Learning From Others:

A Case Report From the Anesthesia Incident Reporting System

Anesthesia Quality Institute
ANESTHESIA INCIDENT REPORTING SYSTEM (AIRS)

Review of unusual patient care experiences is a cornerstone of medical education. Each month, the AQI-AIRS Steering Committee abstracts a patient history submitted to the Anesthesia Incident Reporting System (AIRS) and authors a discussion of the safety and human factors challenges involved. Real-life case histories often include multiple clinical decisions, only some of which can be discussed in the space available. Absence of commentary should not be construed as agreement with the clinical decisions described. Feedback regarding this article can be sent by email to Lance Mueller: **l.mueller@asahq.org**. Report incidents or download the AIRS mobile app at **www.aqiairs.org**.

Case 2015-12: A Different Point of View

A 34-year-old man, newly paraplegic from a gunshot wound, presented for thoracic spine instrumentation. While his ventilatory reserve was poor, his airway was patent in his baseline awake state, and minute ventilation was adequate. After induction with propofol and rocuronium, bag mask ventilation was iffy with one provider attempting, but adequate with two-person ventilation. An attempt at intubation with a video laryngoscope (VL) failed twice, as did an attempt at direct laryngoscopy with a Macintosh 3 blade and a Macintosh 4. The vocal cords could not be visualized with either technique. Bag-valve-mask ventilation with a volatile anesthetic was continued, and the patient was finally intubated using fiberoptic bronchoscopy.

Discussion

We are grateful to our colleagues who reported this case for a number of reasons, not the least of which is not falling into the trap of "this is so routine, we should not report it." There is no question this is a common occurrence, which does nothing to detract from its discussion value. While severity and rarity of an event are closely coupled, learning value and rarity are not. Events such as this are dress rehearsals (in this case, for a failed fiberoptic, necessitating perhaps a surgical airway).

Anything can fail. Why worry about a failed fiberoptic as plan E? Stand by.

First, a relatively small, but not in any way trivial, point: Two-person ventilation often serves us well. However, there is no reason for this to be routine. Two providers ventilating means that one fewer is available to help in other ways. Furthermore, the bag ventilation that results may be overenthusiastic and may distend the stomach, complicating the rest of the exercise. An alternative approach would be to have the provider who is managing the ventilation turn the machine to pressure ventilation mode (if available). One now has a machine preventing over-ventilation, timing ventilation and easily adjusted in all parameters when the result is seen. The human provider now can concentrate on a two-handed jaw thrust, which has a very high success rate even without an oral airway. As a final benefit, avoiding the two-person exercise can also prevent the needless crisis mode that this maneuver can trigger.

We searched the AIRS report archives for cases in which a video laryngoscope was used. We found 12 reports out of 1,564, and counting. We classified these 12 reports as follows: the VL is the hero (saved the day, and the report is mostly about the intubation), the dunce (failed spectacularly, and the report is mostly about intubation), an innocent bystander (maybe helped,

maybe didn't, but the gist of the report is something else, such as a medication error) or "other" (for example, the VL failed because the proper stylet is out of stock).

We found that of the 12 reports, the VL was hero in two, dunce in six, a bystander in two and "other" in two.

Careful here. We emphatically believe that the introduction of the video laryngoscopes was a great moment in our specialty, and the VLs represent great progress in safe airway management. However, with each great advance comes the potential for unintended consequences. With the video laryngoscopes, this unintended consequence may be in the very way in which we think about advanced airway management.

Human factors research recognizes a natural behavioral trend evident in professionals in their workplace; it is called *risk homeostasis* (RH). We hope that just by naming it, we may better understand it and in turn recognize new instances of it, thereby preventing it.

Risk homeostasis is a theory that states, "people typically adjust their behavior in response to the perceived level of risk, becoming more careful where they sense greater risk and less careful if they feel more protected. Although usually small in comparison to the fundamental benefits of safety interventions, it may result in a lower net benefit than expected" (**https://en.wikipedia.org/wiki/Risk_compensation**). In the 1970s, oil tankers went almost entirely unregulated. They were so big (thus carrying more product and making more money) that they often collided with the sides of the inland deepwater shipping channels in the United States. The U.S. Army Corp of Engineers, who build channels, did the right thing and increased the width of the most critical channels by one foot on each side. Less than a year later, the first new tanker was built since the widening occurred. It was larger by a foot on each side.

Decades later, antilock brakes were introduced in taxis in Germany. A study that followed found taxi drivers drove closer to the car in front, thus negating much of the beneficial effects of the new technology.

RH can work to *decrease* accidents, too. In the 1960s, Sweden switched from driving on the left side of the road to the right side. While some may think this drastic change would lead to an increase in accidents, the actual traffic fatality rate decreased by 17 percent in the first year. The Swedish drivers compensated for the change by driving more carefully. (This example and others can be found in Malcolm Gladwell's article "Blowup" at **http://gladwell.com/blowup**.)

Has the introduction of the video laryngoscope had a similar impact on how we manage the advanced airway? We frequently ask our neurosurgical colleagues if a particular patient with cervical spine pathology should get an awake intubation (in order not to disrupt the spine, thus risking cord compression, and secondarily, in order to be able to do a neurologic exam after intubation). We are looking for a yes, no or maybe, which we will then take into consideration, as the final decision is ours. Since introduction of the VL, we often hear: "Yes, or you can just do a *McGrath™*, *AirTraq™*, *Glidescope™*" or other VL of your choosing.

The use of a VL seems to have largely replaced the awake fiberoptic intubation, previously done for many more indications than the neurosurgical one mentioned above. This is a classic example of RH. The problem? All VLs require training and experience, even for clinicians skilled in direct laryngoscopy. Once this training, which we agree need not be extensive, is completed, the VL will *still* fail in some patients for whom DL failed. Misunderstanding that, we do what we should not; we answer questions 3A and 3C of the ASA Difficult Airway Algorithm[1] in the less-safe manner. While we usually get away with it, as physician anesthesiologists, "usually" has never been good enough.

Risk homeostasis is an artifact of any new technology, particularly one that improves tolerance or reserve in some way. Contemplating risk homeostasis and other human factors constructs is a necessary investment for the physician anesthesiologist. Periodically, we will use this forum to introduce other such concepts.

As a final caveat, we must admit that the AIRS reports, even in aggregate, (similar to the ASA Closed Claims Study files) are *never* a proper forum for quantitative analysis. For one thing, we don't have a denominator (we will one day with NACOR[2]). Second, the "N"s at this point are much too low. Third, AIRS reports are hugely biased toward when things did not go well. And most importantly, trends in these reports say more about the reporters than the toys. To that point, we cannot state for sure that video laryngoscopes have changed anesthesiologists' practice in a way that accepts more risk. But we should at least be concerned that it has.

All change brings with it intended and unintended consequences. Sometimes the unintended consequences become obvious and we can react to them appropriately. When the unintended consequence is a change in the very way in which we think or the amount of risk to which we are willing to expose our patients, this change can be difficult to identify and fix. We must be ever-mindful of these subtle drifts in our practice to ensure continued safety for our patients.

References:

1. American Society of Anesthesiologists Task Force on Management of the Difficult Airway. Practice guidelines for management of the difficult airway. *Anesthesiology*. 2013;118(2):251-270.
2. National Anesthesia Clinical Outcomes Registry. Anesthesia Quality Institute website. https://www.aqihq.org/introduction-to-nacor.aspx. Accessed October 13, 2015.