

James C. Eisenach, M.D., Editor

International Trauma Anesthesia and Critical Care Society (ITACCS). Mainz, Germany. May 4–6, 2000.

TraumaCare 2000, the 13th Annual Trauma Anesthesia and Critical Care Symposium, was hosted by the Johannes Gutenberg University, Mainz, Germany. The meeting was attended by approximately 450 anesthesiologists, surgeons, emergency medicine physicians, certified registered nurse anesthetists, paramedics, and intensivists from 26 countries. Emphasis was placed on an interactive format in lectures, workshops, and round table discussions. Experts presented topics on all aspects of the "trauma chain"—from injury to hospital discharge—with an emphasis on recommendations culled from evidence-based medicine.

The history of trauma anesthesia was presented by C. Grande (USA), executive director of the International Trauma Anesthesia and Critical Care Society. From prehistoric time to the present, the greatest advances in the management of trauma have occurred after wartime activities. With modern technology, it is clear that trauma is becoming less of a surgical disease and more of a critical care issue. Dr. Grande concluded by suggesting that we are only at the beginning of the history of trauma anesthesia.

The symposium attendees were honored by a special lecture given by distinguished Professor P. Safar (USA) on hypothermia and trauma. He suggested that the goals are protection (before injury), preservation (during injury), and resuscitation (after injury) and discussed data supporting these views. One must distinguish between accidental, spontaneous, uncontrolled hypothermia (bad) and therapeutic, induced, controlled hypothermia (good). Uncontrolled hypothermia can increase, not decrease, oxygen consumption, but controlled hypothermia results in no tissue damage. Dr. Safar suggested that future resuscitation potential for traumatic arrest includes induced hypothermia for out-of-hospital arrests and arterial cannulation with rapid instillation of coronary or cerebral flush "cocktails" for in-hospital arrests.

A session on the pathophysiology of trauma began with a discussion by M. Bauer (Germany) about his research on the limits of oxygen uptake and delivery, in which he showed the occurrence of stagnant flow in the microcirculation when mean arterial pressure reaches 30 mmHg. The mediators generated during this process likely explain the systemic instability seen with reperfusion injury. J. Nolan (United Kingdom) attempted to define the critical threshold of blood flow after traumatic injury. After a thorough review of the current literature, he concluded that the markers we use (*i.e.*, vital signs, cardiac index, oxygen delivery, mixed venous oxygen saturation, and lactate) are likely inadequate indicators of acceptable flow. C. Mackenzie (USA) discussed optimal hemoglobin and cardiac output and suggested that extremely low hemoglobin levels (< 5 mg/dl) may be tolerated. This concept will be investigated in a multicenter, randomized, controlled trial that will begin this year. F. Della Corte (Italy) presented neuropathophysiology changes after primary and secondary brain injury and reported that the neurologic "ABCs" (antioxidants, barbiturates, calcium antagonists) have been disappointing and that we must continue to support the traditional "ABCs" and maintain cerebral perfusion pressure.

A review of the literature by H. Kuhnigk (Germany) and a report of German experience suggest improved survival when prehospital systems are developed formally. Successful airway management explains much of this outcome, but it is interesting that there is no correlation between desired arterial carbon dioxide tension in the field and actual arterial carbon dioxide tension at arrival in the emergency department, based on manual minute ventilation techniques. Data from surgery, including thoracotomy and cesarean section performed in the field in the civilian setting, were presented by T. Silfvast (Finland). Survival for both was low. R. Hahn (Sweden) addressed fluid resuscitation, including a recently published nomogram¹ for infusion time and rate to achieve steady-state plasma distribution. Small amounts of hypertonic

fluids have a volume-expanding effect similar to that of several liters of crystalloid and remain intravascular longer. In uncontrolled hemorrhagic shock models, attempts to restore normal blood pressure yielded a worse outcome, but a decrease in the dose (1 ml/kg) over a longer period improved survival. Dr. Hahn concluded that we should "promote survival, not circulation."

J. Berman (USA) reviewed the advantages and pitfalls of classic and newer endpoints of resuscitation in trauma. No single method predicts adequate resuscitation consistently and reliably; however, a combination of at least two measures (*e.g.*, serum lactate, base deficit, intramucosal pH) provides an adequate determination. In a discussion of hypertonic solutions, U. Kreimeier (Germany) focused on Rescue-Flow[®] (BioPhausia, Uppsala, Sweden), a hyperosmolar isoosmotic fluid containing 6% dextran 70 and 7.5% NaCl. This product is administered by rapid intravenous infusion in a single 250-ml dose, which should be followed immediately by isotonic fluids. The biomedical application of artificial oxygen carriers, described by K. Waschke (Germany) include fluid resuscitation from hemorrhage, perioperative hemodilution, and organ preservation. These fluids are manufactured by isolating hemoglobin from sources such as outdated human red blood cells, bovine blood, and protein engineering. Exploring patient outcomes after use of various volume resuscitation regimens, C. Menckhoff (USA) listed questions that persist in this area of trauma care: What blood pressure (40 *vs.* 60 *vs.* 80 mmHg) is the most desirable target? For what types of injuries does delayed resuscitation work best? What method of fluid resuscitation is most appropriate for patients with head injury? If a device for monitoring gastric intramucosal pH can be developed, under what circumstances should it be used?

Critical care in the next millennium was discussed by M. McCune (USA), who suggested that regionalization of critical care with the use of telemedicine, increased use of DNA technology for drug development, and use of less invasive and more portable devices in the ICU will direct care. Current advances include a medical emergency team introduced by M. Parr (Australia). Most in-hospital cardiac arrests can be predicted by changes in vital signs hours before the event. A team of critical care physicians, nurses, and therapists is alerted by bedside floor nurses when changes in a patient's physical or mental status are noted. The team then determines if the patient needs to be transferred to a higher level of care. L. Kaplan (USA), a trauma surgeon, presented new techniques in the concept of damage control surgery for staged care.

Age-related patient populations were discussed in individual sessions: geriatric trauma, chaired by J. Silverstein (USA), and pediatric trauma, chaired by G. Rasmussen (USA).

Special equipment for trauma care was discussed in a series of presentations. J. Berman (USA) reviewed applications and limitations of blood substitutes. C. Smith (USA) described bispectral encephalographic analysis, which generates a numeric index that indicates depth of anesthesia (awareness). The administration of anesthetics in the prehospital arena was reviewed by J. Schou (Germany).

A session about the use of simulators in trauma care was chaired by P. Barach (USA) and S. Monk (Germany), who discussed the advantages of simulator training in teaching and research, including the advantage of decreasing human errors. Recent progress in trauma allows emergency department management training with a full-scale simulator and the development of performance outcome measures and expertise.

Responses to mass casualty incidents were reviewed in a session cochaired by C. Smith (USA) and R. Urban (Germany). T. Martin (UK) described the crash of Freccia Tricolori into a crowd at Ramstein Air Force Base in 1988. More than 500 patients were triaged and transported within 77 min. The aftermath of a high-speed train near Eschede 10 yr later was reviewed by H. Paschen (Germany). More than 70 people with severe trauma were transported from the scene, and 101 people died. W. Gaber (Germany) discussed disaster response preparations at Frankfurt Airport, which has been the site of terrorist activ-

ities and, with a daily passenger volume of 96,000, is one of the busiest facilities in Europe. The combination of mass casualties and low temperature, characteristics of ship wrecks and avalanches, was reviewed by H. Lossius (Norway). Investigative principles of airline crashes and identification of bodies were discussed by C.-H. Schuberdt (Germany) and R. Urban (Germany).

Two of the more than 50 oral, video, and poster presentations received awards. The Best Oral Presentation award was given to Drs. Kober, Fulesdi, Friedmann, and Sessler and Mr. Scheck, Kieba, and Vlach, University of Vienna, for "Prehospital Incidence and Treatment of Hypothermia in Victims of Minor Trauma." "Quality of Life after Brain Trauma," by Drs. Diren, Zobar, and Mauritz, Lorenz Bohler Trauma Hospital, Vienna, was named Best Poster.

The 14th annual International Trauma Anesthesia and Critical Care Society symposium will be held May 17-19, 2001, in San Diego, California. Information is available at <http://www.itaccs.com/ataccs/sandiego.htm>.

Maureen McCunn, M.D., R Adams Cowley Shock Trauma Center, University of Maryland Medical Center, Baltimore, Maryland. mmccunn@umm.edu

Reference

1. Drobin D, Hahn RG: Volume kinetics of Ringer's solution in hypovolemic volunteers. *ANESTHESIOLOGY* 1999; 90:81-91

(Accepted for publication September 14, 2000.)