PA PSRS
Pennsylvania Patient Safety Reporting System

Patient Safety Advisory

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PCA by Proxy—An Overdose of Care

Patient-controlled analgesia (PCA) has considerable potential to improve pain management for patients, allowing them to self-administer more frequent but smaller doses of analgesia. When used as intended, PCA actually reduces the risk of over-sedation, which is an unintended consequence of the more traditional method of nurse-administered analgesia in larger, less frequent doses. In fact, with PCA, patients often develop a synergism with the device and can quickly learn how to manage their pain while avoiding undue mental clouding.

Several safety features exist with PCA to make sure patients do not receive too much analgesia. These include a lockout interval that specifies the minimum amount of time between each dose, and a maximum allowable amount that may be administered during a set time interval.

Another "built-in" safety feature that is often overlooked is that the device is intended for *patient* use. A sedated patient will not press the button to deliver more opiate, thus avoiding toxicity. However, family members and health professionals have administered doses for the patient, by proxy, hoping to keep them comfortable. This well-intentioned effort has resulted in cases of over-sedation, respiratory depression, and even death.[1]

PA-PSRS has received a number of reports where family members activated the PCA bolus. In one such report, a patient received morphine PCA at 1 mg/hr with a 1.5 mg patient-administered bolus every eight minutes as needed. When the attending physician from the Pain Service entered the patient's room, he witnessed the patient's boyfriend pushing the PCA button for the patient. The patient was placed on a monitor, and it was noted that her oxygen saturation had dropped to 40%. Her PCA was stopped, and she was placed on 100% oxygen until her oxygen saturation improved.

PA-PSRS has also received reports of *nurse*-controlled analgesia. Nurse-controlled analgesia may be used in critical care settings if patient selection protocols have been established and assessment tools are in place to guide the level of pain and sedation.

However, another report stated that during the changing of a patient's linens, the patient experienced severe sternal pain. When the patient was asked what was wrong, he verbally expressed that he was in pain. When asked if he was using his PCA button, the patient responded "What button?" Further investigation by the organization revealed that the patient had been given pain medication throughout the night, but the nurse had been pushing the button. The patient had not received any education on pain control before the initiation of PCA therapy.

Similar cases have been reported to other patient safety reporting systems. For example, the USP-ISMP Medication Errors Reporting Program (MERP), received a report involving nurse-controlled analgesia in which a 72-year-old woman, following cancer surgery, was prescribed PCA with a 2 mg morphine loading dose and 1 mg every 10 minutes as needed (6 mg maximum per hour). Initially, the patient was restless and agitated in the post-anesthesia care unit, but she remained obtunded after surgery. Despite the patient's inability to verbalize pain, nurses pushed the PCA button and delivered frequent doses of morphine over the next 48 hours. Subsequently, the patient suffered a cardio-respiratory arrest and seizure, leading to hypoxic encephalopathy. She died several months later without ever regaining consciousness.[2]

In this case, the patient was most likely not a good candidate for PCA, and adequate assessment tools were not used to guide nurse-controlled analgesia. This patient was at risk for morphine toxicity because she was obtunded, obese, and had compromised lung capacity. Though vital signs were recorded periodically (oxygen saturation monitoring was not used), nurses did not recognize the signs of morphine toxicity and continued to administer the analgesic despite serious hypotension and very shallow respirations.[2]

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PCA by Proxy—An Overdose of Care (Continued)

Based on 15 reports of PCA error by proxy submitted to the U.S. Pharmacopeia (USP) medication error databases—12 cases were attributed to family members, two to a nurse, and one to a pharmacist.[3] Based on this information, the Joint Commission on Accreditation of Healthcare Organizations has recently issued a Sentinel Event Alert, which is being distributed to more than 8,500 accredited hospitals, critical access hospitals and home-care organizations across the country, on errors related to patient-controlled analgesia by proxy.[3]

To help reduce the risk of overdoses with PCA, consider the following steps:

- **Establishing selection criteria** for PCA and nurse-controlled analgesia. While PCA is used for a wide range of patients to safely manage pain (not agitation or restlessness), some patients are unsuitable candidates due to level of consciousness, psychological reasons, or limited intellectual capacity. Consider:
  - The types of patients who may be suitable for nurse-controlled analgesia.
  - Risk factors (age, weight, preexisting conditions, concomitant medications, etc.) that might necessitate increased monitoring.
  - Periodic reassessment of the appropriateness of therapy at regular intervals.[4]

- **Developing protocols and standardized order sets** to guide the selection of drugs, dosing, lockout periods, and infusion devices. Consider:
  - Avoiding use of meperidine (due to the risk of neurotoxicity), and if hydromorphone is used, ensuring proper dosing based on narcotic equivalents.
  - Prohibiting use of other analgesics while PCA is being administered.

- **Increasing patient monitoring**. Opiates, even at therapeutic doses, can suppress respiration, heart rate, and blood pressure, so the need for monitoring and observation cannot be overemphasized. This can be more important during the first 24 hours and at night since the effects of opiate analgesics on intellectual functioning are not entirely predictable, and nocturnal hypoxia can be a serious side effect. Monitoring parameters might include regular clinician assessment of vital signs, alertness, pulse oximetry or capnography, and patient self-reported pain using a consistent pain scale. If support staff takes vital signs, a timely clinician's review is important. If continuous pulse oximetry or capnography is not available for all patients, using it for those with heightened risk of toxicity and when nurse-controlled analgesia is employed may be wise.

- **Requiring two clinicians to independently double check** patient identification and PCA device dose settings prior to use (and each pump refill) to detect possible errors.

- **Educating patients and families** about the proper use of PCA before initiation. Starting this education during the preoperative testing visit may improve patient understanding and recall. Warning family members and visitors about the danger of PCA by proxy may also help to prevent this type of error.[5]

- **Educating staff about proper use of PCA**. One strategy is to encourage clinicians to critically think about the cumulative dose that the patient could receive if the maximum dose limits were given. Ensuring that staff receives adequate training on all pumps that are used to deliver analgesics is also important.

Notes

1. ISMP. Medication Safety Alert! 10 Jul 2003; (8), 14.

2. ISMP. Medication Safety Alert! 29 May 2002; (7), 11.

3. Joint Commission on Accreditation of Health Care Organizations. Sentinel event alert: patient controlled analgesia by proxy [online]. 20 Dec 2004; (33). [Cited 2005 Feb 21.] Available from Internet: http://www.jcaho.org/about+us/news+letters/sentinel+event+alert/sea_33.htm.

4. ISMP. Nurse Advise-ERR™. Feb 2005; (3), 2.

5. ISMP. Medication Safety Alert! 24 Jul 2003; (8), 15.

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The Institute for Safe Medication Practices (ISMP) is an independent, nonprofit organization dedicated solely to medication error prevention and safe medication use. ISMP provides recommendations for the safe use of medications to the healthcare community including healthcare professionals, government agencies, accrediting organizations, and consumers. ISMP's efforts are built on a non-punitive approach and systems-based solutions.

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