Learning From Others:

A Case Report From the Anesthesia Incident Reporting System

Anesthesia Quality Institute
ANESTHESIA INCIDENT REPORTING SYSTEM (AIRS)

Detailed review of unusual cases is a cornerstone of anesthesiology education. Each month, the AQI-AIRS Steering Committee will abstract a case and provide a detailed discussion based on a submission to the national Anesthesia Incident Reporting System. Feedback regarding this item can be sent by email to ***r.dutton@asahq.org****. Report incidents to* ***www.aqiairs.org****.*

Case 2012-9: Garbage in …

"I know I've made some very poor decisions recently, but I can give you my complete assurance that my work will be back to normal. I've still got the greatest enthusiasm and confidence in the mission. And I want to help you."

– HAL 9000 Computer in "2001: A Space Odyssey"

A 32-year-old woman is scheduled for a laparoscopic cholecystectomy as the second case of the day, to follow a 63-year-old woman with diabetes and chronic infection with methicillin-resistant staphylococcus aureus (MRSA) scheduled for extensive debridement and skin-grafting of a left lower-extremity venous stasis ulcer. On the morning of surgery, the order of cases is switched to allow for extended cleaning of the operating room after the MRSA patient. Prior to the switch, the provider in the room logged into the anesthesia information management system (AIMS) to set up the record for the original first case. When the cases were switched, a pre-operative evaluation was completed for the new first case on the computer in the holding area, and the patient was brought into the O.R. and anesthetized. At the conclusion of an uneventful general anesthetic, it was discovered that the intraoperative record had been completed under the wrong patient's name. Hours of time on the part of the provider and a hospital information technology expert were required to move this documentation to the correct record.

This event did not result in a patient injury, but the consequences of documenting an anesthetic on the wrong patient's electronic medical record (EMR) are potentially catastrophic. First, the patient who was actually anesthetized now lacks a record of the event. This could create patient risk when planning future anesthetics and medicolegal liability if any question arises about the conduct of the case (such as a retained foreign body discovered years later). Second, there is now an erroneous record in a different chart. If not corrected, this could lead to a misunderstanding of anesthesia tolerance, normal vital signs or even such fundamentals as whether the patient still has a gall bladder. Further, this event required significant time and effort to correct: an anesthesia record in a modern AIMS is not a simple paper document that can be lifted out of one record and placed in another; numerous links to other portions of the medical or billing record must be properly managed.

This particular case is an example of a COWPIE (Charting On Wrong Patient In EMR), an evocative acronym attributed to Dr. Scott Springman of the University of Wisconsin. While automated records improve documentation in many areas, they also create new possibilities for human error. To date, 35 of 604 submissions to AIRS involved a near miss or unsafe condition related to health care information technology. COWPIEs accounted for four of these occurrences, and most members of the AIRS Committee have observed at least one example in their own practice. Other IT-related incidents included sudden catastrophic failure of the system (about half of the events), failure to correctly record or display vital signs, failure of pharmacy dispensing systems, incorrect calculations (!) and inability to find critical electronic documents. A recurrent theme across all reports was the distraction from clinical care that resulted from the need to reboot, restart, restore or generally work around the information technology issue.

Discussion

Although painfully slow to astute observers, anesthesiology has moved faster than many specialties towards fully digital documentation. AIMS are installed in more than half of all university hospitals – with most of the remainder under contract for future installation – and between 20 and 30 percent of community hospitals (Tremper 2011). Today's residency graduates may never see a paper anesthesia record. Use of AIMS in surgery centers, office-based practice and "off-site" anesthesia is less common, but will soon increase based on extension of hospital-based systems and development and promulgation of cloud-based solutions. With this rapid change in routine documentation have come predictable growing pains. Eric Severeid could have been discussing health care information technology when he said "the chief cause of problems is solutions."

The Institute of Medicine issued a report in early 2012 titled *Health IT and Patient Safety: Building Safer Systems for Better Care* that summarized the risks and benefits of EMRs and health care information technology in general (IOM 2012). Included was a

review of the concept of "e-iatrogenesis," defined as patient harm facilitated by an electronic record (Weiner 2007). Most adverse events attributed to AIMS, including the one described above, include an element of human error. However, the IOM report notes the strong influence of system design, configuration and training (human factors) in facilitating or preventing adverse events: "Safety is an emergent property of a larger system that takes into account not just the software but also how it is used by clinicians." Neither the software nor the user is entirely to blame for adverse events related to information technology; they are the result of both a human error and a system that makes that error possible.

Safety outcome analyses of AIMS, usually conducted as retrospective before-and-after observations, have suggested either mild improvement in clinical safety or no difference (Lubarsky 1997; Kheterpal 2011). It is likely that publication bias has influenced this literature. Reporting on negative outcomes may be limited by embarrassment, fear of legal consequences, or even contractual obligations that prohibit reference to specific products or vendors. One study did note a reduction in medicolegal risk when an AIMS is in place: the availability of accurate and legible records outweighed the risk that they would be used against the provider (Feldman 2004). What is made clear in many reports is that changing from paper documentation to an AIMS requires substantial changes in workflow, ongoing commitment to customization and a long view of the potential return on investment.

Recommendations

As with most adverse events in anesthesia, prevention is more cost-effective than recovery. Avoidance of incidents related to information system failure depends on the human factors design of the system, the intensity of training provided to clinicians and the ready availability of ongoing support. The more the system is configured to the workflow of the group using it, and the better trained providers are in its use, the less likely the AIMS is to contribute to adverse outcomes.

Because COWPIEs are an obvious and common problem, most departments with AIMS have added steps to their preoperative checklist to ensure that O.R. records are created in the correct patient's chart (a human work-around to a computer problem). These steps can include comparison of medical record numbers, bar-code scanning of the patient's hospital ID band or even visual comparison of the patient to his or her picture in the AIMS (Hyman 2012). These approaches have been shown to reduce COWPIEs in other areas of the hospital (Adelman 2012). Interestingly, every anesthesia department that describes using such a system also reports that it has failed at least once. This illustrates the importance of making IT systems fault-tolerant. Recognizing that COWPIEs happen, there should be an easy mechanism for moving data and collections of data from one chart to another (an IT work-around to a human problem).

When a system failure does occur, the clinician's first priority should be the patient. Help should be summoned to deal with distracting IT issues, while the primary provider increases attention to the clinical situation. When records have been erroneously destroyed or created, as in the present case, the provider should seek expert assistance to sort them out. Every department with an AIMS should have an IT resource person skilled in making this kind of correction. Manual recording of vital signs and medications is recommended in the meantime, a process that every provider should remain familiar with; the department should maintain and periodically rehearse a "Downtime Documentation Plan."

Conclusion

Anesthesiology is a complex process, and adverse events are a predictable consequence of changes in practice that disrupt the normal and accustomed workflow. Digital technology improves the ability to gather numbers, preserve them over time, make them available simultaneously at multiple locations, and aggregate them for science and quality management, but it also introduces new and unexpected adverse events. The role of the anesthesiologist as the patient's last line of defense is unlikely to change in the near future.

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