



## Learning From Others:

# 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](mailto:r.dutton@asahq.org). Report incidents in confidence or download the free AIRS mobile application (Apple or Android) at [www.aqiairs.org](http://www.aqiairs.org).

### Case 2015-3: Sowing Landmines

*Case #1: A 25-year-old woman presented for labor analgesia. After seemingly uneventful epidural catheter placement, aspiration demonstrated easy return of cerebrospinal fluid. The catheter was left in the intrathecal space and used successfully for labor analgesia during an uneventful vaginal delivery.*

*Case #2: A 37-year-old man presented for lower-extremity hardware removal under monitored anesthesia care. Significant pain developed, which was treated initially by administration of nitrous oxide via nasal cannula. When pain and agitation worsened, general anesthesia was induced with propofol and a supraglottic airway placed. Desaturation occurred. The SGA was changed to an endotracheal tube, easily placed under direct vision. Desaturation worsened. The ETT was removed and mask ventilation initiated with poor chest excursion. A second ETT was placed easily, at which point it was noted that the common gas outlet was connected to the nasal cannula rather than the anesthesia circuit. Once this was corrected, adequate ventilation was promptly restored. The patient suffered no ill effects.*

### Discussion

Surgery and anesthesia are team sports, necessitating smooth and often unspoken communication between multiple providers. As in professional sports, experienced O.R. teams have an uncanny ability to anticipate the next steps in the surgical procedure. Anticipation is the result of both conscious practice and extensive unconscious experience in similar cases and situations. Effective anticipation depends on a shared mental model of the situation, such that every member of the team is viewing the case and the next steps in the same way at the same time. On good days, this makes the O.R. a graceful ballet of efficiency. But even a single small variation in normal practice can lead to a catastrophic failure in performance. One way this occurs is when one team member inadvertently drops a landmine that the next team member steps on. These landmines, known as latent safety hazards, are something the mindful anesthesia provider will seek to eliminate or mitigate.

While the first case seems relatively innocuous – a minor complication occurred but the providers adjusted their technique and a good result was achieved – it takes only a little imagination to realize just how incredibly dangerous this approach could be. Suppose a shift change occurred during the patient's labor and a new provider took over supervision of her anesthetic? The patient gets uncomfortable, a top-off dose is requested and a total spinal occurs, followed by cardiopulmonary collapse. Oops. Root cause analysis would suggest that the catheter should have been appropriately labeled, that there should have been robust communication between providers about the intrathecal placement and that aspiration should be checked before any dose, but in real life each of these steps will fail from time to time. Labels are overlooked, providers are forgetful or distracted and time pressure leads to rushed performance of routine tasks. In fact, one intrathecal catheter in an environment of many epidurals is a latent safety hazard – a landmine – with significant explosive potential. Recognizing this, the good teammate will use the intrathecal catheter when it happens (if that's what's right for the patient), but will recognize the risk involved and will take extra precautions to call out the exceptional nature of this situation, including the obvious step of not handing off management to any other team or provider.

The second case is similar, except here we can see the landmine triggered. A perfectly normal (but obviously older) anesthesia machine, looking just like all the others in the O.R., has been modified with the best of intentions to become deceptively useless. As with the first case, one can make many arguments for why the providers should have figured out the problem more quickly. Of course they should have traced gas flow from wall to patient as soon as difficulty ventilating developed. But that's not how human cognition works, without conscious training. The mind immediately leaps to the most common cause – SGA misplacement or esophageal intubation – merrily skipping over the more obscure possibilities. Most of the time these cognitive shortcuts serve us well, but not in this case where the real problem was a rare possibility *a priori*. Perseverating with efforts

to replace a normally functioning endotracheal tube when the real problem is elsewhere is a classic fixation error. Increased situational awareness could lead to more rapid resolution, but thought should also be given to how the problem could have been prevented in the first place. Foreseeing that such a cognitive trap might develop, the good teammate choosing to modify the circuit would act to mitigate the potential risk, say by removing the entire circuit from the machine and moving it to the back table, to make it obvious that it was disconnected.

**The Case for Mindfulness:** Many of these case reports have emphasized the goal of building improved systems of care, such that the potential for humans to fail in rote tasks is mitigated. Yet at the same time, human providers are the most important component of a safe O.R. because only humans have the mental flexibility to deal with the myriad variations of patients and presentations that confront us every day. Human cognition is at its best when confronted by complexity and chaos. We can use this ability consciously, by training ourselves to think into the future of the case and asking, “What’s the worst thing that could happen right now? How might this unusual step or decision or event lead to future problems?” This is the concept of mindfulness, or meta-cognition – thinking about thinking. Mindful anesthesiologists improve patient outcomes by anticipating problems, including problems related to how their fellow humans think and act, and taking steps in advance to mitigate or eliminate them.

Another important step, mentioned in this column before, is the use of pre-prepared decision support aids to prop up anticipated deficiencies in human thinking. Numerous written, online and app-based “Emergency Manuals” now exist to help the anesthesia team during a crisis. (See [www.emergencymanuals.org](http://www.emergencymanuals.org) for options offered by the Emergency Manual Implementation Collaborative.) These tools have been designed by mindful providers to fill in gaps in any human’s rote memory, by providing cues for diagnosis and treatment of rare intraoperative disasters. In the second case presented, consultation with such a reference might have prompted the providers to check the circuit connections or attempt ventilation with a self-inflating bag before re-instrumenting the airway.

In summary, the O.R. is a complex environment that creates endless variations on common themes. Experienced teams learn to navigate daily practice through anticipation of common steps. Mindful team members improve safety by recognizing – in advance – how random variations might turn into major problems.

#### **Bibliography:**

- Schulz CM, Endsley MR, Kochs EF, Gelb AW, Wagner KJ. Situation awareness in anesthesia: concept and research. *Anesthesiology*. 2013;118(3):729-742.

## **SEE Question**

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in anxiety found among the three groups, which led the investigators to conclude that midazolam and video glasses have similar anxiolytic effects. While neither technique decreased anxiety levels from baseline, both were effective at preventing further clinically significant increases in anxiety at times that are generally considered the most stressful for the pediatric patient (i.e., transport to the O.R. [also the time of parental separation] and induction of anesthesia).

The authors recommended that the use of video glasses be considered as an alternative method for preoperative anxiolysis, especially when oral midazolam is either not appropriate for the patient or not accepted by the patient.

They also suggested that video glasses may be preferable to other technologic devices used to distract children because they can continue to be used during anesthetic induction.

#### **Bibliography:**

- Kerimoglu B, Neuman A, Paul J, Stefanov DG, Twersky R. Anesthesia induction using video glasses as a distraction tool for the management of preoperative anxiety in children. *Anesth Analg*. 2013;117(6):1373-1379.

**Answer: C**