A Novel Use of Electronic Medical Record Systems To Improve Anesthesia Education and Quality

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Background
Anesthesiologists have a responsibility to use anesthetic techniques that optimize quality, patient safety, and overall satisfaction. One method to achieve this is through evaluation of one’s individual practice with respect to measured outcomes.

Ideally, evaluating one’s anesthesia practice should begin during anesthesia residency. In fact, self-evaluation is specifically emphasized in the ACGME Common Program Requirements for Graduate Medical Education: “Residents must demonstrate the ability to investigate and evaluate their care of patients and to continuously improve patient care based on constant self-evaluation and life-long learning.” However, objective feedback on outcomes for anesthesia trainees (residents and fellows) is limited.

Methods
At Children’s Hospital Colorado, a quaternary level pediatric hospital and referral center located in Denver, Colorado, an anesthesia information management system (AIMS) was implemented in 2011 (Epic Systems, Verona, WI). In addition to an intraoperative anesthesia record, this system is integrated with the hospital’s EMR system. Using this integrated EMR, we designed a data-reporting tool to capture outcomes data on patients that were cared for by individual anesthesia trainees.

We chose metrics believed to be closely associated with anesthetic technique, such as:
• post-anesthesia nausea and vomiting
• severity of post-operative pain scores
• incidence of emergence agitation
• time-to-discharge from the post-anesthesia care unit
• duration of anesthesia start-up time

The system captures additional data relevant to trainees:
• invasive vascular access
• airway management devices used

Results

Clockwise from top left:
• Average anesthesia “start-up” time
• Average administrations of opioid medications in PACU
• Airway management
• Emergence agitation (with comparison data shown)

In contrast to viewing data at broadly spaced time points, continuous data review has been shown to be an effective component of quality improvement. Providing this objective data is a first step toward helping anesthesia trainees “implement changes with the goal of practice improvement.”

Prior to electronic medical records, anesthesia providers did not have a convenient method to view data regarding their anesthetic choices and patient outcomes. We believe this type of data-reporting tool can be instituted at other anesthesia training programs, wherever an anesthesia record is integrated with the EMR system. Furthermore, this type of tool could certainly be extended to provide quality and outcomes data to independent practitioners and supervising anesthesiologists as well.

Discussion

This data collection tool represents a novel use of EMR to allow anesthesia trainees to evaluate their own practice efficiency and anesthesia outcomes. Because the data is updated daily, trainees can participate in continuous self-evaluation of their practice outcomes. In contrast to viewing data at broadly spaced time points, continuous data review has been shown to be an effective component of quality improvement. Providing this objective data is a first step toward helping anesthesia trainees “implement changes with the goal of practice improvement.”

References
1 2011 ACGME Common Program Requirements; IV.A.5
2 Farrell C, Hill D. Time for change: traditional audit or continuous improvement. Anaesthesia 2012;67:899-903