

# Patient Safety Tip of the Week

## October 13, 2015 Dilaudid Dangers #3

Actually, we've done more than 3 columns on the dangers associated with use of HYDROmorphine (Dilaudid) and usually recommend hospitals avoid including it in standardized order sets and even restrict its use to individuals specifically "privileged" to order it, such as pain management physicians.

But recent research reveals a disturbing trend: HYDROmorphine is increasingly replacing morphine as a first line opioid for pain management in hospital inpatients. A study done using data from the University Health Systems Consortium (UHC) from October 2010 through September 2013 ([Gulur 2015](#)) found that over the three year period the use of HYDROmorphine increased 22% and 17% among surgical and medical patients, respectively, while use of morphine decreased 22% and 6% in surgical and medical patients, respectively. During the study period HYDROmorphine actually overtook morphine as the more commonly used analgesic in surgical patients.

In addition, adverse events (defined as use of naloxone on the same day as a dose of opioid) were more frequent in patients receiving HYDROmorphine (1.11% vs. 0.86% in those receiving morphine). While length of stay was almost one day longer in patients receiving morphine, the 30-day readmission rate was 1.37% higher in surgical patients receiving HYDROmorphine and 3.41% higher in medical patients receiving HYDROmorphine.

The study does, however, have significant limitations. First it relied on administrative data that is more intended for billing than clinical uses. The reasons for use of one agent rather than the other could not be determined from the data and the data did not indicate which patients were on PCA pumps. The data also lacked good risk adjustment. And, perhaps most importantly, the only adverse events identified were those requiring rescue with naloxone.

So there are unanswered questions. But these data are in keeping with our own experience with HYDROmorphine and the trend in usage is bothersome. The authors of the study also cite studies showing that common side effects (nausea, vomiting, and pruritis) are no different between the two drugs and that equipotent doses of each drug have no significant difference in efficacy, adverse effect profile or patient preference. One reason clinicians often give for use of HYDROmorphine over morphine is less pruritis with HYDROmorphine but a meta-analysis showed no difference in pruritis between the two drugs ([Felden 2011](#)).

Opioid use in the hospital setting is substantial and it's not just surgical patients who are receiving opioids. Over half (51%) of medical inpatients receive opioids, often in high doses ([Herzig 2014](#)). That study also showed hospitals with higher opioid-prescribing rates had higher adjusted relative risk of a severe opioid-related adverse event per patient exposed.

The Commonwealth of Massachusetts Board of Registration in Medicine issued an Advisory regarding the safety of HYDROmorphine in September 2012 ([Commonwealth of Massachusetts 2012](#)). They had previously issued such an Advisory in 2007 but issued the new one after receiving 26 reports of complications related to the use of HYDROmorphine since the 2007 Advisory. They noted that half the patients were under 60, most were female, and most events occurred on the night shift. Most had comorbidities or use of concomitant medications that predisposed them to respiratory depression. Events were described with all routes of HYDROmorphine administration. The Advisory provided some case studies and lessons learned and made recommendations, most of which focused on systems improvements and many of which we have previously recommended and are discussed below.

Ironically, problems with Dilaudid may be an unintended consequence of a patient safety initiative taken by most facilities. Demerol (meperidine) was removed from formularies a number of years ago because a toxic metabolite was causing significant untoward effects. Dilaudid became the alternative many physicians chose and most healthcare workers were much less familiar with Dilaudid. Obviously, the trend has continued and, as the Gulur study shows, Dilaudid use has now surpassed morphine use in many hospitals.

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.

A second factor is that HYDROmorphine crosses the blood-brain barrier faster than morphine does, resulting in faster analgesic effect. However, this also means the side effect of respiratory depression would occur earlier as well.

That 2012 Commonwealth of Massachusetts Advisory ([Commonwealth of Massachusetts 2012](#)) lessons learned and multiple recommendations. Some hospitals began to require the clinicians who prescribe and administer HYDROmorphine undergo a privileging process and annual competencies to verify proficiency with pain management and opioid reversal. Others discourage the use of HYDROmorphine as a first line narcotic analgesic and require consultation/approval of Anesthesia/Pain Management or Pharmacy. Many created standard order sets and eliminated use of ranges for dosing or timing. Some

limited hospital stock to 1 mg/ml vials and floor access was eliminated or tightly controlled. Several eliminated the override function from automated dispensing cabinets for HYDROmorphine. They also describe the education process for physicians, nurses and patients and their families. Monitoring of patient prescribed HYDROmorphine was discussed and special attention was given to patients sent to areas like Radiology after receiving HYDROmorphine.

To reiterate from our multiple columns on Dilaudid dangers, here are strategies you should consider to reduce the risk of Dilaudid/HYDROmorphine (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 restricting ordering of HYDROmorphine to clinicians who you have specifically credentialed and privileged to order and administer HYDROmorphine (such as Pain Management physicians)
- 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)
- Don't allow orders for dose ranges (eg. do not allow "Dilaudid 2-4 mg q3h prn for pain levels...")
- 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
- Include section of opioids on your "Ticket to Ride" intrahospital transfer form for patients being taken to areas such as Radiology

- 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 or eliminate overrides completely for HYDROmorphone
- 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 though even that is challenged by the meta-analysis showing no difference in pruritis between Dilaudid and 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

Yes, we use “Dilaudid Dangers” as a catchy title. But it’s no laughing matter. Use of HYDROmorphone has become a real risk lurking in most hospitals and other healthcare settings today despite warnings from multiple patient safety organizations and the trend toward its increased use is bothersome.

**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?”](#)
- June 2, 2015 [“Reminders of Dilaudid Dangers”](#)

**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](#)”
- June 2, 2015 “[Reminders of Dilaudid Dangers](#)”
- August 11, 2015 “[New Oxygen Guidelines: Thoracic Society of Australia and NZ](#)”
- August 18, 2015 “[Missing Obstructive Sleep Apnea](#)”
- Tools: [PCA Pump Audit Tool](#) and the [PCA Pump Criteria](#)

**References:**

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