaking Point*. Washington, D.C., National Academies Press 2006.
5. MacKenzie EJ, Rivara FP, Jurkovich GJ, Nathens AB, Frey KP, Egleston BL, Salkever DS, Scharfstein DO: A national evaluation of the effect of trauma-center care on mortality. **N Engl J Med** 354:366-378, 2006.
6. Moore EE, Maier RV, Hoyt DB, Jurkovich GJ, Trunkey DD: Acute care surgery: Eraritjaritjaka. **J Am Coll Surg** 202:698-701, 2006.
7. Richardson JD, Miller FB: Will future surgeons be interested in trauma care? Results of a resident survey. **J Trauma** 32:229-233, 1992.
8. Rinker CF, McMurry FG, Groeneweg VR, Bahnsen FF, Banks KL, Gannon DM: Emergency craniotomy in a rural Level III trauma center. **J Trauma** 44:984-989, 1998.
9. Rodriguez JL, Polk HC Jr: Profitable versus unprofitable expansion of trauma and critical care surgery. **Ann Surg** 242:603-606, 2005.
10. Rotondo MF, Esposito TJ, Reilly PM, Barie PS, Meredith JW, Eddy VA, Rabinovici R, Jacobs LM, Cunningham PR, Frykberg ER, Rhodes M, Pasquale MD, Enderson BL, Locurto JJ Jr, Atweh NA, Ivatury RR: The position of the Eastern Association for the Surgery of Trauma on the future of trauma surgery. **J Trauma** 59:77-79, 2005.
11. Seaver MJ: Completing the Picture: AANS 2006 Workforce Survey Assesses Neurosurgical ER Coverage. **American Association of Neurological Surgeons Bulletin** 15:8-11, 2006.
12. Trunkey DD: What price commitment? **Bull Am Coll Surg** 88:8-16, 2003.
13. Wester K: Decompressive surgery for "pure" epidural hematomas: Does neurosurgical expertise improve the outcome? **Neurosurgery** 44:495-500, 1999.
14. Wester T, Fevang LT, Wester K: Decompressive surgery in acute head injuries: Where should it be performed? **J Trauma** 46:914-919, 1999.