



# How safe are your patients?

Addressing opioid risks in the hospital setting



Gina Pugliese, RN, MS  
Vice president / Premier Safety Institute

Opioid analgesics provide dose-dependent pain relief with minimal toxic effects for patients suffering from a variety of conditions, such as trauma-related injuries, post-surgical pain, cancer and other diseases. They can be administered by a variety of delivery systems, including oral, parenteral, transdermal, epidural and spinal. Examples of opioids include morphine, fentanyl and others.

## Opioids associated with serious adverse events

A recent study showed that opioids were used in more than half of hospital admissions of non-surgical patients at 286 U.S. hospitals.<sup>1</sup> Two specific opioids – fentanyl and morphine – are among the top 10 medications administered to pediatric inpatients.<sup>2</sup>

Unfortunately, opioids are some of the most frequently associated drugs with adverse reactions. In one large study, opioids were responsible for 16 percent of drug-related adverse effects,<sup>3</sup> while a study of post-surgical patients found that

almost 14 percent of those who received opioids experienced an adverse event.<sup>4</sup>

Such incidents can include excessive sedation and respiratory depression, nausea, vomiting, constipation, falls, hypotension, hallucinations, delirium and aspiration pneumonia. These symptoms can occur in patients receiving any opioid drug, and serious adverse events can happen even when opioids are prescribed correctly. Although the risk has been described as small, respiratory

depression, one of the most serious adverse effects, can lead to respiratory arrest and death.<sup>5,6</sup>

Opioid-associated adverse events are also costly. A recent study, using a Premier database, found that post-surgical patients who experienced an opioid-related adverse event were significantly more likely to incur greater expense, have a longer length of stay and experience more readmissions.<sup>7</sup>

There are strategies that can mitigate risks associated with inpatient opioid use, including:

- Prescreening to identify patients at risk;
- Using non-opioid analgesia;
- Adopting careful patient-controlled analgesia (PCA) practices; and
- Carefully monitoring patients during opioid therapy.

## Prescreen to identify patients at risk

Patient responses to opioids are highly variable due to biological differences, interactions with other drugs (e.g., sedatives, hypnotics), and

### Opioid analgesics

- Codeine
- Dextropropoxyphene
- Fentanyl
- Hydrocodone
- Hydromorphone
- Meperidine
- Methadone
- Morphine
- Oxycodone
- Pentazocine

OUTLOOK QTR 3.14 | 17

comorbid conditions.<sup>8</sup> Clinical studies and reports have identified several factors that put patients at higher risk for sedation and respiratory depression due to opioid use. Clinicians should carefully screen patients for these risk factors and consider risk levels when creating pain management plans. They should also question patients or their representatives about past exposure to opioids and any associated side effects.

## Choose non-opioids to cut risks

Multimodal (balanced) therapy for pain is the administration of two or more drugs (by the same or different routes) that use diverse mechanisms to provide analgesia.<sup>9</sup>

The use of multimodal pain management allows lower doses of each analgesic and may reduce the severity of

side effects associated with each drug.<sup>10,11</sup> There can also be a synergy when drugs with different action mechanisms are combined.<sup>12</sup> According to an American Society of Anesthesiologists (ASA) task force, pain management therapy should be multimodal whenever possible to reduce the risks associated with opioids.<sup>14</sup>

Clinicians should implement multimodal pain plans for both short- and long-term pain management, shifting from an opioid-based to an opioid-sparing approach. To reduce the use of opioids, using or adding non-narcotic medications should be considered. These include NSAIDs, acetaminophen, regional infusion of local anesthetics, steroids, ketamine and gabapentinoids. The ASA task force also recommends that pain management plans include continuous

regimens with NSAIDs, COX-2 inhibitors or acetaminophen, unless there is a patient contraindication.<sup>15</sup>

## Carefully monitor patients on opioid therapy

While assessing patient risk factors before initiating opioid therapy is necessary, that alone is not enough to prevent serious adverse events. According to the Joint Commission, “Even at therapeutic doses, opiates can suppress respiration, heart rate and blood pressure, so the need for monitoring and observation is critical.”<sup>16</sup> The Joint Commission, which recommends performing serial assessments of respiration and depth of sedation, notes that continuous electronic monitoring of oxygenation and ventilation may be appropriate in some cases.<sup>17,18</sup>

A task force of the Anesthesia Patient Safety Foundation (APSF) advises healthcare providers to use continuous electronic monitoring for post-operative patients who receive opioids in an inpatient setting.<sup>19</sup> This includes monitoring oxygenation (e.g., pulse oximetry) for those patients not receiving supplemental oxygen and ventilation (e.g., capnography) for patients who are on supplemental oxygen.

## Adopt safe PCA practices

Patient-controlled analgesia can be effective in delivering pain medication in an inpatient setting. However, the safety of PCA is highly dependent on the practices surrounding its use. A recent national survey found significant gaps in PCA practices. For example, almost 20 percent of hospitals failed to assess patients’ previous exposure to opioids before initiating PCA.<sup>20</sup>

Also disturbing is the fact that approximately one-third of survey respondents reported that “alarm fatigue” prevented them from implementing continuous electronic monitoring. With the documented gaps in safety practices related to PCA, the failure of clinicians to respond to or silence PCA alarms represents a serious patient safety concern.

To reduce the risks associated with PCA, the Joint Commission recommends careful patient selection, ongoing monitoring of those receiving PCA, and possible use of infusion pumps with dosage error reduction software. The Joint Commission dedicated a Sentinel Event Alert to the risks associated with PCA given by family members and others who are not authorized to administer the drugs (“PCA by proxy”).<sup>21</sup> The Alert recommended education of staff and family members about the danger of PCA by proxy and reiterated the importance of careful patient selection and monitoring.

To ensure consistent safety practices, organizations should consider using a PCA safety checklist, such as the one created by the Physician Alliance for Health and Safety.<sup>22</sup>

## Conclusion

Opioid analgesics are widely used in the inpatient setting and can be associated with respiratory depression and other adverse events, even when prescribed correctly. Clinicians can take steps to reduce the risk of opioid-associated adverse events, including:

- Prescreening all patients to identify those at higher risk for these events, such as those with obstructive sleep

apnea or who recently underwent thoracic surgery;

- Incorporating non-opioid analgesics to create a balanced multimodal pain management plan; and
- Carefully monitoring patients’ respiration and level of sedation and strongly considering continuous electronic monitoring for all patients.

Meanwhile, healthcare leaders should mandate the use of safe PCA practices, including the avoidance of PCA

administration by family members and others without proper training. They should also consider ordering the use of safety checklists.

■ For more information on opioids, see *Opioids and Patient Safety* on the Premier Safety Institute website at [www.premiersafety.com/opioids](http://www.premiersafety.com/opioids).<sup>23</sup>

For additional information, see Premier Safety Institute’s review: *Opioid analgesics: a double threat to patient safety*.

## REFERENCES

1. J. Herzig et al., “Opioid Utilization and Opioid-Related Adverse Events in Non-surgical Patients in US Hospitals,” *J Hosp Med* 9 (2014): 73-81.
2. T. Flacker et al., “Estimating Pediatric Inpatient Medication Use in the United States,” *Pharmacoepidemiol Drug Saf* 20, no. 1 (2011): 76-82.
3. E. C. Davies et al., “Adverse Drug Reactions in Hospital Inpatients: A Prospective Analysis of 3695 Patient Episodes,” *PLoS One* 4, no. 2 (2009): e44309.
4. E. R. Kosler et al., “Cost and Quality Implications of Opioid-Based Postoperative Pain Control Using Administrative Data From a Large Health System: Opioid-Related Adverse Events and Their Impact on Clinical and Economic Outcomes,” *Pharmacotherapy* 33, no. 4 (2013): 385-391.
5. C. Kao and M. Elkerram, “Respiratory Effects of Opioids in Perioperative Medicine,” *Open Anesthesiol Journal* 5, suppl. no. 1-3 (2011): 23-34.
6. F. J. Overdyk et al., “Continuous Oximetry/Capnometry Monitoring Reveals Prevalent Desaturation and Bradypnea During Patient-Controlled Analgesia,” *Anesth Analg* 102, no. 2 (2007): 412-8.
7. G. M. Odeh et al., “Effect of Opioid-Related Adverse Events on Outcomes in Selected Surgical Patients,” *J Pain Palliat Care Pharmacother* 6, no. 1 (2013): 62-70.
8. C. Kao and M. Elkerram, “Respiratory Effects of Opioids in Perioperative Medicine,” *Open Anesthesiol Journal* 5, suppl. no. 1-3 (2011): 23-34.
9. Joint Commission, “Safe Use of Opioids in Hospitals,” *Sentinel Event Alert* 49 (2012): 1-5.
10. American Society of Anesthesiologists Task Force on Acute Pain Management, “Practice Guidelines for Acute Pain Management in the Perioperative Setting: An Updated Report by the American Society of Anesthesiologists Task Force on Acute Pain Management,” *Anesthesiology* 116, no. 2 (2012): 244-73.
11. Ellis et al., “Does Multimodal Analgesia with Acetaminophen, Nonsteroidal Anti-inflammatory Drugs, or Selective Cyclooxygenase-2 Inhibitors and Patient-Controlled Analgesia Morphine Offer Advantages Over Morphine Alone? Meta-Analyses of Randomized Trials,” *Anesthesiology* 103, no. 6 (2005): 1296-304.
12. E. Maund et al., “Paracetamol and Selective and Non-selective Non-steroidal Anti-inflammatory Drugs for the Reduction in Morphine-related Side-effects After Major Surgery: A Systematic Review,” *Br J Anaesth* 106, no. 3 (2011): 295-7.
13. Fernandez-Duque et al., “Synergistic Interaction between Fentanyl and a Transdermal Fentanyl Combination on the Inhibition of Nociception in Mice,” *J Pharmacol Sci* 118, no. 2 (2012): 299-302.
14. American Society of Anesthesiologists Task Force on Acute Pain Management, “Practice Guidelines for Acute Pain Management in the Perioperative Setting: An Updated Report by the American Society of Anesthesiologists Task Force on Acute Pain Management,” *Anesthesiology* 116, no. 2 (2012): 244-73.
15. 15b6.
16. Joint Commission, “Safe Use of Opioids in Hospitals,” *Sentinel Event Alert* 49 (2012): 1-5.
17. 17b6.
18. Joint Commission, “Patient-Controlled Analgesia by Proxy,” *Sentinel Event Alert* 33 (2010): 1-2.
19. Anesthesia Patient Safety Foundation, *No Patient Shall Be Harmed by Opioid-Induced Respiratory Depression*, 2011. Available at: <http://www.apsf.org/newsletters/Nov2011/fall-no-opioid.htm> (accessed March 25, 2014).
20. Wong M, Mahony A, Gonzalez R. First national survey of patient-controlled analgesia practices. *Physician-Patient Alliance for Health & Safety* 2012. Available at: <http://jpaas.files.wordpress.com/2013/10/first-national-survey-of-patient-controlled-analgesia-practices.pdf> (accessed March 26, 2014).
21. Joint Commission, “Patient-Controlled Analgesia by Proxy,” *Sentinel Event Alert* 33 (2010): 1-2.
22. Physician-Patient Alliance for Health & Safety (PPAHS), *Patient-Controlled Analgesia (PCA) Safety Checklist*, 2013. Available at: <http://jpaas.org/category/patient-monitoring/> (accessed March 26, 2014).
23. “Opioids and Patient Safety,” Premier Safety Institute Website. [www.premiersafety.com/opioids](http://www.premiersafety.com/opioids).

## Patient factors increasing the risk of sedation and respiratory depression with opioids<sup>9</sup>

- Obstructive sleep apnea (OSA) or high risk for OSA
- Morbid obesity with high risk of sleep apnea
- Advanced age
- Longer duration of general anesthesia
- Lack of recent opioid exposure
- Post-surgical period, especially for procedures in the thoracic or upper abdominal areas
- Increased opioid use requirement or habituation
- Concurrent use of other drugs with sedative effects, including antihistamines, benzodiazepines, sedatives, diphenhydramine and other CNS depressants
- Smoking
- Comorbid pulmonary or cardiac disease or major organ dysfunction or failure (e.g., renal or hepatic)