

The Power of CAs for Anesthesiologists in Managing Perioperative Crises

Written by Dennis Bittner

The utility of emergency manuals is well established in professions such as aviation, nuclear energy, and space travel, where the consequences of decisions made under stress can be grave when the unexpected happens. However, until recently, the same could not be said of the operating room, arguably an environment more complex than that found in the cockpit of a commercial jet or the control room of a nuclear power plant, due to the inherent complexity of human beings. David Gaba, MD, Veterans Administration (VA) Palo Alto Health Care System, Palo Alto, California, USA, reviewed the rationale for the use of emergency manuals, also known as cognitive aids (CAs), designed for use by anesthesiologists.

In probing why emergency manuals for perioperative settings were not more prevalent, Dr Gaba noted contributing factors. One is the perception that rules from other professions—where making good decisions quickly can be a matter of life and death—are not relevant, because the health care profession is unlike other lines of work. Not only are there no regulatory requirements for emergency manuals in the operating room, Dr Gaba said, but another factor is a medical culture that might view use of a checklist as a sign of weakness. There exists a culture of expectation that a real doctor will remain composed in a crisis and have all necessary information committed to memory for reacting to an emergency. However, human memory and computation are limited resources, especially under stress and unforeseen circumstances. Prospective memory—that is, remembering to do something in the future—is vulnerable to this kind of stress such that even smart and capable people can profit from some assistance in dynamic settings such as the operating room.

Although Dr Gaba showed a distant historical precedent for an anesthesia emergency manual—citing a publication from 90 years ago [Babcock WW. *Anesthesia and Analgesia*. 1924]—as recently as 1987, there were only 2 anesthesia protocols or CAs available: 1 for malignant hyperthermia and 1 for advanced cardiac life support. However, in the 2 years between 1988 and 1990, Dr Gaba and colleagues at the Palo Alto VA created a catalog of about 70 critical events, later published as a book entitled *Anesthesia Crisis Resource Management*. While the document included simulation training in decision making and team management, it was not optimized for use during crises. With so many events, it was difficult to quickly find the event of interest; the print was too small; and the piece would not stay open on a flat surface. Nevertheless, this early effort represented a major advance in establishing the value and acceptance of CAs in the operating room, with the following decade seeing continuing development of the concept at the Palo Alto VA as well by other groups in the United States and abroad.

In 2003, Dr Gaba and collaborators created the VA Cognitive Aid for Anesthesiology, which was favorably received

across the nation. The *Joint Commission Journal on Quality and Patient Safety* conducted a survey on its use by anesthesiologists, with 87% saying that they were aware of the aid, 7% claiming that they actually used it in an emergency (all of whom said that it helped), and 50% using the tool as a reference at some point [Nelly J et al. *Jt Comm J Qual Patient Saf*. 2007]. Continued simulation testing of these tools worldwide has provided a lot of information about what constitutes an effective CA and, just as important, what is not helpful.

Large font size and liberal use of photos and icons—with bold or alternate fonts to emphasize key elements—are important design features. Offering clear medical guidance that is evidence based whenever possible is a central principle. There is, however, much that still needs to be established on best practice for CA graphical design and usability factors, and in some cases, there may be no right answers. Questions that remain include the following: Is a full-size version best, or are pocket cards more usable? Is folding flat the best way to position it in the workspace? Should an electronic version or hard copy be offered or both? Addressing the areas of greatest utility for CAs, Dr Gaba highlighted facilitation of differential diagnosis and providing clear and precise direction on how to perform critical actions for a rare event. He said that a good CA will also offer ways to recognize if the initial diagnosis is not correct. However, beyond these uses at the time of a rare event, CAs are excellent tools for aiding general education and training about diagnosis and prescriptive actions of events, as well as precase review of likely occurrences and postevent review of actual management versus recommended management.

Not everyone is a supporter of the use of CAs. Speaking to potential pitfalls involved with the use of CAs and how to mitigate these, Dr Gaba touched on a number of points. To the criticism that a problem sometimes unfolds too rapidly for use of a manual, he agreed, acknowledging that anesthesiologists must still know many immediate actions by heart. To the issue that the CA may take up too much of the leader's attention, one solution is to encourage other team members to obtain the manual and to nominate one member of the team to function as the reader. Regarding the future of such tools, Dr Gaba said that he expects to see wider dissemination, adoption, and implementation of emergency manuals, with research studies conducted to provide further information on best practices as well as patient outcomes.

Underscoring what he called the “ultimate rationale” for the use of emergency manuals in his concluding remarks, Dr Gaba reminded his audience of the basis of the medical calling: saving lives. Furthermore, Dr Gaba said that even though CAs are designed to address rare events, every life is precious, and if a CA saves even a single life, it has achieved its purpose.