What's New in General Surgery: Critical Care and Trauma

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There have been a number of major developments in critical care and trauma in 2004, ranging from new research findings to critical care workforce issues and discussions regarding optimal education and training in trauma and surgical critical care. We have made great advances in a number of areas, and additional initiatives to expand research efforts in trauma and critical care are ongoing.

Research

There are a number of obstacles to performing clinical trials and outcomes studies involving critically ill and injured patients with complex syndromes that currently lack effective treatments. The Canadian Critical Care Trials Group and the Australia and New Zealand Intensive Care Society Clinical Trials Group have established comprehensive research efforts in this regard. The Acute Respiratory Distress Syndrome (ARDS) Clinical Network (ARDSNet) was the first organized US national effort to conduct multicenter clinical trials in critical care, established in 1994.[1]

The US and Canada launched a major collaborative research program in 2004. The leading federal health research agencies in the US and Canada—the National Institutes of Health (NIH) and the Canadian Institutes of Health Research (CIHR)—formed a partnership to advance research in cardiovascular and respiratory diseases.

Three research programs were initiated in 2004, including "Clinical Research Consortium to Improve Resuscitation Outcomes," which will address novel strategies to resuscitate heart attack and trauma patients. This is the first organized multicenter effort to perform resuscitation research in trauma in the US. The Resuscitation Outcomes Consortium (ROC) consists of 10 Regional Clinical Centers and a Data and Coordinating Center that will provide the necessary infrastructure to conduct multiple collaborative trials to aid rapid translation of promising scientific and clinical advances to improve resuscitation outcomes. The ongoing direct study commitment of the sponsors is for at least 5 years of funding at approximately $10 million per year. Information regarding the specific participating centers can be obtained on the ROC Web site.[2] Others contributing support to this initiative include the US Department of Defense, other institutes within the NIH, the Institute of Circulatory and Respiratory Health from the Canadian Institutes of Health Research, the Canadian Defense Research and Development Program, and the National Institute of Neurological Disorders and Stroke.

There is significant concern that it has become increasingly difficult to conduct clinical research in trauma and critical care, and that it may negatively impact on future efforts.[3] Difficulties in obtaining patient or surrogate consent and in determining the standard of care for the control group are relevant issues.[4] An important statement from the American Thoracic Society regarding the ethical conduct of clinical research involving critically ill patients was published in 2004, providing some principles and guidance in this difficult area.[5]

Education and resident training

The Guidelines for Critical Care Medicine Training and Continuing Medical Education were published this year by the American College of Critical Care Medicine.[6] Guidelines for the continuum of education in critical care, from residency training through specialty training and ongoing through practice, will facilitate standardization of physician education in critical care medicine.

The future of trauma care as a specialty and the optimal training paradigm for those interested in trauma and surgical critical care have come under great scrutiny. In 2004, a number of national organizations established an initiative to collaborate and coordinate with all of the professional societies that represent surgical critical care, trauma, and acute surgery. This effort includes the American Board of Surgery, American Association for

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Abbreviations and Acronyms

CCM = critical care medicine
CRB = catheter-related bacteremia
ECG = electrocardiographic
HBOC = hemoglobin-based oxygen carrier
HR = hazard ratio
NPPV = noninvasive positive pressure ventilation
NTDB = National Trauma Data Bank
PEEP = positive end-expiratory pressure
rFVIIa = recombinant factor VIIa
TBI = traumatic brain injury
TRISS = Trauma and Injury Severity Score
VAP = ventilator-associated pneumonia

the Surgery of Trauma, the American College of Surgeons Committee on Trauma, the Eastern Association for the Surgery of Trauma, the Surgical Section of the Society of Critical Care Medicine, the American Burn Association, and the Western Trauma Association. These organizations are examining options for linking the specialties of general surgery, trauma surgery, and surgical critical care to create a career practice model for the future.

Critical care workforce and manpower issues

The US is currently facing an unprecedented, and largely unrecognized, shortage of physicians trained to provide critical care services. This is one of the most pressing issues affecting the future of our aging population and American medicine. As initially described in a study by the Committee on Manpower for Pulmonary and Critical Care Societies (COMPACCS), future demand for critical care services in the US will soon exceed the capabilities of the current delivery system.[7] The most alarming problem is the anticipated shortage of healthcare professionals practicing critical care.

This past year, the four major critical care societies in the US (American Association of Critical Care Nurses, American College of Chest Physicians, American Thoracic Society, and Society of Critical Care Medicine) united in their efforts to address the shortage of healthcare providers who care for the critically ill.[8] The Critical Care Workforce Partnership was established and the recommendations for actions were reported by the FOCCUS (Framing Options for Critical Care in the United States) Task Force.[9] An additional publication outlined federal policy initiatives to address the shortage of critical care providers.[10]

Numerous studies demonstrate that critical care services directed by physicians formally trained in critical care medicine reduce mortality in the ICU and reduce health-care costs. To address the shortage, the critical care professional societies recommend that steps be taken to improve the efficiency of critical care providers, to increase the number of critical care providers, and to address the demand for critical care services.

Critical care use in the US

A recent analysis of nonfederal acute care hospitals in the US documented that the number of hospitals offering critical care medicine (CCM) between 1985 and 2000 decreased by 13.7% (4,150 to 3,581). Also, total hospital beds decreased substantially, by 26.4% (889,600 to 654,400) in these hospitals. In contrast, CCM beds increased by 26.2% (69,300 to 87,400) and CCM bed costs per day increased by 126% ($1,185 to $2,674 US). Although CCM costs increased by 190.4% ($19.1 billion to $55.5 billion US), the proportion of national health expenditures allocated to CCM decreased by 5.4%. In 2000, CCM costs represented 13.3% of hospital costs, 4.2% of national health expenditures, and 0.56% of the gross domestic product. These authors concluded that CCM is increasingly used and prominent in a shrinking US hospital system.[11]

The Leapfrog Group has recommended that implementation of the Intensive Care Unit Physician Staffing be standard in all hospitals.[12] The ICU Physician Staffing standard requires that intensive care units have a dedicated intensivist present during daytime hours. Outside of these hours, an intensivist must be immediately available by pager, and a physician or "physician extender" must be in the hospital and able to immediately reach intensive care unit patients. Research shows that if the first three leaps (Computer Physician Order Entry, Intensive Care Unit Physician Staffing, and Evidence-Based Hospital Referral) were implemented in all urban hospitals in the US, we could save up to 65,341 lives and prevent as many as 907,600 serious medication errors each year.

A recent study using financial modeling examined hospital costs and savings over a 1-year period of implementing the ICU Physician Staffing standard compared with the existing standard of nonintensivist staffing in adult ICUs using published data for nonrural hospitals.[13] Cost savings ranged from $510,000 to $3.3 million US for 6- to 18-bed intensive care units. The best-