Drawn Curtains, Muted Alarms, and Diverted Attention Lead to Tragedy In the Postanesthesia Care Unit

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Problem: A 17-year-old girl died following an uncomplicated tonsillectomy performed in an outpatient ambulatory surgery center after receiving a dose of intravenous (IV) fentanyl in the postanesthesia care unit (PACU). While it is too late to reverse the tragic outcome of this case, we call upon all hospitals and outpatient surgery centers to learn from the event and take action to prevent a similar tragedy in your facility.

About the Event

Following surgery, the teen arrived in the PACU where a nurse anesthetist administered a dose of fentanyl by slow IV push to the patient to help manage pain. The drug led to respiratory depression and eventual respiratory arrest. The patient was found pulseless and breathless 25 minutes after receiving the fentanyl. Resuscitation efforts were initiated, and the patient was transferred from the ambulatory surgery center to a hospital emergency department. As a result of oxygen deprivation, the patient suffered profound, irreversible brain injury and died.

After investigating the causes of this adverse event, the ambulatory surgery center staff identified several reasons why the PACU staff failed to notice the patient’s declining respiratory status.

Inadequate Monitoring

After receiving the IV fentanyl, the teen was not observed or assessed for 25 minutes. The attention of the teen’s PACU nurse was temporarily diverted to tend to another patient who had developed postoperative complications. An initial set of vital signs had been taken upon the patient’s arrival in the PACU, but no further assessment of the patient occurred until she was found in cardiac arrest 25 minutes later.

Muted Alarms

The alarms on the monitoring equipment used to alert health care professionals to changes in the patient’s cardiac and respiratory status were muted. In fact, all the alarms associated with monitoring equipment in the PACU were muted, most likely due to alarm fatigue. The purpose of a medical device alarm is to warn caregivers of potential problems with patients who may require immediate action. The cacophony of sounds from alarms that echo through a hospital, however, can be overwhelming. The sheer number of alarms—up to 700 per patient per day—along with a high rate of false or clinically insignificant alarms can quickly desensitize staff and cause alarm fatigue, which can lead to missed alarms, ignored alarms, delayed responses to alarms, muted or low volume alarm settings, or adjustments to alarm limits outside a safe range. Alarm fatigue has been described by those who experience it as follows:

- When a nurse or other caregiver is overwhelmed with hundreds of alarm signals per patient per day
- When a patient can’t rest with the multitude of alarm signals going off
- When a true life-threatening event is lost in the noise because of the multitude of devices with competing alarm signals, all trying to capture someone’s attention, without clarity around what that someone is supposed to do

Additionally, in a PACU, where nurses are rarely far from the patient’s bedside, staff may have a good-faith but mistaken belief that the risk associated with muting alarms is not significant.

Obstructed View of the Patient

A curtain had been drawn around the patient, obstructing the view necessary for the nurses to maintain an ongoing visual assessment of the patient. Patients in the PACU are particularly vulnerable to adverse events and are more likely to encounter medical difficulties as they emerge from anesthesia versus later in their recovery. In the operating room, an entire team of practitioners is directly caring for the patient and monitoring the patient’s response. Once the patient moves into the PACU, highly trained PACU nurses are available to provide care, but they may be caring for more than one patient. While PACU nurses may be experts in interpreting and responding to events during the brief but intense period immediately following a procedure requiring anesthesia, staffing patterns that do not support necessary monitoring, alarms that are inaudible, and a blocked line of sight for observing patients invite untoward clinical events. While airway obstruction may be the most common untoward event in the PACU, inadequate ventilation and oversedation from residual anesthesia-related medications and pain medications administered in the PACU are a close corollary.

Safe Practice Recommendations

Because unexpected patient emergencies can arise quickly in the PACU and result in diversion of staff attention, hospitals and ambulatory surgery centers will recognize that similar events could happen in any PACU. Consider the following recommendations to reduce the risk of this type of error in your PACU (or a similar unit such as the emergency department).

Maintain a Direct Line Of Sight to Patients

Although patient privacy is an important concern during the postoperative experience, a direct line of sight to PACU
patients is vital to allow staff to observe all patients at all times.4 Privacy curtains should be used judiciously, and a PACU staff member assigned to only one patient may need to remain behind the curtain with that patient if close observation is required. In the ambulatory surgery center where the event happened, drawing curtains that would restrict the view of patients is now prohibited, according to news reports.

**Provide Staffing to Ensure Proper Monitoring**

Review current staffing patterns and monitoring practices in the PACU to ensure patients are adequately observed and cared for during the immediate post-anesthesia period, particularly when IV opioid analgesics are administered. Guidelines from applicable professional associations and national and state regulatory agencies should serve as a resource to ensure that staffing and monitoring practices comply with current standards of care. For example, the American Society of Anesthesiologists (ASA) “Standards for Postanesthesia Care” note that, during recovery from anesthetics, a quantitative method of assessing oxygenation, such as pulse oximetry, should be employed during the initial phase of recovery, and that physiological monitoring, such as cardiac monitoring, has become a de facto standard.4 The ASA also suggests that, during the initial 15 minutes in the PACU, one nurse should be caring exclusively for that patient.4 The American Society of PeriAnesthesia Nurses—professional association to which the ASA defers for issues of nursing care—has promulgated a standard requiring a 1:1 nurse-patient ratio from the time the patient is first admitted to the PACU until explicit critical elements are met, including that the patient is hemodynamically stable.5,7

Because of the cumulative effects of opioids given near the end of a surgical procedure and then again in the PACU, which may contribute to respiratory depression, the surgical center where the adverse event happened now requires one-on-one nursing care for patients who have received opioids in the PACU. Because patient emergencies can quickly arise in the PACU and require unexpected staff attention, the facility also established a charge nurse position in the PACU to monitor the patient flow and staffing, and to redeploy resources as needed.

**Manage Alarm Hazards**

The ECRI Institute—a leading organization that evaluates medical technology—ranked alarm hazards second on its list of the “Top 10 Health Technology Hazards for 2016” after putting them in the number-one spot for four straight years.1,8,11 The potential for alarm-related harm exists every day in every health care facility. Given the ubiquitous nature of medical alarms, ECRI suggests that the potential for alarm-related events may always warrant inclusion on a list of the most pressing technology hazards.1 Nonetheless, health care facilities must do more to improve the manner in which alarms are managed. Awareness of the problem is not at issue—the absence of meaningful action is.

The ambulatory surgery center where the event happened no longer allows muted alarms with monitoring equipment in the PACU. While ISMP concurs with this action, the scope of alarm hazards is larger than just muted alarms and broader than can be addressed with a few bullet points in this article. Therefore, ISMP strongly encourages health care organizations to utilize external resources that are more appropriate to guide the assessment and improvement of alarm hazards.

Another great resource is the 2011 report that describes priority issues and consensus recommendations from a medical device alarms summit convened in October 2011 by the Association for the Advancement of Medical Instrumentation, the Food and Drug Administration, the American College of Clinical Engineers, the Joint Commission, and the ECRI Institute.3 The report, “A Siren Call to Action,” identified and prioritized a range of issues with medical alarms and priority actions for addressing them, including the following:1

- Conduct clinical testing and analyze alarm data to optimize alarm limits and delays for self-correcting alarm conditions that will reduce clinically nonactionable alarms.
- Test the acoustics on clinical floors; environmental noise impacts patient and staff well-being and patient safety.
- Change single-use sensors frequently to reduce nuisance alarm conditions, except in pediatric units (e.g., change electrocardiogram leads every 24 hours).

**REFERENCES**