MANAGING “REAL” ANESTHESIA EMERGENCIES ON HUMAN SIMULATORS

In the late 1950s and early 1960s, Peter Safar, MD, Professor and Chairman of the Department of Anesthesiology at the University of Pittsburgh School of Medicine, conducted research on resuscitation including opening the airway by tilting back the head and using mouth-to-mouth ventilation. He combined this with a separate procedure known as closed-chest cardiac massage, and the combination became the basic life support method now known as cardiopulmonary resuscitation (CPR). Although he is regarded as a father of CPR, Dr Safar was hesitant to take credit for inventing it, as he insisted that he had merely brought to light separate effective procedures that had already been discovered and put them together into what he called the ABCs—maintaining a patient’s airway, breathing, and circulation.

At its annual meeting in 1962, the American Dental Society of Anesthesiology was honored to have Dr Safar present and subsequently to publish a case report of successful CPR with defibrillation in the *Journal of the American Dental Society of Anesthesiology*, the former name of *Anesthesia Progress* (1962;9:106–109). Dr Safar stated that the patient survived because “within 60 seconds [of the cardiac arrest call for help in his hospital] there was an anesthesia resident, a surgical intern, two dentists of Dr Monheim’s anesthesia training program and one staff anesthesiologist in the patient’s room” to apply these lifesaving procedures. He also predicted, “The most gratifying type of resuscitation in the future probably will be the occasional revival of patients with heart attacks outside of hospitals.” How right he was! Rather than just forecasting the development of bystander CPR and dialing 911 for advanced life support paramedics, Dr Safar actually made his prediction happen. He popularized CPR around the world and collaborated with a Norwegian company to create “Resusc-Ane,” the first CPR training manikin. He was also instrumental in the development of the American Heart Association’s original Advanced Cardiac Life Support (ACLS) course in the mid-1970s.

The introduction of ACLS brought about a major change in the teaching of medical emergencies because it coordinated cardiac dysrhythmia recognition with the application of appropriate therapeutic interventions in step-by-step algorithms. Courses in ACLS pushed the development of a new, second-generation resuscitation manikin that permitted the instructor to control with a computerized rhythm generator the type of dysrhythmia

viewed in real time on the cardiac monitor during a scenario that simulated a cardiac emergency. This enhanced the trainee’s skill at immediate recognition of dynamic rhythm disturbances and the application of the appropriate drug or defibrillation. Additionally, the ACLS trainee gained valuable experience in thinking rapidly and clearly despite the stressful nature of this type of realistic emergency. Having the confidence to perform under the stress of an ACLS course is undoubtedly valuable if the same or a similar emergency should occur.

The advancements in computer technology since ACLS was first introduced provide us with a third generation of human simulator manikins. These lifelike, computer-model-driven manikins have pulses, heart sounds, breath sounds, and pupillary reflexes. They can develop bronchospasm with audible wheezing, hypotension, laryngospasm, laryngeal edema, pneumothorax, and many other anesthesia complications that all anesthesia practitioners know how to diagnose and treat, but that are rarely if ever encountered in office anesthesia. Like those of us who give sedation and/or general anesthesia, all commercial pilots have didactic knowledge of how to manage their own life-threatening airliner emergencies, but they go one step beyond the classroom by requiring flight simulation emergency training in which they actually “fly” under the intense stress that the flight simulator emergencies provide. When the availability of anesthesia simulators becomes more widespread in our training programs, simulator training will eventually be required of all new anesthesia trainees.

What about requiring simulator training for current practitioners? Commercial aviation extends its simulation requirements to include all pilots during recertification, rather than just student pilots. It certainly comforts me to know that in bad weather, rather than having only book knowledge, my airline pilot has had extensive hands-on continuing experience in managing all types of simulated emergencies, including such events as a lightning strike, a dead engine, or severe wind shear, all of which have been experienced in a simulator that essentially duplicated the real thing. Assuming that anesthesia simulation courses become as available in the future as ACLS and flight simulator courses are today, our patients and licensing boards will expect a similar level of didactic and actual experience in emergencies via clinical simulation to that required in commercial aviation.

Unless anesthesia simulation becomes a requirement for relicensure, however, there will be some who will argue against it for reasons such as additional cost, or perhaps fear that they might not perform well in front

of their peers. Sedation/anesthesia practitioners all need to see the real value in taking anesthesia simulation courses on a regular basis. Dentist anesthesiologists and others with extensive sedation and anesthesia experience need to develop anesthesia simulation courses that are relevant to ambulatory dental office anesthesia. Otherwise, the only available courses will involve clinical scenarios such as that of medical anesthesiologists doing anesthesia for liver or kidney transplants, or cases involving complications of a total spinal anesthetic.

It took a few years before ACLS courses became universally available, and simulation courses will undoubtedly follow that same pattern. However, we must develop simulation courses with scenarios that pertain to what most of us do. One such course has already been offered by the American Dental Society of Anesthesiology, and another is scheduled in January 2007. I hope you will take advantage of this opportunity.

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