



Learning From Others:

Anesthesia
Quality Institute
ANESTHESIA INCIDENT
REPORTING SYSTEM (AIRS)

A Case Report From the Anesthesia Incident Reporting System

Detailed review of unusual cases is a cornerstone of anesthesiology education. Each month, the AQI-AIRS Steering Committee will provide a detailed discussion based on a case submission to the Anesthesia Incident Reporting System (AIRS). Feedback regarding this item can be sent by email to r.dutton@asahq.org. Report incidents in confidence or download the free AIRS mobile application (Apple or Android) at www.aqiairs.org.

Case 2015-6: This is Not a Drill!

I was called about 19:40 by the intensive care nurse about a patient having difficulty breathing and handling secretions. He was 4 hours post op from an anterior cervical fusion of C2 C7. Upon entering his room I found a large muscular patient in a cervical-spine collar, very agitated, with difficulty talking due to breathlessness and some drooling. Over the next few minutes, his agitation worsened and his oxygen saturation decreased to 92 percent. Assistance with bag/mask improved his saturation to 100 percent, but his agitation continued. Morphine 5 mg and glycopyrrolate 0.2 mg were given intravenously as preparation was made to attempt intubation, which included getting propofol and succinylcholine prepared as well as opening a tracheotomy tray and calling for a percutaneous cricothyrotomy kit. The collar was removed and I used a scalpel to open the surgical incision. As I was starting to evacuate a clot with my finger in the wound, the respiratory therapist shouted, "I cannot ventilate anymore!" The patient became cyanotic almost immediately, and asystolic. While 1 mg of epinephrine was being given, I made an incision just below the cricoid cartilage. Putting my finger in the wound, I could not feel the trachea. As I was about to insert a 14 gauge intravenous catheter, (blanking but hoping I would remember the connection of 3 cc syringe to 6.5 endotracheal tube adapter when that step came) the percutaneous cricothyrotomy kit arrived from the emergency department. I inserted the needle, aspirated air on the third attempt lateral to the midline then used the kit to insert the guide-wire. The patient coughing mildly was reassuring. I then quickly passed the dilator over the guide-wire, withdrew the dilator and looked at the tracheostomy tube. There was not an inserting stylet like the regular tracheostomy tubes. Fortunately, it quickly dawned on me to insert the dilator into the tracheostomy tube and pass the unit over the guide-wire. Upon removing the dilator, the respiratory therapist connected the self-inflated bag and shouted, "I can ventilate!" The patient's oxygen saturation came back to 100 percent and cardiac rhythm returned at about 20:10. Total obstruction to ventilation time was about 90 seconds. The patient went back to the operating room for re-exploration and made a full and uneventful recovery.

Discussion

This case describes a truly heroic effort by a skilled anesthesia provider. However, it also highlights two crucial points about crisis management: The effective use of teamwork behaviors and how difficult it is to maintain critical emergency skills. Even (or especially) during periods of limited resources, effective teamwork is crucial. We don't know much about the team in this case but can assume no surgeon was present. We do know that the anesthesiologist used two critical skills: resource management and effective communication. The anesthesiologist thought to send someone for the cricothyrotomy kit early. As the situation deteriorated, the respiratory therapist was asked to manage the bag/mask ventilation while the anesthesiologist did the procedure. The team communicated effectively about the arrival of critical devices and the ability to ventilate. Despite the fact that the specific group of people who came together for this event had probably not worked together or practiced as a well-organized team, they were able to effectively use teamwork behaviors to help ensure a positive outcome.

The second point is that our knowledge and skills degrade when we do not use them. Few active anesthesiologists would worry about forgetting how to place an intravenous line or intubate the trachea; we do these every day. But when faced with a rare event, our memories and technical skills are more likely to fail. This is heightened when the rare event is an emergency and we must cope with time pressure and our own emotional stress. The author of the case hoped to "remember the connection of 3 cc syringe to 6.5 ET tube adapter" and later felt fortunate that "it quickly dawned on me to insert the dilator into the tracheostomy tube and pass the unit over the guide-wire." Hopes and serendipity are not a good strategy in a crisis.

Poor clinician performance has been demonstrated during CPR (with or without ACLS certification),^{1,2} the estimation of maternal blood loss,³ emergency airway management⁴ and cricothyrotomy,⁵ highlighting only a few instances in which our minds might fail during crisis. However, in each of the instances cited the authors were able to demonstrate that clinical

performance improved after simulation. Draycott demonstrated that use of simulation of teamwork and obstetric skills was associated with decreased rates of hypoxic ischemic encephalopathy.⁶ Simulation to teach both technical and teamwork skills can clearly play a role in helping clinicians develop and maintain critical skills and knowledge required during an emergency.

Many unanswered questions exist about how best to provide simulator education. Specific to cricothyrotomy, the question of what is the best technique, needle or open crich with an ETT is unanswered. More general questions include: Can the training be done on site, or is a simulation center best? Should the training be done in teams, or can individuals learn and use the skills? How often should the training be performed? On this last point, the available literature suggests the answer might be “very often.” As stated above, ACLS certification did not improve performance of CPR, and Toledo found the improved estimation of blood loss degraded after only six months.⁷ On the other hand, Boet demonstrated that the skills learned during simulation of cricothyrotomy (very relevant to the case described above) were retained for up to a year,⁵ and Ortner found that knowledge and skills during emergency cesarean delivery with general anesthesia were maintained for at least eight months.⁸ Why and how this occurred is not understood.

Unfortunately, no amount of simulation can keep the clinician prepared for every emergency at all times. The creation of emergency manuals or checklists is one recent development designed to help overcome this problem. Emergency manuals are designed to be simple, easy-to-read cognitive aids that remind clinicians of critical steps in the diagnosis, management and common pitfalls of critical events.⁹ These manuals come as free booklets,¹⁰ textbooks¹¹ and even mobile apps.¹² Common adverse events and critical conditions are included in the manuals, and the content and layout have been studied and validated in order to best support the provider during crisis.¹³ Links to these resources can be found on the AQL website at www.aqihq.org/emergency-manuals.aspx.

Multiple studies have demonstrated that individual and team performance is improved during simulated crisis when a checklist is used.¹⁴⁻¹⁶ Improvements include better adherence to clinical pathways, higher percent of critical steps completed and improved communication between team members. As yet, no study has demonstrated a link between the use of emergency manuals and improved outcomes in the clinical setting, but recommendations from the Anesthesia Patient Safety Foundation, AQL, Joint Commission and other safety organizations may preclude the need for such proof. As with simulation for task training, the best way to implement emergency manuals has yet to be determined. It is clear that without training, clinicians are likely to overlook the manual, even when they are available.¹⁵ Simulation designed to practice the use of the emergency manuals may be the best way to help implement them into clinical practice.¹⁷ Finally, the use of a checklist may require a fundamental change in how crisis management is organized in the

operating room. The crisis leader (often the anesthesiologist) is no longer expected to be the sole content expert. A person with the emergency manual acting in the “reader” role can help the leader utilize guidance from the manual so the leader and others do not become cognitively overloaded. This frees the leader to be the true clinical expert and to assign resources, assimilate information from the team, ensure that the correct checklist is being used and look for changes in the patient’s condition that would indicate the interventions are (or are not) helping. This is not an easy change and will take practice.

There is an adage, “Better lucky than good.” The anesthesiologist in the event above was both, but might not have been. Here are the final words from the report:

“Whew! A once-in-a-career event. I was fortunate to have once seen the percutaneous kit used electively in the O.R. several years ago; therefore, I knew to ask for it early on. It is now kept in three places in the ICU and goes with the ICU team to all codes.”

References:

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For a complete list of references, please refer to the back of the online version of the ASA NEWSLETTER at asahq.org or email Jamie Reid at j.reid@asahq.org.