

Patient Safety Tip of the Week

June 2, 2015 Reminders of Dilaudid Dangers

It's been almost 5 years since we did our first column on the dangers of Dilaudid/HYDROmorphine (see our September 21, 2010 Patient Safety Tip of the Week "[Dilaudid Dangers](#)") but it remains one of our most frequently accessed columns. Unfortunately, many of the systemic problems we've noted in association with Dilaudid treatment persist and preventable deaths continue to occur. Two new cases serve as a reminder of some of those key problems.

The first appears in a statement of deficiencies and plan of correction from the California Department of Public Health ([CDPH 2014](#)). A patient was admitted with abdominal pain, nausea, vomiting and diarrhea and began receiving IV Dilaudid for pain. Two 1 mg doses were given in the emergency department separated by 3 hours. On admission to the floor Dilaudid doses were increased to 2 mg, then 4 mg so that the patient received a total of 20 mg of Dilaudid over a 24-hour period (CDPH calculated that dose as being equivalent of 133 mg morphine). Unfortunately, the patient was found unresponsive at 2:56 AM on the day after admission and emergency resuscitation efforts were unsuccessful.

The rest of that story is typical from our many columns on failure to appropriately monitor patients who are on opioid therapy (see list at the end of today's column). The period between finding the patient unresponsive and the last prior assessment was 3 hours and 26 minutes. There was no documentation of the patient's pain level or sedation level before or after each Dilaudid dose. And there is no mention of how respiratory status was to be monitored. We assume pulse oximetry was not used in this case because the plan of correction adds pulse oximetry to their revised policy for intravenous dosing of HYDROmorphine. Of course, you already know that visual assessment of respiration and pulse oximetry by themselves are not adequate for monitoring for opioid-related respiratory depression. Rather, monitoring with capnography and looking for apnea are recommended in addition to pulse oximetry.

Details about comorbidities are not specified in the CDPH report other than that the Coroner's Autopsy Report notes under "other significant conditions" morbid obesity and obstructive sleep apnea. At the very least those conditions should have placed the patient in a very high risk category for any opioid therapy. Patients with obstructive sleep apnea usually have normal appearance of breathing and normal oxygen saturation while they are awake, providing a false sense of security. It is only when they are not aroused and fall back to sleep that the obstructive apnea supervenes.

There is also no mention about whether the patient was opioid-naïve or opioid-tolerant, an important consideration in dosing of any opioid.

The second case was an 85-year-old patient admitted to a Canadian hospital with a suspected bowel obstruction and prescribed 1-2 milligrams of Dilaudid every three hours, to be given by “subcutaneous” injection ([Blackwell 2015](#)). The patient suffered respiratory depression, developed pneumonia and died the next day. This case appeared in the news media because the physician apparently conveyed to the family that the medication had nothing to do with the patient’s demise, a position apparently supported by the coroner’s initial report. However, family prompted further review of the case and the coroner later issued a new statement, saying death probably resulted from “narcotic overdose.” The family, meanwhile, complained to the College of Physicians and Surgeons, which issued to the physician a “verbal caution” saying he should have been open about the significance of the “very large” dose of dilaudid given to an elderly, dehydrated patient unaccustomed to powerful opioids. Instead, he was “evasive and vague,” the committee concluded.

No further details about that case are available but it again raises two key issues related to such cases: (1) physicians (and other healthcare workers) often don’t have an appreciation of the relative potency of HYDROmorphine compared to morphine and (2) the issue of opioid-naïve vs. opioid-tolerant patients is important. And though HYDROmorphine can apparently be used by the subcutaneous route, we’ve not seen that route used in hospitalized patients. We suspect that may have been a route unfamiliar to the pharmacist(s) and nurse(s) at that hospital as well.

The major problem is misperception of the relative potency of HYDROmorphine. All too many healthcare professionals mistake HYDROmorphine as being equivalent to morphine when, in fact, HYDROmorphine is much more potent on a mg basis. While estimates of equipotency vary considerably in the literature, most now agree that 1 mg. of Dilaudid is probably the equivalent of at least 7 mg. of morphine. Chang and colleagues ([Chang 2006](#)) had noted several years ago that emergency room physicians and nurses who were hesitant to administer 7 to 10 mg. of morphine were not reluctant to administer 1 to 1.5 mg. of Dilaudid. They point out this is an illusion that less narcotic is being used with that Dilaudid dose.

We’ve highlighted a series of articles addressing the patient safety issues associated with HYDROmorphine from ISMP Canada in our Patient Safety Tips of the Week for September 21, 2010 “[Dilaudid Dangers](#)” and July 3, 2012 “[Recycling an Old Column: Dilaudid Dangers](#)”. Then in our November 19, 2013 Patient Safety Tip of the Week “[Can We Improve Dilaudid/HYDROmorphine Safety?](#)” we highlighted a safety bulletin from ISMP Canada ([ISMP Canada 2013](#)) reporting results of a targeted pilot intervention to improve HYDROmorphine safety. They looked at prior recommendations on HYDROmorphine safety and prioritized them according to a hierarchy of effectiveness and came up with 5 actions designed to improve system safety:

1. Preparation by pharmacy of doses less than 1 mg in prefilled syringes
2. Availability of standard-volume chart for usual doses withdrawn from a 2 mg/mL vial or ampoule

3. Creation of an electronic alert in CPOE screens, pharmacy information systems, and ADC (automated dispensing cabinet) screens for initial doses greater than 1 mg IV/IM/SC/PO
4. Performance of a weekly audit to remove high-dose HYDROmorphine (i.e. parenteral dose greater than 2 mg) from patient care areas
5. Distribution of an opioid information sheet to patients and families

They found that workload issues and alert fatigue were barriers that limited full implementation at some participating hospitals. They note that because of concerns about alert fatigue it may be more practical to limit the dose of HYDROmorphine by using standardized order sets. We concur with that. Order sets, whether computerized or paper-based, can help steer away from using HYDROmorphine as well as helping avoid prescription of inappropriately high doses when it is prescribed. But in your order sets be very careful about having checkbox items that would allow a physician to check two boxes for drugs you don't want to be used together. For example, in ISMP's Guideline for Standard Order Sets (see our March 23, 2010 Patient Safety Tip of the Week "[ISMP Guidelines for Standard Order Sets](#)") they note that contraindicated combinations such as IV morphine and epidural HYDROmorphine/bupivacaine should not appear on the same order set ([ISMP 2010](#)).

We strongly recommend that you limit the number of opioids to be used in your PCA pumps. You can standardize PCA on morphine and restrict prescription of other opioids to members of your pain management service or providers who have been specifically credentialed and privileged to order other opioids. Keep in mind that there may be legitimate indications for using HYDROmorphine in preference to morphine in some cases. For example, you may have a patient who gets pruritis with morphine, in which case HYDROmorphine may be an acceptable alternative.

In our November 19, 2013 Patient Safety Tip of the Week "[Can We Improve Dilaudid/HYDROmorphine Safety?](#)" we noted that look-alike/sound-alike (LASA) issues also continue to occur, in which hydromorphone and morphine are mixed up both in sounding alike and in that vials may be similar. Use of tall man lettering (HYDROmorphone) is advised but, frankly, many healthcare workers still mistakenly assume that HYDROmorphone is an equipotent form of morphine.

To reiterate from our multiple columns on Dilaudid dangers, here are some strategies you should consider to reduce the risk of Dilaudid (and other opioid) adverse events:

- Education of physicians, nurses, pharmacists, etc. on the different potencies of various opioids (but keep in mind that education and training are relatively weak patient safety interventions so other preventive interventions will be needed)
- Equipotency cards/posters/popups for commonly prescribed opioids
- Consider dose range alerts during CPOE (eg. note a typical dose is 0.2-0.5 mg. IV and limit dose to 1.0 mg for an opioid-naïve patient)
- Other alerts during CPOE (eg. if a patient is already on a sedative/hypnotic drug prompt "Are you aware sedative agents make patient more vulnerable to opioid-induced respiratory depression?")

- Other decision support tools for ordering (eg. prompts asking about whether the patient is opioid-naïve or opioid-tolerant, then suggest starting dosages)
- Establish criteria for using intravenous opioids
- Patient selection/identify hi risk patients (the very young and the very old, those with obesity, sleep apnea, neuromuscular diseases, COPD, and those in higher ASA classes, those receiving sedative/hypnotic drugs)
- Screening for obstructive sleep apnea (OSA) prior to use of IV opioids with a tool such as STOP or STOP-Bang
- Look for other risk factors (renal function, coadministration of sedative/hypnotic drugs, etc.)
- Monitor, monitor, monitor...
- Continuous pulse oximetry and capnography or apnea monitoring
- Close monitoring (in an ICU setting if necessary for high-risk patients)
- Pain assessment, RASS (Richmond Agitation-Sedation Scale) or other scale for level of arousal
- Enforce RASS (by requiring input of RASS score at BMV or when taking out of ADC)
- Tie recommended course of action to the RASS score
- Always have narcotic reversal agents readily available where IV opioids are being used and have protocols that deal with issues like **renarcotization**
- Standardized order sets
- Different order sets for opioid-naïve and opioid-tolerant patients
- Avoid order sets that allow a provider to check boxes for contraindicated combinations such as IV morphine and epidural HYDROmorphone/bupivacaine on the same order set
- Avoid basal rates for PCA in opioid-naïve patients
- Warnings when taking it out of ADC (eg. “This is DILAUDID. Is this what you wanted?”) or require a witness for overrides when using ADC
- Independent double checks
- Use tall man lettering “HYDROmorphone”
- Consider limiting the number of different opioids you use for acute pain management (eg. use morphine as your “preferred” opioid and reserve Dilaudid for rare patient who gets pruritis from morphine)
- Have pharmacists prepare and dispense the doses in prefilled unit dose syringes
- Stock HYDROmorphone only in lower doses on patient care floors and ADC’s
- Stock HYDROmorphone and morphine in different concentrations and keep them separate in stock
- Add labels to avoid confusion (consider using brand name “HYDROmorphone (DILAUDID)”)
- Involve patients and families in educational efforts about IV opioid therapy
- Perform regular audits with feedback for doses of HYDROmorphone exceeding 1 mg
- Make sure HYDROmorphone is on your “High-Alert” drug list
- Consider doing a FMEA (Failure Mode and Effects Analysis) to determine your potential vulnerabilities to Dilaudid incidents

“Dilaudid Dangers” is not just a catchy title. It’s a real risk lurking in most hospitals and other healthcare settings today despite warnings from multiple patient safety organizations.

Our prior columns on patient safety issues related to Dilaudid/HYDROmorphone:

- September 21, 2010 [“Dilaudid Dangers”](#)
- November 2011 [“FDA Changes on Dilaudid/HYDROmorphone”](#)
- July 3, 2012 [“Recycling an Old Column: Dilaudid Dangers”](#)
- November 19, 2013 [“Can We Improve Dilaudid/HYDROmorphone Safety?”](#)

Other Patient Safety Tips of the Week pertaining to opioid-induced respiratory depression and PCA safety:

- January 4, 2011 [“Safer Use of PCA”](#)
- July 13, 2010 [“Postoperative Opioid-Induced Respiratory Depression”](#)
- May 12, 2009 [“Errors With PCA Pumps”](#)
- September 21, 2010 [“Dilaudid Dangers”](#)
- November 2010 [“More on Preoperative Screening for Obstructive Sleep Apnea”](#)
- February 22, 2011 [“Rethinking Alarms”](#)
- May 17, 2011 [“Opioid-Induced Respiratory Depression – Again!”](#)
- September 6, 2011 [“More Tips on PCA Safety”](#)
- December 6, 2011 [“Why You Need to Beware of Oxygen Therapy”](#)
- February 21, 2012 [“Improving PCA Safety with Capnography”](#)
- September 2012 [“Joint Commission Sentinel Event Alert on Opioids”](#)
- September 2012 [“FDA Warning on Codeine Use in Children Following Tonsillectomy”](#)
- July 3, 2012 [“Recycling an Old Column: Dilaudid Dangers”](#)
- February 12, 2013 [“CDPH: Lessons Learned from PCA Incident”](#)
- February 19, 2013 [“Practical Postoperative Pain Management”](#)
- May 6, 2014 [“Monitoring for Opioid-induced Sedation and Respiratory Depression”](#)
- March 3, 2015 [“Factors Related to Postoperative Respiratory Depression”](#)
- Tools: [PCA Pump Audit Tool](#) and the [PCA Pump Criteria](#)

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http://www.ismp-canada.org/download/safetyBulletins/2013/ISMPCSB2013-10_HYDROmorphone.pdf

ISMP (Institute for Safe Medication Practices). ISMP’s Guideline for Standard Order Sets. 2010

<http://www.ismp.org/tools/guidelines/standardordersets.pdf>



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