



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 the AIRS Committee: airs@asahq.org. Report incidents or download the AIRS mobile app at www.aqiairs.org.

Case 2016-08: Aspirations of Safety

A 42 y.o., obese, ASA Physical Status 3 woman received sedation with propofol for esophagogastrosocopy and duodenoscopy (EGD), followed by colonoscopy. During resection of a polyp she began to vomit. The patient was already in the left lateral decubitus position; her mouth was immediately suctioned, but some aspiration occurred. Arterial oxygen saturation declined to the upper 70s. Positive pressure ventilation was provided through the anesthesia circuit, along with continued suctioning. Saturation slowly improved to the low 90s. Nebulized albuterol produced minimal improvement. The patient was transferred by ambulance from the GI center to a nearby emergency department.

Discussion:

The anesthesiologist who submitted this AIRS report offered the following recommendation for future cases: *Have suction immediately available and be very diligent in observing the patients head and mouth during colonoscopy.* This advice is hard to dispute, but is it sufficient?

The pathophysiology of the described event seems clear: the patient had gastric distension after the EGD; when stimulated, vomiting occurred with immediate aspiration despite prompt suctioning. Laryngospasm with negative pressure pulmonary edema may have contributed as well. Reaction and rescue appears to have been prompt and appropriate, if not entirely successful. In a tertiary center intubation and bronchoscopy-guided lavage might have been appropriate, but in a GI-only facility this option might not be available and prompt transfer to a higher level of care might be the best alternative. A quick look at AIRS shows a number of adverse events reported during EGD, many of which involved similar difficulties with the airway.

Given the limitations of treatment once aspiration has occurred, it seems reasonable to focus on prevention. While the majority of anesthesia for colonoscopy and EGD is moderate to deep sedation, the choice of when to elect general anesthesia with endotracheal intubation is a controversial issue. Some practices and providers intubate every patient having a complex procedure

(e.g., ERCP), while others do so only selectively. Variables that must be considered include:

- The complexity, duration and painfulness of the planned procedure
- The natural speed and efficiency of the endoscopist
- The common practice of the facility and the anesthesia team
- The comorbidities of the patient, with emphasis on sensitivity to anesthetics, tolerance of hemodynamic and respiratory stress, and pre-existing airway issues
- Anatomic variables which will effect positioning and airway management
- Risk factors for gastric distension

As with many clinical decisions, it is not possible to create a hard and fast rule for which endoscopy patients should be intubated; potential complications from moderate sedation must be balanced against the risks of deeper anesthesia, the need for active airway management and the increased time and cost of general anesthesia. Systematic measurement of outcomes can help inform this decision. In a recent quality management review of aspirations in a large group anesthesia practice over a three year period, risk factors for this complication were identified. Twenty of forty-three cases occurred during EGD – far and away the most common case – all in cases with planned moderate sedation and an unprotected airway. The majority of these patients had potential risk factors, including active GI bleed or known bowel obstruction. Many of the aspirations occurred at the end of the case, with removal of the endoscope. Of note, only one patient was identified who aspirated during a planned rapid sequence induction.

Recent publications in the gastroenterology literature have noted increased complications when propofol sedation is used¹ and when an anesthesia professional is involved.² Despite an attempt in both papers to control for patient risk, it is likely that retrospective comparisons are confounded by selected involvement of anesthesia professionals in caring for sicker patients. Indeed, the increasing complexity of endoscopic surgical procedures has been facilitated

by the availability of anesthesia teams to manage very complicated patients over extended periods of time. How to manage this increasing risk profile is especially critical in remote or off-site locations like the GI suite because the anesthesiologist has only a fraction of the resources available (she may be the only one on the unit), and so recovery from adverse events may be more difficult and less certain. The assistance of the ancillary and support personnel in a remote location may also be less than optimal – even if the knowledge base is present, the practice and experience in dealing with these uncommon emergencies may be deficient.³ “Anesthesia Stat to OR 6” brings an army of skilled staff in the general OR suite, but is not available at all in the GI suite.

Institutional culture/inertia and production pressure is likely to have significant impact on the care we provide, especially in places like the high volume GI unit. The strongest source of institutional inertia is likely the belief that GI cases can all be performed with sedation. While we know this is not true, it unarguably is mostly true. Thus, we tend to practice like it is true as nearly every case is done with sedation. This can lead to “confirmation bias”, in which we try to force the facts into our preset conclusion in order to confirm our desired outcome (“This patient’s BMI is not too high. I can manage the procedure with sedation”). This inertia is made worse if changing the plan leads to significant delays or work. If performing general anesthesia is easy and the recovery area can easily manage the patient, there is little disincentive to changing the plan. But if the anesthesiologist must transfer the patient to the main PACU after general anesthesia, or cancel the case and send them to the main hospital, the inertia to perform the case with sedation becomes powerful.

There are few places where we administer anesthesia at a higher pace than in the GI clinic. Fifteen cases a day in each room is not uncommon. An EGD may take only a few minutes. Adding 15 minutes for induction of and emergence from anesthesia, and another 15 for transport to the PACU can drastically change the flow of the day. Pressure from the gastroenterologists (and even from anesthesia leadership) to get the cases done can lead to bad decisions. We are not suggesting that the decision to perform the cases above under sedation was inherently bad (that would be both hindsight and outcome bias), but it is likely that the decision was influenced by the pressure to keep the day moving.

What recommendations can be made? As stated above, it is difficult to create hard and fast rules to mandate intubation. Worse, intubation is associated with its own set of complications, including aspiration. However, several concrete recommendations can help the general safety of any remote location:

1. Concrete inclusion/exclusion criteria for the unit should be created. These can include a BMI maximum, excluded comorbidities, even airway issues. This can also include a set of broad guidelines for the consideration of general anesthesia. These should not be overly proscriptive, but can be used to break clinicians from the inertia of “sedation for all GI cases”. Other team members (e.g. the GI nurse) might even recommend general anesthesia for those who fit the guideline.

2. Clear processes should be in place for management of emergencies. In a free-standing GI center this might mean stabilization and calling an ambulance, while calling the code team might be appropriate in the GI center connected to a hospital. The use of cognitive aids and checklists might help with the management of these events, and *in situ* simulation can help the team be ready for crises they very rarely see (failed intubation, anaphylaxis, etc).
3. A multi-disciplinary team meeting or huddle before the start of the day to review the planned cases can help the team to identify and prepare for potential problems. These planning huddles can be short (10 minutes) and have been demonstrated to improve efficiency throughout the day.
4. Early identification of potential “problem patients” before they are scheduled is a powerful tool to decrease cancellations, but requires planning, collaboration and communication between the anesthesiologists and endoscopists. The institution of a formalized system – perhaps a scaled-down version of a preoperative consultative service, whereby a set of criteria could prompt the gastroenterologist to consult an anesthesiologist about patient suitability – might be developed.

Anesthesiologists should take nothing for granted when dealing with these most common cases, and should not hesitate to insist on general anesthesia with a protected airway when the procedure is going to be complex, the patient is fragile or the risk of aspiration is high. An ounce of prevention just might be worth a pound of cure.

References:

1. Goudra B, Nuzat A, Singh PM, Borle A, Carlin A, Gouda G. Association between type of sedation and the adverse events associated with gastrointestinal endoscopy: an analysis of 5 years’ data from a tertiary center in the USA [published online ahead of print April 29 2016]. *Clin Endosc*. 2016. doi: 10.5946/ce.2016.019.
2. Vargo JJ, Niklewski PJ, Williams JL, Martin JF, Faigel DO. Patient safety during sedation by anesthesia professionals during routine upper endoscopy and colonoscopy: an analysis of 1.38 million procedures. [published online ahead of print February 18 2016]. *Gastrointest Endosc*. 2016. doi: 10.1016/j.gie.2016.02.007.
3. Urman RD, Punwani N, Shapiro FE. Office-based surgical and medical procedures: educational gaps. *Ochsner J*. 2012;12(4):383-388.
4. Correll DJ, Bader AM, Hull MW, Hsu C, Tsen LC, Hepner DL. Value of preoperative clinic visits in identifying issues with potential impact on operating room efficiency. *Anesthesiology*. 2006;105(6):1254–1259.