Acute Care Surgery Survey

Opinions of Surgeons About a New Training Paradigm

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Hypothesis: The acute care surgery (ACS) 2-year training model, incorporating surgical critical care (SCC), trauma surgery, and emergency general surgery, was developed to improve resident interest in the field. We believed that analysis of survey responses about the new training paradigm before its implementation would yield valuable information on current practice patterns and on opinions about the ACS model.

Design: Two surveys.

Participants: Members of the Surgery Section of the Society of Critical Care Medicine and SCC program directors.

Interventions: One survey was sent to SCC program directors to define the practice patterns of trauma and SCC surgeons at their institutions, and another survey was sent to all Surgery Section of the Society of Critical Care Medicine members to solicit opinions about the ACS model.

Main Outcome Measures: Practice patterns of trauma and SCC surgeons and opinions about the ACS model.

Results: Fifty-seven of 87 SCC program directors responded. Almost all programs are associated with level I trauma centers with as many as 15 trauma surgeons. Most of these trauma surgeons cover SCC and emergency general surgery. Sixty-six percent of surgical intensive care units are semiclosed; 89.0% have surgeons as directors. Seventy percent of the staff in surgical intensive care units are surgeons. One hundred fifty-five of approximately 1100 Surgery Section of the Society of Critical Care Medicine members who responded to the other survey did not believe that the ACS model would compromise surgical intensive care unit and trauma care or trainee education yet would allow surgeons to maintain their surgical skills. Respondents were less likely to believe that the ACS fellowship would be important financially, increase resident interest, or improve patient care.

Conclusions: In academic medical centers, surgical intensivists already practice the ACS model but depend on many nonsurgeons. Surgical intensivists believe that ACS will not compromise care or education and will help maintain the field, although the effect on resident interest is unclear.


Recruitment of surgical residents into surgical critical care (SCC) and trauma fellowships has become increasingly difficult, leading to staffing concerns. The reasons include lack of performing operations, poor reimbursement, too much night work, and absence of prestige. More nonsurgeons may be required to staff surgical intensive care units (SICUs). There may be too few surgeons dedicated to trauma to adequately staff trauma centers. In an attempt to prevent this crisis, organizations have begun to consider changes in the fellowship training paradigms. The Careers in Trauma Committee of the American Association for the Surgery of Trauma (AAST) has consequently developed the acute care surgery (ACS) model, which incorporates SCC, trauma surgery, and emergency general surgery into a 2-year training program, anticipating that surgical residents will consider this training more favorably because of the increased surgical experience.

This new training paradigm may better match the current practice patterns of many trauma surgical services. Recognizing the real and perceived negative aspects of trauma care and SCC, many trauma groups have already added more emergency and elective general surgery to their practices. These changes have improved faculty job satisfaction and income. Hospitals may also benefit.

New training paradigms raise many questions. The Surgery Section of the Society of Critical Care Medicine (SCCM) sought to answer some of these ques-
tions in 2 separate surveys. One survey was sent to SCC fellowship program directors to describe what surgical groups at academic medical centers are already doing vis-à-vis the ACS model. Another survey was sent to all members of the Surgery Section of the SCCM to solicit opinions about the ACS model and training paradigm, focusing on the educational environment for ACS trainees, not the effect of ACS on practicing surgeons or on institutions.

**METHODS**

This study was approved by the Institutional Review Board of the University of Pittsburgh, Pittsburgh, Pennsylvania. No written informed consent was necessary for the surveys.

For the SCC program director survey, a request to participate was sent via e-mail in April 2007 to all directors listed by the Accreditation Council for Graduate Medical Education. They were instructed to complete the survey online. Two additional requests were sent to all directors. One additional request was sent only to directors who had not yet participated in the survey. Several directors inadvertently completed the survey more than once. Follow-up e-mails were used to clarify the information. The surveys included the program name, program director, and his or her IP address (to identify duplicate responses).

The first section of the survey asked questions about the faculty at the institution. The second section referred to the general SICU at the institution. The third section referred to a separate trauma intensive care unit (ICU) if the institution had one.

The other survey elicited opinions from surgical intensivists about the ACS model. All members of the Surgery Section of the SCCM were invited by e-mail in December 2006 to participate via an online survey. A reminder e-mail was sent. Because the responses were anonymous, there was no way to track who had or had not responded.

**RESULTS**

**SCC PROGRAM DIRECTOR SURVEY**

Representatives from 57 of 87 programs responded. Fifty-four SCC programs were associated with level I trauma centers, 2 were level II, and 1 was a nonlevel center. These centers had a mean (SD) of 6 (3) (maximum, 15) attending trauma surgeons. Ninety-five percent of trauma surgeons also covered SCC for a mean of 10 weeks per year. They took a mean (SD) of 6 (3) call nights per month, 72% of which were in the hospital. Eighty-nine percent also covered emergency general surgery at some point, 82% when on trauma call.

Sixty-six percent of SICUs were semiclosed, 20% were closed, and 13% were open. Eighty-nine percent had surgeons as directors. Seventy percent of the staff in SICUs were surgeons and 30% were nonsurgeons (21% anesthesiologists, 7% internists, and 2% emergency medicine physicians). Management of airways was split 50/50 between the critical care team and the anesthesiology service.

One-third of the programs had a separate trauma ICU. In this unit, 86% of the staff were surgeons, 70% of whom also covered the SICU at some point. In 41% of programs, the trauma ICU was covered by the attending trauma surgeon on call.

**MEMBER SURVEY**

One hundred fifty-five of approximately 1100 members of the Surgery Section of the SCCM responded to the survey. They disagreed with statements that any time-consuming aspects of the ACS model would compromise the care of ICU or trauma patients (Figure 1). They also tended to disagree with statements that the ACS model would compromise education by intensivists or by trauma surgeons.

The members were in strong agreement that the ACS model would allow surgeons the opportunity to maintain their surgical skills (Figure 2). Most believed that the model would contribute financially to the field. Overall, there was strong agreement that this model was important to the future of the trauma and critical care surgeon.

There seemed to be less agreement on the effect of the ACS model on recruitment of surgical residents into the field, as 48.4% of respondents agreed or strongly agreed that it would, whereas 29.0% disagreed or strongly disagreed (Figure 3). There was a similar trend of agreement about the potential benefit of this model on patient care.

**COMMENT**

**OVERVIEW**

We found that surgeons involved in trauma care and SCC at academic institutions with SCC fellowships have frequently taken on emergency general surgery at their institutions, consistent with the new ACS model. Members of the Surgery Section of the SCCM believe that adoption of this model will not compromise care or education and will help maintain the field. Opinions are mixed about how this will affect resident interest in the field.

**HISTORY OF SCC AND TRAUMA TRAINING**

The field of general surgery has become much more subspecialized as the body of knowledge has increased and surgical techniques have become more complex. Although many still strongly believe that trauma and SCC are core elements of general surgical residency education, both fields have developed into bona fide subspecialty practices. The practice setting varies based on hospital population, academic vs community locale, number of trauma admissions or ICU beds, professional interests, and relationships with other practitioners, particularly other critical care providers.

Surgeons have traditionally been involved with the care of the most critically ill patients; care of the critically ill surgical patient has long been a requirement of surgical training. Moore and Moore argued that surgeons must remain responsible for the critical care of their patients. Continuity of care is essential. To this end, surgeons must remain available or have other trauma surgeons or designated critical care teams managing their patients. The attending trauma surgeon must remain ultimately responsible for the patient, necessitating ongoing communication with surrogates. Moore and Moore further ar-
gue that surgeons must be involved in the administration of the ICU, preferably as director.

As critical care became more complex, the need for specialized training in critical care for interested trainees was clear. Because training programs in critical care were proliferating under sponsorship of the American Board of Internal Medicine and the American Board of Anesthesiology, the American Board of Surgery (ABS) determined that surgeons must do the same or risk being left out of the ICU. Consequently, the ABS began issuing Certificates of Added Qualifications in 1987.

The Residency Review Committee for surgery initially believed that SCC fellowships should be exclusively nonoperative. Trauma and burn fellowships would not qualify. At the same time, trauma leadership, including the American College of Surgeons Committee on Trauma and the AAST, believed that trauma care was so integral to general surgery that additional certification in trauma care was inappropriate.7 The ABS believed that a Certificate of Added Qualifications in SCC would allow surgeons interested in taking leadership roles in the ICU to do so but that, in general, surgeons should con-
Most programs reported that they did not meet the medical education–accredited SCC fellowship. Notably, programs had an Accreditation Council for Graduate Medical Education–accredited fellowship. Thirty-nine nations of SCC and trauma training. Only 6 programs responded. Training included various combinations of SCC training with trauma, burns, or transplantation fellowships. This change enabled programs to combine SCC training with trauma, burns, or transplantation fellowships if desired, although there were no specific stipulations about the content of the operative experience.

Training in trauma has not undergone the scrutiny that operative management to nonsurgeons. 

![Figure 3](image)

Figure 3. Respondents’ views on the effect of the acute care surgery model on resident interest in trauma and critical care (A) and on patient care in general (B).

Recruitment into these fellowships was difficult, in part, because they were nonoperative. In 1993, Steinberg et al found that two-thirds of surgical intensivists, many of them leaders in surgical education and in critical care, thought that the ban on operative experience during SCC fellowships limited interest in these fellowships. They also believed that alternative pathways to SCC certification (eg, trauma, burns, and transplantation fellowships) were appropriate. In 1993, the Residency Review Committee agreed to allow fellows to spend up to 25% of their time in operative experiences. This change enabled programs to combine SCC training with trauma, burns, or transplantation fellowships if desired, although there were no specific stipulations about the content of the operative experience.

Training in trauma has not undergone the scrutiny that an accreditation process imposes. Therefore, there have not been specific educational objectives or a defined curriculum for trauma training except for guidelines developed by the AAST and the American College of Surgeons Committee on Trauma. To obtain a profile of trauma fellowship training programs, Chiu et al surveyed all active trauma fellowship program directors. Fifty programs responded. Training included various combinations of SCC and trauma training. Only 6 programs were identified as trauma-only fellowships. Thirty-nine programs had an Accreditation Council for Graduate Medical Education–accredited SCC fellowship. Notably, most programs reported that they did not meet the trauma curriculum guidelines. Few had structured didactic curricula. Chiu et al found a “relative lack of distinction in fellowship programs identified as trauma, critical care, or trauma/critical care.”

CURRENT SITUATION

More than 15 years after these changes to SCC and trauma training, staffing concerns have been raised because of poor recruitment of residents into SCC and trauma fellowships. Factors cited by residents in a recent survey include the beliefs that trauma care has a negative effect on personal lifestyle, is overly labor intensive, involves too much night work, and is too nonoperative. For a trauma surgeon, elective surgical practice is difficult to maintain, and there is high medicolegal risk, increased chance of contracting disease, a high burnout rate, and insufficient remuneration for the amount of work and stress involved. The most pervasive issue was the lack of operative experience. An earlier survey of surgical residents found similar negative sentiments. Some of these factors may lead surgeons to switch their practices in mid-career to avoid trauma and critical care. Altering training programs may not prevent subsequent loss of interest unless the practice paradigm changes. A survey of members of the AAST, the Eastern Association for the Surgery of Trauma, and the Western Trauma Association found that almost 90% of respondents believed that their work was undervalued by society and by the healthcare system. Most thought that the discipline had to change. They recommended the addition of more general surgery and limited emergency orthopedic and neurosurgery procedures. Broad-based training was considered useful to trauma surgeons, although such comprehensive practices are rarely found. An effort to improve the public perception of the value inherent in trauma care was also recommended.

Surgeons like to operate, but it is true that SCC practice is inherently nonoperative; trauma call is increasingly nonoperative because of a decrease in penetrating injuries requiring surgery and an increase in nonoperative modalities to address even the most life-threatening injuries. In a survey of surgical residents in postgraduate years 3 through 5, Cohn et al found that only 21% expressed an interest in SCC. Fifty-six percent planned to handle SCC issues for their own patients, whereas 39% would allow an intensivist to manage their patients. The respondents believed that SCC fellowships would be more appealing if they included less SCC and more general surgery and trauma surgery, even emergency orthopedics and neurosurgery. Perhaps to the chagrin of traditional general surgeons, this fits in with the European model of focusing on the operative management of critically ill patients, while leaving nonoperative management to nonsurgeons.

The staffing issue in the ICU is compounded by a shortage of intensivists. The Committee on Manpower for Pulmonary and Critical Care Societies study estimated that the demand for intensivist care would start increasing faster than the supply in 2007, reaching shortfalls of 22% by 2020 and 35% by 2030. The Health Resources and Services Administration came to a similar conclusion that
the intensivist workforce will be insufficient by 2020 to provide the optimal level of care.

DEVELOPMENT OF ACS

To maintain their operative skills and reimbursement, many trauma groups have taken on responsibility for performing emergency general surgery.\(^1\) This has improved resident and faculty satisfaction\(^1\) and increased productivity of the surgeons, operating room, and ICU.\(^3\)

The addition of emergency general surgery to trauma and critical care has been proposed by several national organizations (AAST, Eastern Association for the Surgery of Trauma, and the Surgery Section of the SCCM), and the concept of ACS has emerged.\(^2\) Presidents of the AAST have emphasized the importance of general surgery, both elective and emergency, to the practices of trauma surgeons for career satisfaction.\(^3,9\)

The Committee to Develop the Reorganized Specialty of Trauma, Surgical Critical Care, and Emergency Surgery of the AAST, as well as the committee on Acute Care Surgery, described the challenges facing trauma and SCC.\(^1,2\)

Outlining the needs for moving forward with a new training paradigm, they recommended a 2-year training program with 9 months devoted to SCC (6 months of trauma-related critical care and 3 months of general surgery-related critical care) and 15 months of rotations on various surgical services, while taking trauma calls for a minimum of 12 months. The Eastern Association for the Surgery of Trauma strongly endorses these changes in the training paradigm but has also focused attention on the professional responsibilities, lifestyle constraints, and remuneration of practicing trauma surgeons to attract trainees to the field.\(^20\)

Although there is a defined body of knowledge and skills required of training in SCC as defined by the program requirements of the Accreditation Council for Graduate Medical Education, fellowship programs fulfill these requirements in different ways. In a 2006 study,\(^21\) the Surgery Section of the SCCM explored the current curricula in SCC programs to determine if they had already incorporated some of the recommendations related to ACS. Indeed, 79% include operative experiences, with approximately half of the experience in trauma and a quarter in emergency general surgery. Most critical care experiences were in general surgical or trauma ICUs.

The present study has important implications for future training paradigms in trauma and SCC. Training programs, particularly those with a second year of training devoted to trauma care, already include a substantial amount of emergency general surgery. They also include meaningful experience in the management of patients in general surgical ICUs. Inclusion of other surgical subspecialty ICU rotations varies. In designing the future training paradigm, experience in the care of diverse nontrauma surgical patient populations should be considered. This point is particularly important for trainees who may not choose to include trauma in their practices.

FUTURE OF ACS

Cryer\(^9\) noted that a major issue that needs to be addressed by the ABS’s Trauma, Burns, and Critical Care Advisory Council is the development of a standardized curriculum for the trauma and emergency general surgery component. The curriculum for SCC already in place for fellowship training would be incorporated into this new fellowship paradigm.\(^22\)

As training in ACS moves forward, accrediting bodies will need to develop appropriate educational requirements and clinical experiences to train these specialists, as well as to provide certification. So far, it seems that the ABS has not expressed an interest in accrediting ACS fellowships. The AAST has taken it on itself to do so. These discussions about trauma and SCC training may be timely as the ABS considers whether a modular format for surgical resident education should be developed to include a basic surgical core curriculum, followed by further training in general surgery or a surgical subspecialty that leads to relevant specific certification.\(^23\) Focused subspecialization could be available through postgraduate fellowships. Shortening the required general surgery training required before training in trauma and SCC, as in the ACS model, could appeal to many residents.

If changing the training paradigm does not increase the numbers of acute care surgeons and surgical intensivists, trauma groups may need to rethink the ACS model. To provide excellent patient care 24 hours a day, surgical groups may have to collaborate more directly with intensivists from other fields, including internal medicine, anesthesiology, and emergency medicine.

STUDY LIMITATIONS

The surveys herein have limitations that should be considered. This study focused on educational issues. The financial and institutional effects of the ACS model require further study. Also important would be the perspective of other stakeholders, including the lay public, nonsurgical specialists, and other health care professionals, as well as general surgeons uninvolved in critical care.

Regarding the SCC program director survey, the number of responses was good, but the data obtained about trauma and SCC may not be representative of all practices. Many trauma centers, particularly smaller rural centers, do not have SCC fellowship programs. A survey of these practices is warranted.

Regarding the survey of members of the Surgery Section of the SCCM, the number of responses was low. We can only speculate about the views of those who did not respond. Furthermore, the potential reasons for any effect of the ACS practice paradigm on education should have been explored in more detail.

CONCLUSIONS

Surgical intensivists believe that the ACS model will not compromise patient care or resident education and will help maintain the field. Opinions are mixed about how this will affect resident interest. Although we should support development of these training programs, just as other surgical societies have, recruitment of fellows and surgical intensivist and trauma surgeon job satisfaction should be gauged as we proceed. In academic medical
centers, surgical intensivists already frequently practice the ACS model but need many nonsurgeons to assist in the SICUs. Therefore, staffing is an issue, and the new ACS training paradigm may be on the right track. Time will tell.

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