



## A comparison between nonoperating room anesthesia *versus* operating room anesthesia in quality assurance events

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### To the Editor,

The volume of nonoperating room anesthesia (NORA) cases has increased in recent years. While older studies found that NORA locations had a higher rate of reported adverse events,<sup>1,2</sup> a 2018 study found that NORA cases had lower morbidity and mortality compared with operating room (OR) cases.<sup>3</sup> Overall, few studies exist on the safety of NORA care and how it compares with traditional OR locations. We conducted a retrospective study evaluating the rates of reported quality assurance (QA) events in NORA *vs* OR locations and assessing the most common QA events by NORA location.

At our large academic institution, an automated QA event reporting system is embedded into the anesthesia information management system (AIMS) for all cases involving anesthesia providers,<sup>4</sup> so that a QA report must be completed before an anesthesia record is closed. A deidentified data set containing all QA events from fiscal years (FY) 2019–2021 was used in analyses. Each event location was categorized as OR *vs* NORA (adult endoscopy; cardiac catheterization, echocardiography, and electrophysiology; *in vitro* fertilization; electroconvulsive therapy; pediatric endoscopy and hematology–oncology; and radiology). To calculate QA event rates, institutional patient

volumes by FY were obtained. The three most reported QA event categories in NORA locations were then generated. Events between NORA and OR locations and within NORA locations were compared using the z-test and Fisher's exact test, respectively. Analyses were performed in R 4.1.3 (R Foundation for Statistical Computing, Vienna, Austria). This study was deemed exempt from institutional review board review.

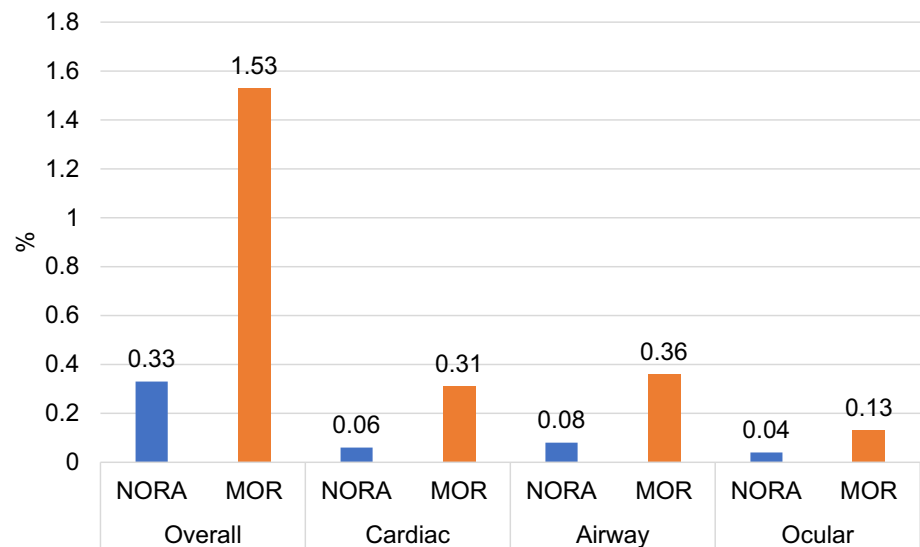
A total of 1,988 QA events were reported from FY 2019 to FY 2021. Of those, 182 events were excluded because of missing, off-site locations, and locations associated with intensive care units, postanesthesia care units, and obstetric ORs. A total of 1,806 QA events were analyzed—1,629 (90.2%) in OR locations and 177 (9.8%) in NORA locations. The total case volume during this period was 106,341/160,189 (66.4%) in OR locations and 53,848/160,189 (33.6%) in NORA locations. The overall rate of reported QA events was lower in NORA *vs* OR (0.33% *vs* 1.53%,  $P < 0.001$ ).

The most reported QA events in NORA were cardiac (acute coronary syndrome, cardiac arrest, and other cardiac events), airway-related (aspiration, inability to intubate, reintubation, and other airway events), and ocular (ocular injury). The rates of cardiac, airway, and ocular events were lower in NORA locations than in OR locations (0.06% *vs* 0.31%,  $P < 0.001$ ; 0.08% *vs* 0.36%,  $P < 0.001$ ; and 0.04% *vs* 0.13%,  $P < 0.001$ , respectively) (Figure). The rates of cardiac and airway QA events were higher in the cardiac catheterization lab than in other NORA locations (1.12% *vs* 0.06% and 1.12% *vs* 0.08%, both  $P < 0.001$ ), while the rate of ocular QA events was higher in the electrophysiology lab (0.24% *vs* 0.005%,  $P < 0.001$ ).

In summary, we found that the rates of QA events overall and by most common categories were lower in

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**Figure** QA event rates in fiscal years 2019–2021 (QA events reported/total case volume)



NORA locations than in OR locations. This finding is in line with a 2018 national database study on this topic, and in contrast to earlier studies finding higher rates of adverse events in NORA locations.<sup>2–4</sup> An AIMS workflow at our institution that incorporates a mandatory, automated QA event reporting system for NORA cases allowed us to address specific areas of patient safety. Nevertheless, it is possible that absolute QA event rates were underestimated by only examining QA reports filled out through the AIMS system, since events can also be reported via other methods. Additionally, a significant limitation of our study is our inability to control for patient and procedure characteristics because of the deidentified nature of the QA data analyzed. Given the increase in NORA anesthetic volumes in recent years,<sup>5</sup> more studies are needed to better understand the safety of NORA care and to further investigate opportunities for improvement in this rapidly expanding setting.

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