Patients Receiving Opioids Must Be Monitored With Continuous Electronic Monitoring

June 2017

Much of the public attention has been focused on the harm caused by prescription use and abuse of opioids. However, there is another facet that must be focused on: opioid-induced respiratory depression in clinical settings. This includes patients undergoing moderate and conscious sedation, or recovering from procedures and managing pain using a patient-controlled analgesia (PCA) pump, particularly those during the postoperative period.

Opioids, such as morphine and oxycodone, are commonly prescribed to manage pain for those recovering from surgical procedures. It is well known that, at certain dosages, these drugs can lead to a depression in respiratory function. Overdoses can run the risk of respiratory failure, jeopardizing patient safety.

Prescribing the “right” amount of opioids to manage pain is not a simple task. Patients react to medication differently - a fact that is an undefined factor, for example, in the opioid naive until it is too late. The situation can be further complicated by existing conditions and treatments. Obstructive sleep apnea (OSA), for example, is a condition that Thomas Frederickson, MD - lead author of the Society of Hospital Medicine’s Guide for Reducing Adverse Drug Events Related to Opioids (RADEO) - identifies as a key risk factor in the safe use of opioids. A 2008 report published in the Expert Review of Respiratory Medicine indicated that up to 80% of moderate to severe cases of OSA are undiagnosed. Other risk factors are identified in the PPAHS PCA Safety Checklist.

Intermittent spot checks are not sufficient to detect the signs of respiratory depression.

The PPAHS advocates for regular interaction of nurses and other clinicians with patients. However, for patients receiving opioids, intermittent "spot checks" to determine key physiologic metrics are not sufficient in isolation.

Respiration can rapidly decelerate under the influence of opioids, sometimes in a matter of minutes. By the time a patient experiencing opioid-induced respiratory depression is visited again, it can be too late to intervene.

As a result, PPAHS strongly recommends the use of continuous electronic monitoring for all patients receiving opioids. This position is echoed by ECRI, which listed "Undetected Opioid-Induced Respiratory Depression" in its Top 10 Health Technology Hazards for 2017.

All patients receiving opioids must be monitored using continuous electronic monitoring.

Pulse oximetry is a lagging indicator of respiratory distress.

The use of pulse oximetry to monitor is broadly used in hospital settings. While continuous monitoring with pulse oximetry is encouraged, the sole use of the technology to monitor for respiratory depression is not sufficient.

In an interview with Richard Kenney MSM, RRT, NPS, ACCS, RCP (Director, Respiratory Care Services, White Memorial Medical Center) outlines why:

> "Pulse oximetry is only designed to detect oxygen saturation and heart rate, not the ventilatory status of a patient. By the time oxygen saturation has dropped and the alarms are alarming, you've gotten beyond that threshold of the patient having a quick recovery from that."

This lagging indicator can be elongated if supplemental oxygen is being administered to the patient.

Robert Stoelting, MD, President of the Anesthesia Patient Safety Foundation states:

> "The conclusions and recommendations of APSF are that intermittent 'spot checks' of oxygenation (pulse oximetry) and ventilation (nursing assessment) are not adequate for reliably recognizing clinically significant evolving drug-induced respiratory depression in the postoperative period. For the CMS measure to better ensure patient safety, APSF recommends that monitoring be continuous and not intermittent, and that continuous electronic monitoring with both pulse oximetry for oxygenation and capnography for the adequacy of ventilation be considered for all patients."

Robust patient monitoring plans provide an earlier indication of respiratory depression.

An effective plan gives attending clinicians the earliest warning of declining patient health. Patient monitoring plans should provide continuous monitoring of multiple physiologic metrics; ideally, this technology is implemented in a way that is as minimally invasive as possible for both patients and clinicians (such as wearable & wireless) to facilitate and encourage patient mobility.

Most notably, PPAHS advocates for the inclusion of capnography monitors alongside other methodologies. Studies have shown that monitoring of end-tidal CO_2 (ETcO2) provides an earlier indication of respiratory distress than intermittent checks or pulse oximetry. In one study, 72% of events of prolonged hypoxia were preceded by a drop in ETcO2, at an average of 3.7 minutes before a subsequent decrease noted by pulse oximetry.

Monitoring with capnography has been endorsed by the Association of periOperative Nurses (AORN):

> "Perioperative nurse should monitor exhaled CO2, end-tidal CO2, by capnography in addition to SPO2 by pulse oximetry during moderate sedation analgesia procedures"

It is also supported by the Association for Radiologic & Imaging Nursing (ARIN):

> "ARIN endorses the routine use of capnography for all patients who receive moderate sedation/analgesia during procedures in the imaging environment. This position is based on an extensive literature review demonstrating technical superiority and cost advantages with capnography use."

This multiple-parameter monitoring philosophy is recommended by the Canadian Anesthesiologists' Society (CAS). The organization's anesthesia guidelines requires monitoring with pulse oximetry, blood pressure, electrocardiography, and capnography for general anesthesia and sedation.

Monitoring is an important, but not all-encompassing, facet of opioid safety.

While continuous electronic monitoring can provide an earlier indication of respiratory depression, it is one part of the solution. Monitors are not meant to remove clinicians from the equation; instead, monitoring technology should be a multiplying factor for hands-on, proactive care.

A comprehensive quality improvement program is one that empowers clinicians to identify high-risk patients, develop the right processes, and intervene in life-threatening incidences in an effective manner. The Society of Hospital Medicine's RADEO guide provides in-depth recommendations on selecting the right checklists and processes to do so. PPAHS also offers a free, downloadable PCA Safety Checklist that was developed as a result of an expert panel.