



## 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 2015-4: Vancomycin Blush

A 50-year-old woman with a brain tumor and no other significant medical history presented for craniotomy and intraoperative MRI. The anesthesiology team consisted of an attending and two residents. After induction of general anesthesia and placement of a radial arterial line, the anesthesiology attending left the O.R. briefly. The senior resident, who was preparing drug infusions and programming pumps, instructed the junior resident to “take care of the antibiotic.” The patient was to receive vancomycin. The junior resident had never worked in an MRI operating room before, but had administered I.V. vancomycin on several occasions. The senior resident noted the patient’s blood pressure suddenly decreased from 120/70 mmHg to 40/10 mmHg. The surgical team was immediately notified and asked to stop draping the patient. All infusions (remifentanyl and dexmedetomidine) were paused and the junior resident was asked to stop the vancomycin. At this point, the junior resident realized that the full dose of vancomycin (1 gram) had been given I.V. push. Phenylephrine and ephedrine were administered, and the patient’s blood pressure returned to baseline over the next 2-3 minutes. The anesthesiology attending was notified and the remainder of the case proceeded as planned.

### Discussion

The distraction and stress of an unfamiliar clinical environment ultimately caused this resident to commit a medication error despite prior experience with proper vancomycin administration. Fortunately, this particular patient did not have significant comorbidities, such as ischemic heart disease, and tolerated the profound hypotension without sequelae. Additionally, there was no delay in diagnosis and treatment, as the drop in blood pressure was immediately recognized and the cause identified.

Physician anesthesiologists participate in a variety of cases, and assignments are usually made to cover staffing needs, sometimes with little regard for prior experience in a given clinical area. As a result, there is often exposure to new personnel and unfamiliar procedural locations. To avoid sowing landmines (see last month’s case report), it is important to understand the clinical

scenarios where anesthesiology errors are more likely to occur. Anticipation may help to modify behavior and mitigate risk.

Experienced physician anesthesiologists are familiar with many of the following clinical conditions and scenarios known to increase the risk of error:

- High-complexity patient or procedure.
- Unfamiliarity with location or equipment.
- Unfamiliarity with the surgical procedure.
- Unfamiliarity with a requested anesthesia technique.
- Failure to follow personal routine.
- Distraction.
- Time or production pressure.
- Inadequate supervision.
- Low staffing situation (not enough hands).
- Trauma or emergency cases with high acuity.
- Evening and late-night hours.

High-complexity patients or procedures require more clinical decisions to be made and therefore increase the likelihood of committing errors. Unfamiliarity with location, equipment, anesthesia technique or surgical procedure can all contribute to unforeseen circumstances. Deviation from personal routines, be it due to distractions or production pressure, increases the likelihood that a critical step will be missed. Low staffing situations, such as after-hours and emergency cases that stretch staff availability, can also increase the risk of error.

Examining the present case in light of the above risk factors, it is clear that “unfamiliarity with location or equipment” was a major contributor to the medication error. The MRI operating rooms at this particular institution use unique monitors, operating tables and infusion pumps. The room layouts are awkward, and specialized teams staff the procedures. Such a change in routine is no doubt overwhelming for any physician anesthesiologist new to this location, but especially for a less-experienced trainee. Familiar cues available to prompt recall of intended actions may

no longer be present when working in a new environment, and extra vigilance and additional checkpoints are required in order to mitigate this increase in risk and reduce vulnerability to error. Instructing the junior resident to “take care of the antibiotic” would have been better phrased in a way that reiterated safe practices, perhaps: “mix the vancomycin in 250mL of normal saline and administer as a slow infusion over the next 60 minutes.” Direct, redundant instructions that review standard protocols help ground clinicians in familiar norms and reinforce knowledge that may be insufficiently solidified. The junior resident could also have asked that his work be double checked, given the level of distraction and challenges created by contextual factors. Even a simple verbal statement to the senior resident such as “just to confirm, I’m giving the patient vancomycin 1 gram I.V. push” would have alerted the other team member that the medication was about to be administered incorrectly. Staff members, especially trainees, should be encouraged and empowered to speak up if they’re unsure about an assigned task or if they have misgivings about clinical decisions.

*“The increasing volume of non-operating room anesthesia nationwide (currently 30 percent of all cases reported to the National Anesthesia Clinical Outcomes Registry are outside of the traditional O.R.) will increase the potential for repeating familiar mistakes in an unfamiliar environment. Anticipation of this risk will help to mitigate it, so that no one – patient or provider – will need to turn red.”*

Human cognition has strengths, limitations and vulnerabilities. Understanding how errors occur within the context of human performance and workload management is important for implementing change at the individual and organizational level. Anesthesiology providers will continue to be challenged by new clinical environments and procedures. The following is a list of provider behaviors that may be helpful for adjusting to a new location:

- Allow time for orientation.
- Notify remaining staff that you are new to the clinical environment, and actively request assistance.
- Clarify procedural workflow.
- Create reminders for essential tasks.
- Minimize distractions.
- Utilize checklists when appropriate.
- Verify key procedure components, drug dosing and calculations with another provider, if possible.

Dispelling the culture of blame and punishment can encourage reporting of adverse events, medical errors and near-miss events, allowing for organizational approaches to improvements in quality and safety. Possible system-wide changes that could decrease the chance of future vancomycin bolus dosing at this institution could include pre-mixed preparations of vancomycin by pharmacy or visible labels on medication ampules alerting the physician of proper administration. Additionally, organizing orientations for anesthesia trainees prior to their participation in low-volume, high-risk procedures or specialty clinical areas can increase familiarity with environments that greatly differ from those of daily practice. Reducing other burdens on attending staff in these areas may increase the level of supervision and enhance resident orientation and learning.

The increasing volume of non-operating room anesthesia nationwide (currently 30 percent of all cases reported to the National Anesthesia Clinical Outcomes Registry are outside of the traditional O.R.) will increase the potential for repeating familiar mistakes in an unfamiliar environment. Anticipation of this risk will help to mitigate it, so that no one – patient or provider – will need to turn red.

*Acknowledgement:* The AQI AIRS Committee would like to thank Elena Bukanova, M.D., a Fellow in Perioperative Quality and Safety at Yale University, for assistance in developing this report.

#### **Bibliography:**

- Campbell G, Arfanis K, Smith AF. Distraction and interruption in anesthetic practice. *Br J Anaesth.* 2012;109(5):707-715.
- McLaughlin K, Eva KW, Norman GR. Reexamining our bias against heuristics. *Adv Health Sci Educ Theory Pract.* 2014;19(3):457-464.
- Merry AF, Webster CS, Hannam J, et al. Multimodal system designed to reduce errors in recording and administration of drugs in anaesthesia: prospective randomized clinical evaluation. *BMJ.* 2011;343:d5543. doi: 10.1136/bmj.d554
- Staender SE, Mahajan RP. Anesthesia and patient safety: have we reached our limits? *Curr Opin Anaesthesiol.* 2011;24(3): 349-353.