

EDITORIAL VIEW

Doctor, the child has no pulse; where is the manual?

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SUMMARY

We provide excellent and safe anesthesia care. How do we get better? The editorial below provides a glimpse in an approach of a perpetual quest of improvement. It dares us that if we feel that we have reached at a comfort zone and things have stabilized, that is the time to find a new horizon.

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Society of Pediatric Anesthesia has recently published practical and easy to use resources including a hand out and an app for addressing pediatric anesthesia emergencies. These handouts and smartphone apps do not replace the skills of an anesthesiologist; rather these are there to provide help and facilitation. A bonus point of the smart phone app is that it can help calculate doses of medications on weight-based requirement. Two critical reminders need to be emphasized at this juncture. First, it must be realized that during a crisis situation, someone other than the leader of the scene has to open the resource and go through various steps with the leader. Second, practice the scenarios and get familiar with the system. A repeated drill and rehearsal in peacetime is a key to the success, when actual emergency situation is encountered. With adequate practice, the utilization of this resource will be most useful.

Some of the readers may wonder as why do we need a hand out or a checklist for a crisis situation. Isn't it the time to act, and not to flip through the pages of some dusty old manual lying in the corner of the operating room? The answer lies in one word, 'Heuristics'. Heuristics are simple and necessary techniques that help people to efficiently decide adequate responses to difficult questions. Clinicians, like all dynamic decision makers, use heuristics as approximation strategies during ambiguous, time-sensitive situations. However, heuristics reduce the complex task of assessing probabilities and predicting values to simpler judgmental operations. In general, heuristics are quite useful but sometimes they may lead to severe and systematic errors. To answer the question about looking for a manual in a time of crisis; it took just four

minutes from the time US flight 1549 was hit by a flock of birds, which shut down both of the engines, till it landed in the waters of the river Hudson. During that period, the pilot took control of flying the plane and communicated with air traffic control, while the first officer read from the "dual engine failure" section of the emergency manual to ensure that they completed the recommended management actions. The airlines prepare for such scenarios over and over till the need arises once in many years.

The common culprits in performance gaps include knowledge gaps and a combination of crisis management team challenges (communication, leadership, etc.) with a failure to implement knowledge under stress. This latter failure to appropriately execute actions may be because of non-deployable knowledge, systematic cognitive errors, or common memory issues. These issues have been proven to exist even in the best of the systems as simulation studies have shown. Once we have decided that cognitive aids are useful during the time of crisis, the next question is how to utilize them effectively. In order for a checklist to be useful, it must address context, content, structure, images, and usability. The decision to implement these emergency manuals into clinical practice must include the following four steps: create, familiarize, use, and integrate.

An example of the importance of using emergency manuals is as follows. During simulation scenarios of malignant hyperthermia, treatment with dantrolene was originally listed as one of the many actions. Later when dantrolene's name was bolded and a 70 kg adult dose pre calculated, it was explicitly shown to improve the ease of dantrolene use. Improvements were seen in the number

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of vials required, appropriate focus by practitioners on more relevant resources and on rapid preparation of this critical medication. Later in debriefings it was stated that the cognitive load of calculating dose details was also decreased. Location is also important and after multiple pilots, many departments have decided to hang the spiral-bound, laminated book from a hook on the computer arm that connects the anesthesia machine with the anesthesia workstation. There are 3 distinct types of use in the clinical environment, all of which can facilitate one another by increasing familiarity with both content and format: pre-crisis education, post-crisis debriefing and during-crisis consultation.

Pediatric anesthesiologists are no strangers to managing emergency situations. Of course, experienced anesthesiologists manage uncomplicated laryngospasm for example on a routine basis without breaking a sweat. Certain crises however arise so infrequently that individual practitioners experience them personally only a few times within their professional lifetimes. Under such circumstances it can be hard to recall full details of all necessary facts, decision points and management steps.

The Society for Pediatric Anesthesia (SPA) Quality and Safety Committee has recently completed a two years project to address these challenges. Inspired by ultra-safe industries like aviation and nuclear power, the committee created a compendium of crisis checklists for consultation in the pediatric OR at the first hint of trouble. This manual has 17 challenging emergency problems for this treatment. Each checklist starts by summarizing the problem it addresses, and then lists relevant factors to consider and possible steps

to take in the event of that particular emergency.

The checklists include drugs treatments, if appropriate, along with a handy weight-based dose calculator. The full list of topics covered by the checklists is: air embolism, anaphylaxis, bradycardia, cardiac arrest, difficult airway, fire (airway and OR), hyperkalemia, hypertension, hypotension, local anesthetic toxicity, loss of evoked potentials, malignant hyperthermia, myocardial ischemia, tachycardia, tension pneumothorax, transfusion reactions, trauma and head trauma.

Additional Features (app) include built-in timer to keep track of actions in the event, Built-in log timestamps actions to assist in debriefing and education, malignant hyperthermia calculator and a Glasgow Coma Scale calculator.

The authors of the cognitive aid have made several observations from years of teaching simulation courses for multiple institutions, specialties and levels of experience. They have reinforced the idea that emergency manuals address an unmet need and do resonate almost universally with practicing clinicians. The evidence is evolving and does point to the direction of utilization of cognitive aids during a crises situation.

This manual highlights an important lesson. Always try to differentiate between evidence and experience.

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