Monitoring Sedation in Patients Receiving Opioids for Pain Management

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Excessive sedation precedes opioid-induced respiratory depression. An evidence-based practice project standardized systematic sedation monitoring by nurses using an opioid sedation scale and respiratory assessment when opioids are administered for pain management. Nurses were educated and documentation updated. Nurses demonstrated increased ability to identify at-risk patients (3.2 pre-implementation; 3.6 post-implementation; 1-4 Likert scale) and reported understanding the tool to assess for oversedation (2.6 pre-implementation; 3.2 post-implementation). Documentation compliance improved, and patient safety was maintained. Key words: evidence-based nursing, opioid analgesics, pain, physiologic monitoring, sedation, sedation monitoring

RECOGNIZING the right of all patients to appropriate assessment and pain management was a standard issued by The Joint Commission in January 2001.1,2 Increased emphasis on pain management allowed for increased ordering and administration of opioid analgesics. Nursing’s role continues to be assessment and monitoring of efficacy while balancing side effects.

Sedation is a common side effect of opioid medications, especially when opioid medications are first administered or the opioid dose is increased significantly.3-10 Research has shown that excessive sedation precedes opioid-induced respiratory depression, which can progress to respiratory failure if not promptly reversed.5,10,11 Assessment of sedation and decreasing the opioid dose and increasing monitoring when excessive sedation is detected are important nursing activities that can prevent this unintended and potentially fatal scenario. There is an abundance of case reports and research published over the past several years showing that respiratory depression can occur in patients of all ages and in a variety of settings.9,10,12-24 Concern over the large number of opioid-induced adverse events in US hospitals prompted The Joint Commission to issue a Sentinel Event Alert in 2012, which encouraged hospitals to evaluate practices surrounding opioid administration.25

A review of the existing literature and concern for safety to prevent an opioid-related adverse event led to the implementation of changes in practice at an academic medical center. Nurses who administer opioid
medications have the ability to affect patient outcomes by closely monitoring all patients for opioid-induced side effects and intervening in a timely manner to prevent adverse outcomes.

PURPOSE/RATIONALE

The purpose of this evidence-based practice (EBP) project was to standardize monitoring of sedation in adult and pediatric patients receiving opioid analgesia in general care areas. Evidence suggests that standardization of monitoring is necessary to help nurses identify excessive sedation and prevent respiratory depression while providing the best possible pain management for patients.

THE EBP PROCESS

The Iowa Model of Evidence-Based Practice to Promote Quality Care serves as the framework to successfully promote the integration of evidence into practice and outlines the process for developing an EBP project. The first step is to identify the project trigger, which is either a practice problem or new knowledge. This EBP project began as a result of both types of triggers: a problem-focused trigger came from a desire to improve processes and manage risk within the institution and a knowledge-focused trigger came from new literature emphasizing the need to monitor sedation in patients receiving opioids. The next steps in the Iowa Model require the involvement of leaders in the health care facility or in the nursing unit, depending on the scope and purpose of the EBP project; the prioritization of issues to be addressed; and assembling a team to begin work on the project. The EBP project was given high priority and had strong support at all organizational levels, thus providing resources to support the practice change.

A multidisciplinary team is selected to review, critique, and synthesize evidence in the literature. The team for this EBP project was comprised of representatives from nursing, pharmacy, and medicine. Nursing staff of all levels, including bedside staff nurses, nurse managers, assistant nurse managers, and clinical nurse specialists, participated and provided input. Team members from nursing informatics were integral to the process as the new practice change needed to be integrated into the electronic medical record. It was important to include pharmacy professionals and physicians, as they needed to be aware of how nurses would be monitoring patients and when they would be notified if a patient appeared to be excessively sedated during opioid administration.

Benchmarking was completed to garner current external practices and tools to monitor opioid-induced sedation. An international pain expert was crucial in helping the project team decipher what the evidence suggested. According to the Iowa Model, the team initiates change if the research evidence is sufficient. If the evidence is insufficient, the team reviews other evidence or suggests more research. After a thorough review of the literature and expert consultation, the work team initiated a practice change related to nurse monitoring of unintended sedation in all pediatric and adult patients who were receiving opioids for pain management in general care units.

The Iowa Model recommends piloting the desired practice change in a clinical area and evaluating its effectiveness to determine, if and what, revisions are needed before integrating and applying the change in other clinical areas. Ongoing evaluation and dissemination of the results of the EBP project are critical to sustain change and to help others implement change. Internal dissemination of the results was completed through the institutional nursing shared governance structure and committees and at several educational offerings.

SYNTHESIS OF THE EVIDENCE

The goal for this EBP project was to monitor unintended (unwanted) sedation in an effort to prevent respiratory depression when opioids were administered for the purpose of pain management. It was important for the team to differentiate this goal from the goal
of producing intentional (wanted) sedation, for example, during painful procedures and in ventilated critically ill patients. The EBP team reviewed and critiqued the available evidence and the factors that influence the incidence of unintended sedation in general care practice settings.

Protecting patients from opioid-induced adverse outcomes, such as excessive sedation and respiratory depression, was top priority. Literature exists to provide guidance regarding what factors put patients at high risk for these adverse events (see Supplemental Digital Content Table 1, available at: http://links.lww.com/JNCQ/A76). Although risk factors were identified, the EBP team recognized that all patients are at risk for opioid-induced sedation and respiratory depression and designed the project to protect all patients. As supported in the literature, vigilant nurse monitoring of sedation and respiratory status is essential during the first 24 hours of opioid administration after surgery, when existing doses of analgesics are altered, and when new analgesic modalities are introduced.* The literature underscored the need to evaluate patients’ responses to opioid treatment in order to ensure patients have adequate oxygenation and ventilation.†

The literature identified a variety of both patient and iatrogenic factors that influence the level of monitoring required during opioid administration. Examples of patient factors include: age, opioid tolerance, and co-morbidities. Examples of iatrogenic factors include: concomitant administration of other sedating medication, pharmacokinetics (what the body does to the drug) and pharmacodynamics (what the drug does to the body) of the various opioids, and routes of administration. The number and diversity of factors underscore the importance of taking an individualized approach to patient monitoring during opioid administration.‡

The literature search identified sedation as a common, but often overlooked, side effect of opioids because it is not systematically assessed. According to Pasero,8 sedation usually precedes opioid-induced respiratory depression and therefore is a sensitive indicator of a potential adverse respiratory event. Patients progress along a continuum from an alert and awake state to a comatose state in most cases,4 which implies the need to complete assessments using a tool that allows nurses to identify levels of sedation. The EBP team reviewed various sedation assessment tools identified for clinical use in the literature before deciding on the Pasero Opioid-Induced Sedation Scale (POSS).33 The POSS was found to be reliable and valid for the assessment of unintended sedation during opioid administration in general care units.28 The POSS was chosen for this reason as well as its simplicity of use and reliability in early identification of excessive sedation in patients receiving opioids.8,14,28,29

HOSPITAL POLICY AND PRACTICE CHANGE

The EBP team created a hospital-wide policy (see Table for Practice Highlights) based on evidence in the literature and consistent with published American Society for Pain Management Nursing guidelines.7 The policy will be reviewed and revised at least every 3 years per hospital policy to ensure that it reflects current research and evidence-based practices. The policy requires that nurses monitor sedation levels using the POSS before and after all opioid medications are given, regardless of route of administration. A respiratory assessment that includes rate, rhythm/pattern, effort, depth, and airway characteristics (eg, presence of snoring)
Table. Practice Highlights: Monitoring Sedation in Patients Receiving Opioids for Pain Management

<table>
<thead>
<tr>
<th>Monitoring Guidelines:</th>
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<tbody>
<tr>
<td>• Two required components:</td>
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<tr>
<td>o Respiratory Assessment(^b)</td>
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<tr>
<td>■ Rate</td>
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<tr>
<td>■ Rhythm/Pattern</td>
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<tr>
<td>■ Effort</td>
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<td>■ Depth</td>
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<td>■ Airway Characteristics</td>
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<tr>
<td>o Sedation Assessment</td>
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<tr>
<td>■ Modified POSS:</td>
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<tr>
<td>0 = Sleep and easy to arouse; Acceptable, no action necessary; may increase opioid dose if needed/ordered</td>
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<tr>
<td>1 = Awake and alert; Acceptable, no action necessary; may increase opioid dose if needed/ordered</td>
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<tr>
<td>2 = Slightly drowsy, easily aroused; Acceptable, no action necessary; may increase opioid dose if needed/ordered</td>
</tr>
<tr>
<td>3 = Frequently drowsy, arousable, drifts off to sleep during conversation; Unacceptable; decrease opioid dose; continue to monitor more frequently until return to baseline; notify licensed provider; and consider calling the Rapid Response Team and giving dilute naloxone</td>
</tr>
<tr>
<td>4 = Somnolent, minimal, or no response to physical stimulation; Unacceptable; stop opioid; continue to monitor more frequently until return to baseline; notify licensed provider; and consider calling the Rapid Response Team and giving dilute naloxone</td>
</tr>
<tr>
<td>• Frequency of assessment based on route and method of delivery:</td>
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<tr>
<td>o Continuous Infusions/Long-Acting Opioids or Patient Controlled Analgesia, Caregiver Controlled Analgesia, Frequent Nurse Controlled Analgesia with and without a basal rate:</td>
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<tr>
<td>■ At initiation</td>
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<tr>
<td>■ Initial reassessment based on peak effect of opioid, patient activity, risk factors for sedation, and previous exposure to opioids</td>
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<tr>
<td>■ Every 1 hour for 12 hours</td>
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<tr>
<td>■ Every 2 hours for 12 hours</td>
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<tr>
<td>■ Then every 4 hours for the duration of administration (if patient stable and POSS score &lt; 3)</td>
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<tr>
<td>o Scheduled or PRN (as needed) Opioids or Infrequent/Routine Nurse Controlled Analgesia (any route):</td>
</tr>
<tr>
<td>■ At initiation</td>
</tr>
<tr>
<td>■ Initial reassessment based on peak effect of opioid, patient activity, risk factors for sedation, and previous exposure to opioids</td>
</tr>
<tr>
<td>■ After the initial 24 hours, stable patients receiving around-the-clock opioid dosing may have respiratory and sedation reassessments completed every 4 hours</td>
</tr>
</tbody>
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Abbreviations: POSS, Pasero Opioid-Induced Sedation Scale.
\(^a\)From Jarzyna et al., Pasero,\(^b\) and Pasero et al.\(^c\)
\(^b\)Based on nursing judgment, patients who are alert, awake, and/or participating in activities may not require a full respiratory assessment.

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Monitoring Sedation in Patients Receiving Opioids for Pain Management is also conducted at the same intervals as the sedation assessment.

The policy outlines considerations for assessment in sleeping patients. Nurses are instructed to assess the patient’s respiratory status before arousing the patient and then reassess for sedation (e.g., responsiveness to stimuli, such as seeing whether the patient stirs when the bed is lightly bumped or the shoulder is lightly squeezed). Nurses must awaken patients if there is an abnormal assessment or if the patient is snoring.

As part of the policy, nurses consider the opioid pharmacokinetic and pharmacodynamic factors when determining the monitoring requirements. In addition to the baseline assessment before opioid administration, nurses reassess patients at the opioid’s peak effect time. Monitoring differs depending on the frequency of opioid dosing as well. For example, the monitoring during intermittent dosing differs from the monitoring when long-acting opioids and continuous infusions and patient-controlled analgesia are administered. The policy does not address monitoring requirements for intraspinal therapies, as these were already standardized based on published evidence-based guidelines. The policy also does not require routine monitoring of sedation in palliative care patients at end-of-life because the sedation goals may differ in those patients from patients in general care units; however, sedation assessment is provided when requested by the licensed provider.

A documentation flowsheet was created and added to the electronic medical record based on the new policy requirements. The flowsheet was revised based on feedback received from nurses who participated in the pilot. For example, reminders (practice prompts) about the required frequency of assessment for patients receiving continuous opioids versus patients receiving intermittent opioids were added based on nurses’ feedback.

IMPLEMENTATION STRATEGIES

One of the most challenging and time-intensive steps in the EBP process is to ensure that the implementation phase is effective in accomplishing identified goals and the practice change is sustained well into the future. Evidence of this is depicted on the project timeline, which is provided in Supplemental Digital Content Table 2 (available at http://links.lww.com/JNCQ/A77). A multifaceted implementation process was applied because prior evidence suggested that using only one implementation strategy, such as education, would not be enough to ensure complete adoption and integration of the practice change within a large health care system.

The POSS was implemented following a pilot program on selected units. Nurses on the pilot units were informed and educated about the new standard of practice and policy through a variety of formats. Educational approaches included in-services during staff meetings and a PowerPoint presentation through the hospital computer education system. A 1-page flier and pocket cards were distributed (see Supplemental Digital Content Figure 1, available at: http://links.lww.com/JNCQ/A75), and unit reference binders were created. The pain resource nurses from the pilot units assisted with initial and ongoing education and implementation of the practice change in their individual clinical units and served as primary resources to the bedside nurses.

EVALUATION

Prior to implementation of the practice change, nurses on the pilot units completed a questionnaire to assess their baseline knowledge and attitudes regarding patient assessment, monitoring, and risk factors related to opioid administration. Approximately 6 months after the practice change was implemented house-wide, nurses on the pilot units completed the same questionnaire to evaluate whether or not changes had occurred. Pre- and post-implementation results (Figure 1) demonstrated that nurses were better able to identify patients at risk for oversedation when administering opioids (3.2 pre-implementation; 3.6 post-implementation;
1-4 Likert scale) and nurses reported understanding the tool to assess for oversedation (2.6 pre-implementation; 3.2 post-implementation).

Post-implementation evaluation of the EBP project also included monthly random chart audits by clinical nurse specialists, pain resource nurses, and nurse managers. The chart audits entailed reviewing at least 5 patient charts per unit for compliance with monitoring as demonstrated by documentation in the electronic medical record in a defined 24-hour time frame. Supplemental Digital Content Table 3 (available at http://links.lww.com/JNCQ/A78) provides the Opioid Monitoring – Audit-Feedback Tool used. The data were discussed at the monthly Nursing Pain Management Committee meetings. The initial data showed low compliance rates, which prompted additional efforts aimed at improving compliance and follow-up education at the unit level.

Audits continue on a monthly basis and demonstrate improved compliance with documentation of the initial POSS (22% June 2011; 61% December 2011; 73% December 2013) and reassessment of the POSS at medication peak (21% June 2011; 49% December 2011; 68% December 2013). Documentation compliance of respiratory assessments at baseline and medication peak also improved for the same time frames (Figure 2). These results demonstrate an improvement, but a continued focus is necessary for full integration into daily nursing practice. To accomplish this goal, education and data feedback continue at the unit and departmental levels, including review of institutional incident report case studies that are meaningful to each nursing unit. The clinical nurse specialists and pain resource nurses continue to emphasize and focus on fully integrating this practice change, since it affects a large proportion of patients within the organization.
The recent organizational commitment to increase staff nurse participation on all shared governance committees, including the Nursing Pain Management Committee, has resulted in enhanced patient safety and improved patient outcomes. For example, overall awareness and compliance with monitoring sedation have increased as demonstrated by the monthly audit results and random case reviews. The most important outcome of this EBP project is that the overarching goal of the project has been achieved in that, to date, no cases of respiratory failure or death have been attributed to opioid administration since the practice change was implemented and adopted house-wide.

CONCLUSION

Health care professionals strive to deliver safe and effective pain management to all patients on a daily basis. This can be challenging when opioid analgesics are administered as part of the pain treatment plan. As a mainstay to postoperative and acute pain management, opioids are used in almost every patient care area, but they carry the risk of excessive sedation, which can lead to respiratory depression. An EBP project was undertaken in an academic medical center to identify patient risk and establish monitoring parameters for patients receiving opioid analgesics in an effort to prevent unintended excessive sedation and potentially fatal respiratory depression in general care units. As a result, bedsides nurses have demonstrated an improved ability to identify patients at risk for oversedation when administering opioid medications and report providing safer care to these patients with the new sedation and respiratory monitoring policy.
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