



Learning From Others:

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A Case Report From the Anesthesia Incident Reporting System

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 airs@asahq.org. Report incidents or download the AIRS mobile app at www.aqiirs.org.

Case 2019-5: Diagnostic Safety

A 79-year-old man presented for laparoscopic excision of an intra-peritoneal mass. History of chronic bronchitis, esophagectomy over 10 years ago, laparoscopic cholecystectomy, and aortic insufficiency developed after treatment of aortic stenosis. Four years ago, he aspirated on induction and spent three days intubated in the ICU. The patient had been septic prior to surgery, so it was not clear how much the aspiration contributed to the ICU stay. Patient used oxygen during the day but did not use it at night, despite frequent episodes of severe productive coughing which may have been chronic aspiration. Counselled that team would do their best, but could not guarantee an aspiration-free course. Family was advised that both awake intubation and rapid sequence induction can result in aspiration. Pre-induction arterial line was inserted and a rapid sequence induction (RSI) with cricoid pressure was performed. On direct laryngoscopy, the patient was seen to be regurgitating green liquid which was rising in the posterior pharynx, not reaching the glottis. Suctioned, and immediately began appearing again, despite continued cricoid pressure. After rapid intubation, a small amount of regurgitated fluid may or may not have been seen rising to level of the glottis.

During the surgery, A-a gradient was monitored on various levels of PEEP. Improved during surgery. Extubated wide awake, was breathing comfortably, and saturation remained at or above 94 percent on two liters of nasal oxygen. He did fine for 40 minutes. Over the next two hours he developed a severe cough, struggled to clear his secretions, and developed a worsening oxygenation deficit, requiring six liters per minute to keep sat at 92 percent and desaturating to 78 percent whenever he fell asleep.

Anesthesiologist and surgeon agreed that he probably had a worse aspiration than was appreciated. Chest X-ray was consistent with atelectasis, aspiration, fluid overload or heart failure. He was transferred to the ICU, where his oxygenation,

cough and general comfort rapidly improved over an hour with no new therapeutic interventions. Discharged home on postoperative day one. Thirty-six hours later, paramedics were summoned. Patient was hypotensive and confused. Found to be in decompensated heart failure related to worsening aortic regurgitation. He underwent an aortic valve replacement. Weaning from bypass was problematic. He was discharged to a rehabilitation unit weeks later after a stormy postoperative course. He was never the same in terms of mental status and level of function.

The reporter for this month's case focused on the failure to consider the diagnosis of heart failure due to valvular disease in the recovery room. In this setting, the symptoms of worsening cardiac failure and an acute pulmonary event could have been very similar. The reporter felt that an echocardiogram and/or a cardiology consultation would have led to more timely management and perhaps a better outcome.

Discussion

Diagnostic safety refers to protecting patients from harm due to misdiagnosis. There is a substantial body of research detailing methods and principles to reduce the harm done by diagnostic error. A related concept is diagnostic "safety-netting," which is a diagnostic strategy to accommodate the reality that "classic" features of a disease may not yet be present. Safety-netting encompasses three questions: 1) If I'm right, what do I expect to happen? 2) How will I know if I'm wrong? 3) What would I do then?¹

The only way to minimize misdiagnosis is to immediately order the most expensive, uncomfortable and risky tests for every new complaint.² Newman-Toker and Pronovost observe, "Because it is impossible to eliminate all diagnostic errors, open dialogue is necessary about how much diagnostic safety medicine can afford."³

It does not make sense to classify every diagnostic error as a safety lapse. We should focus on diagnostic errors that are preventable and lead to immediate harm. For this class of diagnostic errors, we should not hesitate to apply tools we use for other patient safety incidents. Some experts, specifically Pronovost, try to keep the diagnostic error definition completely separate from the question of “did harm result?”^{4,5} From a purely human factors point of view, the last approach would seem to be favored. The tendency to judge the presence and severity of errors by how badly the patient does is known as outcome bias.⁶ Diagnostic errors are a subcategory of physician cognition issues.⁷ Dekker informally classifies these as 1) attentional dynamics issues including fixation, 2) problematic mental models including knowledge deficits and the use of oversimplifications and heuristics, 3) strategic factors (such as production pressure), and 4) fatigue.⁸



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In this case, the physicians involved were focused on a diagnosis of aspiration pneumonitis. Fixation error is the failure to revise one’s situational assessment as new evidence comes in.⁹ There were signs and symptoms pointing to other possibilities. The course of symptoms is unusual for aspiration pneumonitis: doing well for 40 minutes after extubation, then deteriorating, then doing magically better in the first hour after ICU admission. How can we prevent fixation? The two strategies traditionally suggested are to “step back” and to invite the input of others. Stepping back is engaging in metacognition, getting outside the limited view we have and adopting an outside view. Critical event checklists have reminders to step back, often phrased as “reassess.” However, this diagnostic dilemma was perhaps not seen as a crisis at the time. Similarly, it may not occur to someone treating the wrong diagnosis to call for help. We don’t know we are fixating, else we would not do it.

To the two classic answers to prevent fixation, we would like to be able to add decision support software. The software highlights isolated abnormalities we might have missed, warns us of trends that we were complacent of and can

present diagnostic possibilities that were not being considered. A recent study found that a decision-support system was associated with improved process measures, although not postoperative clinical outcomes.¹⁰ The modest findings belie the great value of decision support, which is to always consider and present abnormal findings, regardless of the working diagnosis. Decision support is an excellent tool for mitigating fixation, as it essentially acts as a constant alternative point of view.¹¹ Such a benefit is hard to prove. Early studies from the internal medicine world may be seen as disappointing, and that just speaks to the difficulty of doing these studies the way we might want, given our limited resources.

The AIRS committee thanks the reporter for presenting such a detailed case for this month’s review.

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