



# Chapter 16

## The Future of Acute Care Surgery: From Divergence to Emergence and Convergence

### The Evolution in General Surgery Continues

**Steven D. Schwartzberg**

In the beginning, there were just surgeons who did it all. With all due respect to Ambrose Pare the sixteenth century giant of the battlefield, the dawn of modern surgery is the late 1700s and early 1800s. This era was witnessed by the challenges and struggles of the preanesthetic and pre-antibiotic era. Nearly all care was acute care. Elective surgery was less common. Surgeons were measured by their daring and moreover their speed. Our forebearers operated at such lightning speed that incisions were not only made in the patients, but also to the assistants and the

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S. D. Schwartzberg (✉)

Department of Surgery, University of Buffalo, Jacobs School of Medicine, Buffalo, NY, USA

Biomedical Sciences, The State University of New York, Buffalo, NY, USA

e-mail: [schwartz@buffalo.edu](mailto:schwartz@buffalo.edu)

surgeons themselves. Infections were fatal unless the supuration drained spontaneously or by the knife. Pus was laudable, actually a good sign in the eyes of many surgeons of the day.

Despite some early specialists like obstetricians William Hunter (brother of John Hunter who is often regarded as the father of modern surgery) in the Scotland and Meigs in Philadelphia, most surgeons did it all. They set fractures, removed bladder stones, repaired hernias, and performed a thyroidectomy. As anesthesia and sterile technique made abdominal procedures feasible, we entered the abdomen and the chest with vigor. The rise of institutions like the Johns Hopkins Hospital under the leadership of the visionary and sadly drug addicted, William S. Halsted, the splintering of surgery began to take hold. Still one trained to be a surgeon and then went off to study with giants such as Harvey Cushing (neurosurgery) or Hugh H. Young (urology) who themselves started as general surgeons and were either assigned or found their passion in a particular area.

All through the 1940s to the 1980s, many surgeons had crossover interests. I had the unique opportunity to have an extended conversation with Michael E. DeBakey, the legendary cardiac surgeon who spoke fondly of organizing care for the injured soldier in World War II and the management of amoebic abscess as a young attending at the Ochsner clinic where he wrote the seminal paper on the topic. John Border, one of the fathers of modern trauma surgery, is revered by general and orthopedic surgeons alike where his career is memorialized in the annual Border Lecture hosted by both surgery and orthopedics in alternating years at the University at Buffalo. Today it is a rare trauma surgeon who would pin his own patient's fracture.

Severe super specialization in surgery is a fairly recent phenomena and there are both good and other consequences of these forces. No one argues that best in class outcomes are associated with volume and repetition although sufficient outcomes can be achieved in many procedures without needing different surgeons to repair right versus left groin hernias.

This specialization has created silos and truly calls into question, how many general surgeons do we have and how many do we need? For my money, if you do not take at least acute care (but not necessarily trauma) call, then you are not a “general surgeon” for headcount and workforce assessment purposes regardless of holding an American Board of Surgery certificate. A hospital can stay open without a bariatric only, colorectal only, endocrine only, transplant only, or even a breast/surgical oncology only surgeon, but if these folks don’t or won’t take call and there is no one to do an appendectomy, the doors will close since the top seven surgical mortalities are all related to emergency general surgery. The diverging pathways of these surgeons has led to radical change in the last 20 years where many who hold ABS certificates simply state they will not take night call outside of their narrow vertical sliver of care.

This set the stage for two specialist groups laying claim to the title of *general surgeon* in addition to those who went directly from training into practice. They are the trauma surgeons creating a new moniker in the form of acute care surgery led through the efforts of groups like AAST or EAST and the MIS type surgeons who operate all over the body led by SAGES and others. There are both intended and unintended consequences of the emergence of these two groups that has led me to the conclusion that at least some convergence is needed among them.

The arrival of the acute care service was propelled by a number of forces. (1) Trauma and/or ICU surgeons (including me in my first iteration) were doing less and less operative surgery particularly as trauma care became increasing nonoperative. In 2005 the Denver group writing to inspire change, “To resurrect our discipline, we must reclaim and expand our operative potential and be relieved of our excessive night and weekend burden of serving as housestaff for the neurosurgeons, orthopedic surgeons, and interventional radiologists. The trauma surgeon can effectively manage trauma and acute care surgery emergencies including thoracic and vascular conditions. Education of the future trauma and acute care

surgeon must include specialty training in thoracic and vascular surgery” [1]. (2) Subspecialists were refusing to take general call citing they were becoming increasingly “uncomfortable” managing patients coming through the emergency room. (3) The lack of surgeons to take call created a lever to motivate hospitals to pay for call coverage creating the financial headroom to create a sustainable service. No model is perfect and there are problems associated with this new type surgical care. The nature of the training in trauma and ICU did not leave much time to build expertise in MIS techniques in these acute cases. That expertise existed on other services. Questions arise such as who is best to do a difficult laparoscopic cholecystectomy? Is it the acute care trauma-based surgeon that night or the experienced MIS surgeon the next day? Answers vary; however if acute care surgeons are going to manage these patients, then the operative technical skills not common to trauma/ICU curriculums need to be taught after training or in settings where they congregate for education. Considerable scrutiny of the acute care model ensued after the initial push forward. In 2008 only 18% of Level 1 Trauma Center performed the full range of proposed procedures [2]. On the flip side, critically ill surgical patients are increasingly managed in closed ICUs staffed by their acute care colleagues. Surgeons taking general surgery call who accumulate patients late in the evening before a busy elective schedule benefit from an acute care service willing to take over their care. Hospitals see this as a benefit as well by maintaining an efficient OR schedule. Despite considerable rebranding of trauma surgeons to ACS surgeons in the subsequent years, diffusion is modest. A 2018 survey of more than 2800 hospitals in the United States noted that only 16% had an acute care service [3]. Further adoption may be facilitated by seeking out additional opportunities for convergence as seen in patients with small bowel obstruction, diverticulitis, acute cholecystitis, and non-ICU pancreatitis. These case types point out a potential continuity weakness in the ACS model in some sites where it is conceivable that difficult cases that are not quite sick enough to warrant an emer-

gent operation are “passed on” to the next shift delaying care due to a lack of ownership. Surgeons in practice often have no one to pass the cases to and are motivated to intervene before the patient becomes too ill since they will have to deal with the problem either way.

In other words, acute care services need to hone their minimally invasive techniques, and surgeons in practice need to collaborate with these teams to lend their expertise and continuity of practice to optimize patient care. These conversations could be facilitated by intersociety collaboration at annual meeting or specific postgraduate courses bilaterally sponsored. A case in point could be seen in the performance of laparoscopic cholecystectomy. While this is a commonly performed procedure in general surgery training, it was demonstrated that younger surgeons have a threefold higher incidence of bile duct injury than their more experienced colleagues [4]. These data highlight the need for the safe cholecystectomy task force developed by SAGES. All surgeons performing cholecystectomy benefit from this education, and it would be a waste of resources for an ACS group to duplicate these efforts – these groups must collaborate. As early as 1995, trauma surgeons have been using portable ultrasound in the abdominal and thoracic evaluation of the injured patient [5]. Today it is a common modality used in most emergency departments. General surgeons in practice would be well served and learning these techniques, and are most likely to do so from their acute care colleagues.

One of the significant components of acute care and emergency services involves the use of endoscopy in the management of gastrointestinal bleeding, esophageal obstruction, and ICU services such as feeding access. In hospitals with full-service medical or surgical endoscopy teams, it is less likely that the ACS surgeon will be called upon to perform endoscopy for bleeding or obstruction scenarios. However, many of us notice an increasing movement of gastroenterologists from hospital-based endoscopy to privately owned ambulatory centers where many of the gastroenterologists have almost no hospital involvement and thus have avoided

the emergency call schedule. Carried to an extreme the ACS surgeon of the future may need to add the skills to their ever-increasing armamentarium. Where will the management of a gastrointestinal bleeder be taught? There is not a preponderance of ACS surgeons with this skill set. Current graduates of surgical residencies are required to pass the Fundamentals of Endoscopic Surgery Curriculum. Unfortunately, this curriculum does not create proficiency in the manage of gastrointestinal hemorrhage. Further training would be mandatory and will come from collaborative opportunities developed should the need arise. Groups like SAGES or ASGE or the American College of Surgeons will need to collaborate with ACS surgeons to assist in providing these skills.

As newer technologies come in to play such as robotics, the ACS surgeon will need to be selective as to which arrows to add to his or her quiver. Robotic surgery is such a case in point. The diffusion of robotics and to the general surgery practice has certainly exploded and in recent years on an elective basis. This technology is being used in diverticulitis, acute cholecystitis, bowel resection, hernia, and the like. Robotic technology has certainly been enabling for surgeons such as urologist to perform complex prostate resection without an extraordinary skill set in laparoscopy first. One must wonder if this evolution will be applicable to the acute care surgeon. It may in fact be a straighter line to skip attempts at laparoscopic colectomy and move straight to robotics. Significant competition for console-based and handheld robotic systems is approaching rapidly. This is a broad philosophic question for the leadership of acute care surgical services since most residents do not come out with qualification certificates at this point in history on any robotic system.

This ever-expanding skill set which already requires so many skills in general, vascular, neurosurgical, orthopedic surgery truly represents a training challenge for the future. Adding additional endoscopic or robotic skills may require the training period to expand or force those who want to go into the specialty to do an additional fellowship to function

optimally in selected environments. Without a doubt it seems this group of surgeons may in fact follow the adage “everything old is new again” returning to our roots where general surgeons do it all.

## References

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