



## Learning From Others:

Anesthesia  
Quality Institute  
ANESTHESIA INCIDENT  
REPORTING SYSTEM (AIRS)

# 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 [r.dutton@asahq.org](mailto:r.dutton@asahq.org). Report incidents or download the AIRS mobile app at [www.aqiairs.org](http://www.aqiairs.org).

### Case 2015-8: Mission Creep

*"A 37-year-old woman presented for dilation and curettage, hysteroscopy and endometrial ablation. The planned anesthetic was deep sedation using propofol, midazolam, fentanyl and ketamine with a natural airway and spontaneous ventilation. An unexpected uterine myoma was discovered, and a hysteroscopic myomectomy was added to the planned procedure. At the end of the myomectomy, as the endometrial ablation was about to begin, the patient developed fulminant pulmonary edema. Oxygen saturation declined to <80 percent. Intubation was attempted, but proved difficult due to copious edema fluid. High mask ventilation pressures were necessary, and subcutaneous emphysema resulted. An endotracheal tube was eventually placed and the patient was transferred to the intensive care unit. Hyperchloremic metabolic acidosis was noted along with clinical evidence of aspiration pneumonia. The patient required 10 days to recover sufficiently for discharge home.*

### Disclaimer

Frequent readers of this column will note a change to our introduction header this month. The case presented, like many received by AIRS, raises many questions. How well was the patient tolerating sedation prior to the unexpected surgical finding? How much irrigating fluid was infused (and potentially absorbed) during the myotomy? Did airway obstruction or pulmonary edema develop first? How quickly did the patient become distressed? Was a neuromuscular blocking drug administered to facilitate intubation? What airway management techniques were attempted, and what approach finally worked? While these are all worthy points for discussion, we cannot address all of them in the space available and will therefore choose to focus on just one: the potential hazard resulting from an intraoperative change in surgical plan. This will allow us to dig deeper on one important feature of the case, while saving discussion of other aspects for future columns.

### Discussion

This patient experienced significant morbidity. Multiple complications resulted from a common and simple procedure. Or was it? The actual surgical procedure performed was more involved than originally intended and might have led to a different anesthetic plan if scheduled that way from the beginning. Any intraoperative change in the surgical procedure represents an elevated safety risk, which can be mitigated by planning for the unexpected. But that sounds like an impossible mission itself. How would you plan for what you cannot expect?

Mission creep is often unavoidable and should not be treated as the surgeon's latest effort to ruin our day. Some instances of radical change in a surgical procedure may indeed result from poor planning or technical errors – which we should object to – but even these anecdotes may be colored by hindsight bias. Which of us has not planned poorly or made technical errors? More often than not, a surprise change in the surgical plan represents the surgeon's expert adaptation to imperfections in the original diagnostic data. In fact, the failure to change the surgical plan when indicated would be a cognitive fixation error on the surgeon's part. This variety of fixation error is called "plan continuation." Such a surgical error can be as costly to our patient as any mistake we can make. When the right thing is to increase the complexity of the surgical procedure, we have a great opportunity to showcase our own adaptive expertise and professionalism.

The terms "surprise," "fixation" and "adaptive expertise" have specific meanings in the field of human factors engineering. Each is critical to safety.

The multiple definitions of *surprise* include "an unexpected event or piece of information" and "the feeling caused by something that is unexpected or unusual." Being surprised is a personal experience not directly related to the patient. Surprise is a human factors construct more than a medical one. In general, we should not be surprised by something routine. Lanir<sup>1</sup> introduced a useful nomenclature: Situational surprise versus Fundamental surprise.

Situational surprise is a surgeon who has never had to take back a bleeding cardiac patient suddenly having to do so. We did not expect it, maybe because of complacency, but we knew it could happen. Fundamental surprise, on the other hand, would be the first occurrence of something we did not know could happen, such as a device failure never previously reported in the literature. Fundamental surprise is experienced far more intensely than situational surprise. The safety implication is that immediately after a fundamental surprise, we are not ourselves and, in fact, may question ourselves. To successfully lead a team in this situation we should make increased use of cognitive aids and the input of colleagues and repeat a mantra such as, “Yes, I was caught by surprise, but I can still fall back on my training.”

A second difference is that for fundamental surprise, we could not have defined in advance the issues for which we must be alert, no matter how hard we tried. The process of learning from a fundamental surprise is far more complex and personal than learning from a situational surprise. It requires deep examination of the whole system, including our cognition. If we handle surprise well, we can return to our roots. As physician anesthesiologists, we pride ourselves on our ability to accomplish most goals in more than one way and to adapt our actions to changing circumstances. We should be comfortable with the idea of surprise as a cognitive phenomenon.

**Fixation** is a psychological term indicating obsession with one idea while excluding others. Cognitive fixation, or fixation error, is the most clinical of the phenomena we are touching on. In the clinical sense, fixation is the tendency to cling to a provisional diagnosis or treatment plan in the face of evidence that other possibilities must be considered. When analyzing incident reports, fixation can be seen, for example, in perseverating with attempts at direct laryngoscopy to accomplish a difficult intubation rather than shifting to a supraglottic airway, calling for the fiberoptic bronchoscope or allowing the patient to awaken and performing a regional anesthetic. Surgical mission creep presents the threat of fixating on the existing anesthetic plan. In the case under discussion, blindly continuing to maintain moderate sedation rather than pausing to initiate general anesthesia would be a fixation error. Mindful anesthesiologists can avoid this trap by remembering the first law of holes: when you're in one, stop digging!

**Adaptive expertise** was originally defined as

*“...the development of flexible knowledge and dispositions that facilitate effective navigation across varied settings and tasks,”<sup>2</sup>*  
or

*“...a depth of understanding that allows [response] to unusual clinical problems with original rather than habitual approaches”<sup>3</sup>*

New ways to endanger patient care (by omission or commission) will continue to arise, considering the infinite variations of human physiology and the complexities of modern health care. It is a rare case that proceeds without any deviation in the plan from scheduling through discharge. We manage by adapting to new challenges, small and large, which are not

accounted for in any book or any standard operating procedure. Adaptive expertise is mission critical to safety.

All three of these threats – surprise, fixation and failure to adapt – can be defeated. The antidotes are:

- Metacognition, thinking about our own thinking.
- Asking others for input into what our working diagnosis is, what we may be missing and how we are managing it.
- Stepping back and looking at the big picture. Ask yourself “what would be seen by a colleague just entering the room?”

## Application

We started off by asking: “How would you plan for what you cannot expect?” ASA has recently championed the development of checklists for crisis management. It is possible to develop a checklist for surgical mission creep. Mission creep can be expected or novel, situational or fundamental. Examples of the first are converting a minimally invasive surgery to an open operation. We should be prepared for this eventuality, and its management should be routine.

Examples of fundamental surprise are more concerning, such as a complete change in the surgical procedure. Episodes of mission creep can be characterized by consideration of multiple factors, many with dichotomous approaches. The extra complexity may or may not require an upgrade of the airway management. This may be easy, challenging or impossible without repositioning the patient (or contaminating the surgical wound) or deepening the anesthetic. It may or may not require addition of neuromuscular block (NMB), increasing administered analgesics or addition of new monitors. Higher-capacity I.V. access, upgrading the blood bank order, repositioning or placement of an arterial catheter may or may not be indicated. Recruitment of additional nursing or surgical personnel may be warranted. Ditto for augmenting the anesthesia team.

In most cases, the family waiting for the patient will not be empowered to modify the informed consent process, but both anesthesia and surgical providers must consider communicating with the family. Finally, the appropriate location for recovery and postoperative care should be re-evaluated in light of the new operative and anesthetic plan. This collection of issues can serve as a case-creep safety checklist (Table 1, page 46).

There are two actions that must be automatic when plans change. One is to have a discussion with the surgeons, acknowledging that plans have changed. This discussion may be thought of as pre-briefing version two, a necessary revision of the discussion we should have had prior to the surgery. The surgeons, while not the final authority, may be able to shed light on what the patient would wish. More importantly, they can decide with us, as a team, if the proposed modified or additional procedure is best done now or scheduled for another day. Our surgical colleagues can also consider, with us, the status of the informed consent vis a vis the new procedure. In many cases, the surgeons will already have presented contingency plans to

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the patient and family; it behooves us to do the same during our preoperative discussion. This is especially true for cases (such as cancer resection) with a high potential for mission creep.

The other critical action is discussion of the new plan with all providers involved. This includes nurse anesthetists, anesthesiologist assistants or residents working with us, the circulating and scrub nurses in the room, and our colleague running the O.R. for the day.

Following these discussions, the next question is: Can the anesthetic be safely changed? Converting from deep sedation to general anesthesia with a protected airway is often a wise decision, especially when the ongoing intensity or duration of the procedure is unknown. In the case presented, hindsight suggests that this was not done soon enough and was not done in a deliberate fashion based on discussion with the surgeon. Once the anesthesia team's hand was forced, events cascaded downhill quickly, with development of pulmonary edema, airway trauma and a protracted and difficult intubation. But these are issues for another day.

Safety is the absence of something (causes of unwanted outcomes). It is also the presence of something that we create on a minute-to-minute basis by reflecting on our thinking, modeling adaptive expertise and managing surprise. Lou Pangaro, a physician educator, has said that if we had to differentiate what makes a physician unique among today's confusing assortment of providers, we should aspire to the following: *a physician can follow a protocol, write a protocol, and know when to alter or ignore a protocol.*

## References:

1. Lanir Z. Fundamental Surprises. Tel Aviv: Center for Strategic Studies; 1983. <http://reut-institute.org/en/Publication.aspx?PublicationId=2245>. Accessed June 16, 2015.
2. Scardamalia M, Bereiter C. Knowledge building: theory, pedagogy, and technology. In: Sawyer RK, ed. *The Cambridge Handbook of the Learning Sciences*. New York: Cambridge University Press; 2006:97-115.
3. Cooke M, Irby DM, O'Brien BC. *Educating Physicians: A Call for Reform of Medical School and Residency* [Kindle]. San Francisco, Calif.: Jossey-Bass; 2010:277.

**Table 1: Checklist for Intraoperative Mission Creep**

**Like all checklists, this should be modified for local circumstances.**

### 1. Discuss with the surgeon the changes needed, with the following questions:

- a. Will the operation take longer?
- b. Will repositioning be required?
- c. Will the new procedure cause new or different pain?
- d. Will blood loss increase?
- e. Is the addition within the boundaries of the preoperative consent? Or ...
- f. Is the addition necessary on an emergency basis?

### 2. Formulate an adaptive anesthesia plan:

- a. How would you have done the case if it was scheduled this way from the start?
- b. How do we get from here to there?
  - i. Do I change the anesthetic?
  - ii. Do I change the airway management?
  - iii. Do I add additional lines or monitors?

### 3. Discuss with the O.R. team the implications of the new plan:

- a. Will a pause to reset the anesthetic be required?
- b. Will new O.R. equipment be needed?
- c. Should blood products be ordered?
- d. Will postoperative plans change?

### 4. Notify O.R. management (nursing and anesthesia) of the change in plans.

- a. Reschedule "to follow" cases as needed.
- b. Arrange for staffing if the case will run late.

### 5. Request assistance if needed:

- a. Anesthesia help to add monitoring or assist with induction.
- b. Nursing assistance to find equipment or facilitate repositioning.

### 6. Notify the patient's family of the change in plans.

- a. When will the case be likely to finish?
- b. Where can they see the patient postoperatively?