Perceptions and Attitudes of Critical Care Training and Careers Among United States Surgical Residents: Who Wants to be a Surgical Intensivist?

STEPHEN M. COHN, M.D., MICHELLE A. PRICE, M.ED., RONALD M. STEWART, M.D., BASIL A. PRUITT, JR., M.D., DANIEL L. DENT, M.D.

From the Department of Surgery, The University of Texas Health Science Center at San Antonio, San Antonio, Texas

Less than 50 per cent of surgical critical care (SCC) fellowship positions are filled each year. We surveyed senior surgical residents to determine their opinions regarding a career in SCC and acute care surgery. A survey was sent to 1348 postgraduate year 3, 4, and 5 residents in the United States. Two hundred fifty-one surveys were returned (19% response rate). Whereas 78 per cent were planning to complete a fellowship, 21 per cent expressed interest in SCC. Fifty-six per cent plan to handle SCC problems only for their own patients, whereas 39 per cent plan to turn this management over to a critical care provider. SCC fellowships were considered to be potentially more appealing if the following changes could be made to the existing structure: adding more general surgery (70% of respondents); adding more trauma experience (50%); adding emergency neurosurgery (44%); adding more emergency orthopedics (42%); or decreasing months of critical care (36%). Increasing salary enhanced appeal for 82 per cent. SCC has limited appeal for most senior surgical residents. Theoretical expansion of surgical critical fellowships to include more general or trauma surgery (acute care surgery) increased the level of interest among senior surgical residents.

Surgical critical care (SCC) training represents a relatively small portion of fellowships among graduates of general surgical residencies (Fig. 1). More than 70 per cent of general surgical residents pursued a fellowship program in 2004, but only 13 per cent chose SCC. In the last 2 years, many SCC programs did not match anyone, and half of the positions went unfilled (Table 1). Recently, there has been increasing interest in expanding the scope of practice of those in the trauma and SCC field to place a greater emphasis on acute management of general surgical emergencies and include a wider array of trauma experiences (such as orthopedic and neurosurgical interventions).

A number of investigations have explored the attitudes of practicing surgeons and residents toward trauma care. Various surveys have established the predominant viewpoint that care for the injured is frequently complex, quite time consuming, and is often nonoperative in nature. Trauma care is also felt to be poorly compensated, associated with an increased risk of litigation and disruptive to elective surgical practice. In addition, conflicting lifestyle issues are often cited, such as trauma care being disruptive of personal life, requiring considerable nighttime work, and providing little emotional satisfaction. These perceptions have led many in the trauma field to express concerns about the competence of future surgeons to manage the occasional catastrophic injury that requires broad experience, technical expertise, and sound judgment. Little information exists specifically in the area of SCC. We sought to understand the prevailing attitudes of surgical residents in regard to SCC and SCC fellowships, and to ascertain the impact of adding an acute care surgery component to the fellowship programs. We surveyed senior general surgical residents to determine their inclination toward a career in SCC.

Methods

Participant Recruitment

We developed a list of general surgery residency programs from the Graduate Medical Education Di-
We attempted to contact 248 active general surgery residency programs via e-mail to the program directors explaining the study purpose and requesting that they agree to forward the survey invitation to their residents (three e-mail messages). We then attempted to contact the residency program directors or coordinators who had not responded via telephone and a follow-up e-mail message. Of the 248 programs contacted, 84 programs agreed to forward the survey invitation to their third, fourth, and fifth year residents (a total of 1348 residents). Twenty-six programs chose not to forward the invitation and the remaining 138 programs did not respond.

**Instrument Development**

The 67-item instrument queried residents' training in SCC during their residency program, confidence in managing SCC patients, interest in SCC as a career, interest in completing a SCC fellowship, positive and negative aspects of SCC as a practicing surgeon, and perceptions of SCC faculty. The survey also contained demographic items and questions regarding educational debt level and the impact of debt on career and personal decisions. Several items were adapted from Richardson and Miller's 7 resident survey on trauma care, including the positive and negative factors regarding SCC and interest in SCC as a career choice.

**Survey Method**

The survey was administered via a web-based survey service. The program directors sent an institutional review board-approved e-mail invitation to their third, fourth, and fifth year general surgery residents. There was a URL that linked the resident directly to the survey site. All of the surveys were collected without identifying information, therefore it was not possible to send second requests to nonresponders. The survey responses were collected between February and May 2006. The protocol was reviewed by the Institutional Review Board of the University of Texas Health Science Center at San Antonio (#PRO00000546).

**Results**

**Demographics**

Of the 1348 residents who received the invitation to participate in the survey, 251 general surgery residents completed the online survey (19%). There was an equal distribution of responding residents at the postgraduate year 3, 4, and 5 levels. Men predominated (73%). Most of the group (82%) was 25 to 34 years of age, whereas 18 per cent were older. Seventy per cent were White, 15 per cent were Asian, 7 per cent were Hispanic, and 2 per cent were Black. The respondents were most likely living in medium or large urban centers (76%). Private practice was the planned practice setting for 39 per cent, academic medicine was the plan for 32 per cent, and community medicine was the plan for 16.3 per cent.

**SCC Resident Training**

Ninety-five per cent of respondents stated that there was a dedicated rotation in SCC during their residency. This occurred in the second year of training for 93 per cent of respondents. A SCC fellowship was present in 52 per cent of institutions where responding residents trained.

Senior surgical residents were polled regarding their comfort in caring for specific critical care issues. Most respondents (≥90%) were at ease in caring for complex issues such as volume ventilation, pressure control ventilation, septic shock, acute renal failure, multiple organ failure, or acute myocardial infarction. Less were confident (≤80%) in caring for severe acute respiratory distress syndrome, large pulmonary embolus, severe brain injury, cardiogenic pulmonary

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edema, and hepatic failure. Many senior residents stated they were not comfortable caring for patients with airway pressure release ventilation (53%) or inhaled nitric oxide therapy (72%).

**SCC as a Career**

SCC was not attractive to 57 per cent of the senior surgical residents who responded to our survey. Respondents felt that the field was rewarding (68%) and attractive (65%) to others. Seventy-five per cent of respondents stated that they were somewhat interested to very interested in surgical critical care (Fig. 2), but only 31 per cent wanted SCC as a major part of their surgical practice. Serving as a critical care consultant to colleagues was felt to be undesirable to 55 per cent of respondents. Fifty-six per cent of respondents plan to handle critical care for their own patients, whereas 39 per cent plan to relinquish care to a critical care provider. Approximately one-quarter (26%) were willing to provide in-house call as an attending surgical intensivist, and about half (48%) felt that they would be more likely to do this if they completed a SCC fellowship. Seventy-five per cent of senior surgical residents felt that SCC is already lost to medical intensivists.

Seventy-eight per cent of senior surgical residents responding to this survey were planning to complete a fellowship, with 21 per cent interested in completing a SCC fellowship (Fig. 2). Those individuals interested in completing a SCC fellowship felt it would help them in their surgical practice in the following ways: 1) Practical use in caring for their own patients (86%); 2) Keep options open in an unpredictable practice environment or in the case of physical disability (65%); and 3) Prevent exclusion from care for their patients in the intensive care unit (73%).

When polled on the impact of various potential modifications of the SCC fellowship, the response was as follows: more general surgery increased the appeal of SCC fellowships among 70 per cent of respondents; more trauma increased the appeal among 50 per cent; more emergency neurosurgery increased the appeal among 44 per cent; more emergency orthopedic surgery increased the appeal among 42 per cent; fewer months of critical care increased the appeal among 36 per cent, more research increased the appeal for SCC in 16 per cent; and a higher salary increased the appeal of SCC fellowships for 82 per cent (Fig. 3). The match process was felt to have little impact on the application process in SCC by 59 per cent of residents responding to our survey.

Respondents rated the five most important positive and negative factors regarding a career in SCC. The factors and score weighting system were adapted from those used by Richardson and Miller. The responses were weighted in order of decreasing importance, with a score of 5 given to the first-ranked item, 4 to the second-ranked item, 3 to the third, 2 to the fourth, and 1 point to the fifth. The highest-ranked positive as-
pects of SCC were intellectually challenging and stimulating; enjoyment of SCC; sense of duty to care for the critically ill; and SCC training (Fig. 4). The highest-ranked negative aspects were a lot significant work and few operations; detraction from elective surgery; the large amount of night work; and other specialty interests (Fig. 5).

The predominant model for SCC at the institutions of respondents was that of trauma surgeon intensivists (80%), with nontrauma surgeon intensivists being less common (9%). Fifty-six per cent of SCC faculty appeared to be satisfied and happy, and 62 per cent were thought to be proficient in the operating room. Sixty-five per cent were recognized as positive role models for the residents.

Discussion

The principle finding of our study was that 80 per cent of senior general surgical residents do not find SCC fellowships attractive. Adding components of acute care surgery, such as more emergency general surgery, more trauma surgery, or more emergency orthopedic or neurosurgery, increased the desirability of this fellowship. Our findings are consistent with previous studies that have focused primarily upon trauma care: the field is primarily nonoperative (we recently demonstrated a decrease in trauma operative experience among our surgical residents of 80% over a 15-year period), it detracts from elective surgical practice, it involves significant nighttime work, and it may generate conflicts with referring medical specialists and surgical colleagues. Trauma surgeons themselves feel that lifestyle issues are problematic and that their practice has a limited scope.9 Ninety per cent of trauma surgeons feel that their work is undervalued by society and the health care system, and most feel that the discipline of trauma surgery must change.

There are several limitations of this study. First, this is a convenience sample of residents who responded to one e-mail invitation to complete the survey. We were only able to invite residents from 81 of the 248 general surgery residency programs because program directors elected not to participate or not to respond to our repeated requests for participation. The sample may not be representative, therefore, of all general surgery residents, and may have been biased in some way by the residency program directors that permitted their residents to participate. In addition, only about 20 per cent of the residents queried responded to our survey. There may have been a selection bias in that residents who were more interested in SCC opted to complete the survey. Second, we did not determine the magnitude of influence of SCC practitioners as inspiring role models for resident trainees. It is our contention that programs that provide fine professional examples of successful SCC faculty are more likely to produce residents interested in the field. Third, it is unclear whether or not inclusion of orthopedic or neurosurgical procedures would lead to competent performance of these procedures or sustained participation in these areas. As there are strong considerations for expanding SCC to include trauma and emergency general surgery, we felt that this would be an interesting question to ask. Fourth, the apparent “desirability” of SCC fellowships is determined at least in part by the number of positions available. If there were only a few dozen positions, as in Pediatric Surgery, the competitiveness of this fellowship would likely be increased. Finally, we did not compare the interest of senior residents in other fellowships with that of SCC. Cardiac surgical fellowships, for example, are going unfilled now and most clinicians would agree that the desirability of this field has diminished over the last decade. Cardiac surgical fellowships may undergo some size reduction to maintain appropriate patient volume and fellow quality. Perhaps SCC should adapt in a similar fashion.

Based upon the 2003 Leapfrog Group’s Patient
Safety Practices white paper, there are 1,864,664 adults admitted to urban intensive care units each year in the United States. There are currently 2,178 SCC-certified diplomats and 985 who have been recertified. Certainly, it would not be possible for surgeon intensivists to care for more than a small part of the large total number of critically ill patients. Fellowship-trained surgeons typically gravitate to positions of leadership at academic medical centers or in trauma centers where they can integrate their critical care time with the provision of emergency general and trauma surgery. In our survey, we found that the trauma surgeon intensivists are the predominant (80%) model at most training institutions. SCC fellowships must continue to produce clinician educators and clinician scientists to maintain this leadership role.

Unfortunately, the large number of SCC fellowship positions appears to have far outstripped the demand for these spots and has led to the current environment where less than half of positions are filled each year. At present, most programs require merely board eligibility as the acceptance criterion for their SCC fellows. It will be important to enhance SCC fellowships to increase their professional attractiveness and generate more applicants. In our survey, 20 per cent of the respondents felt that SCC faculty members were unhappy, and the same percentage rated surgical intensivists as not proficient in the operating room. Another method of enhancing SCC would be to address the perceived negative factors by changing policies that have lead to poor reimbursement, increased risk of litigation, and patterns of practice that disrupt elective surgical practice. If we address these fundamental characteristics of SCC that are unattractive to potential practitioners, we may be able to reinvigorate the specialty.

In 1992, Drs. Flint and Carrico reported on the changes that were needed to improve the quality and attractiveness of SCC fellowships. These changes were intended to provide greater flexibility in the organization and conduct of fellowships, and to increase the amount of trauma and general surgical operative time permitted without detracting from the critical care experience. We have a number of suggestions to further increase the desirability of SCC fellowships. First, we feel that SCC fellowships should encompass an integrated year that includes sufficient operative experience and independence to be considered desirable by board-eligible general surgeons who likely just completed a chief residency year. Second, there should be an option for a second year of the fellowship during which the trainees can complete a 2-year Master’s degree (MPH or Master’s in Clinical Investigation) that will increase the likelihood of attracting candidates interested in translational research. These second-year fellows should be treated as a junior faculty (Instructor status with appropriate financial compensation), with independent operating privileges. Two-year candidates should be provided with sufficient mentorship to promote their research capabilities, ultimately facilitating their evolution into clinician educators and scientists. Finally, the Residency Review Committee (RRC) guidelines for accreditation should be raised so that fellowships are confined to institutions that can provide a high operative volume, a truly superlative critical care experience (which would substantially add to the already extensive experience required during surgical residencies), and excellent research mentorship. The number of programs and potential positions in the United States should therefore be reduced. This may increase the appeal of SCC fellowships, heighten competitiveness of applicants, and elevate the surgical intensivists’ status in the medical community.

REFERENCES