

Patient Safety Tip of the Week

May 10, 2022 Dilaudid – Again!

One of our most frequent topics has been opioid-induced respiratory depression (OIRD) and another frequent topic has been dangers specifically associated with Dilaudid. Recent revelations from a malpractice case ([Aguirre 2022a](#), [Aguirre 2022b](#)) bring both issues into the news.

A 28 y.o. man donated a kidney for transplant to his 30 y.o. woman. The recipient, his sister, did well after the transplant surgery. But the donor did not do well and ended up dying.

Details were only available from the media reports noted above, which show that a court ruled the hospital fell below the standard of care in treating [patient], resulting in "death from opioid overdose". We should note that the hospital disputes that conclusion in a [statement](#) issued after the media reports.

The patient complained of severe pain post-operatively and received substantial amounts of opioids via PCA (patient-controlled analgesia) pump. He was not monitored with pulse oximetry nor were vital signs being monitored frequently. On the morning of the day after surgery, he asked his mother for his sunglasses so he could go to sleep. Shortly thereafter, his mother noted him to be cold and not breathing. A Code Blue was called. A heartbeat was restored but he had sustained severe hypoxic/ischemic encephalopathy and 9 days later life support was removed.

His mother was told that perhaps he had “a genetic heart defect” that led to cardiac arrest. However, she sought his medical records. After she was given only 40 pages of his records, she hired a malpractice attorney, who was able to get over 44,000 pages! At the trial, medical experts noted that he was not on pulse oximetry and had not had his vital signs recorded for nearly 5 hours, stating that these did not meet the expected standards of care. A pharmacist serving as an expert witness noted multiple failures in his care but specifically focused on the amount of Dilaudid given, noting that medical, nursing, and pharmacy staff did not seem to be aware of the relative potency of Dilaudid, and the possible need to use lower doses in someone who had just donated one of his kidneys. He also noted that, during the resuscitative efforts, Narcan was not administered to counter the effects of the opioids.

The media report ([Aguirre 2022b](#)) provides a timeline of the events that took place. While he was receiving Fentanyl via PCA pump post-operatively, he complained of

severe pain about 2 hours after the surgery. Because the Fentanyl did not adequately control his pain, an order was written for Dilaudid via PCA pump (“0.6mg/15min ~ 2.4mg. per hour max”). The timeline appears to show he received 11.4 mg of Dilaudid over roughly 14 hours. He also vomited multiple times throughout the evening, night and following morning. At 4:30 AM on the morning following surgery, his last vital signs were taken. It was at 9:17 AM that his mother noted he was cold and not breathing and the Code Blue was called at 9:18 AM.

When his mother had responded to his request for sunglasses, she also took a photo of him. That apparently proved to be important in the malpractice action, since it showed he was not on pulse oximetry. As noted above, the hospital still disputes that the patient died from an opioid overdose, stating “the patient’s clinical course was not consistent with excessive opioids as the cause of death.” However, following the incident, the hospital did change its policy so that transplant patients are now monitored with continuous pulse oximetry. The hospital statement notes “At the time, [the hospital] did not use continuous pulse oximetry monitoring for transplant patients who were on a self-controlled analgesic pump (PCA) to provide pain relief following surgery. National guidance for pulse-oximetry with a PCA continues to evolve but remains at the discretion of providers. However, out of an abundance of caution, we modified our [hospital] transplant program protocol after this incident to include continuous pulse-oximetry monitoring for all patients on a PCA for post-operative pain control.”

The case highlights a point we often make – there really is no such thing as a “low risk patient” when it comes to post-op opioid-induced respiratory depression. We recommend continuous monitoring of such patients, not only with continuous pulse oximetry but also with capnography.

The media reports note that there is currently a new bill before Congress, the [In-Patient Opioid Safety Act](#), that would require all patients on opioids in hospitals to have continuous monitoring.

The media reports also refer to the excellent review from Dartmouth-Hitchcock Medical Center ([McGrath 2021](#)) on inpatient respiratory arrest associated with sedative and analgesic medications and the impact of continuous monitoring on patient mortality and severe morbidity. McGrath et al. found that no patient with continuous monitoring died (of 111,488 discharges in units with surveillance monitoring in place, the only death was in a patient not actually being monitored). There were 3 deaths among the 15,209 discharges in unmonitored units.

But the case also points out the frequent problem of underestimating the relative potency of Dilaudid (HYDROMORPHONE). While estimates of equipotency vary considerably in the literature, most now agree that 1 mg. of Dilaudid is probably the equivalent of 5-7 mg. of morphine. We often quote Chang and colleagues ([Chang 2010](#)) who 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

don't know enough detail in the current case to know whether the relative potency issue was truly a factor or not. The main issue in the case was the lack of monitoring. But it is still a good time to reiterate the dangers of Dilaudid.

To reiterate from our multiple columns on Dilaudid dangers (see the columns listed below), 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?")
- Include a "hard stop" if an attempt is made to order one opioid in a patient already receiving another opioid
- 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 POSS (Pasero Opioid-Induced Sedation Scale) or other scale for level of arousal other scale for level of arousal
- Enforce RASS or POSS (by requiring input of RASS or POSS score at BMV or when taking out of ADC)
- Tie recommended course of action to the RASS or POSS 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 HYDROmorphine/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 HYDROmorphine
- Independent double checks
- Use tall man lettering “HYDROmorphine”
- 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 HYDROmorphine only in lower doses on patient care floors and ADC’s
- Stock HYDROmorphine and morphine in different concentrations and keep them separate in stock
- Add labels to avoid confusion (consider using brand name “HYDROmorphine (DILAUDID)”)
- Involve patients and families in educational efforts about IV opioid therapy
- Perform regular audits with feedback for doses of HYDROmorphine exceeding 1 mg
- Make sure HYDROmorphine is on your “High-Alert” drug list
- Consider doing a FMEA (Failure Mode and Effects Analysis) to determine your potential vulnerabilities to Dilaudid incidents

As an aside, there is one other condition we always consider when we encounter a sudden unexplained death in the hospital. That is Torsade de pointes (see our June 25, 2019 Patient Safety Tip of the Week “[Found Dead in a Bed – Part 2](#)”). The media reports provide no details about the EKG’s. The patient in this case did have multiple episodes of vomiting and was given Zofran, one of the many drugs that may prolong the QTc interval. It is conceivable that, perhaps combined with some electrolyte disturbance related to the protracted vomiting, Zofran might have led to QTc prolongation and torsade. We would assume that the analysis of the incident would have looked for that possibility.

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

- September 21, 2010 “[Dilaudid Dangers](#)”
- November 2011 “[FDA Changes on Dilaudid/HYDROmorphine](#)”

- 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”](#)
- October 13, 2015 [“Dilaudid Dangers #3”](#)
- June 20, 2017 [“Dilaudid Dangers #4”](#)
- June 18, 2019 [“Found Dead in a Bed”](#)
- January 5, 2021 [“Dilaudid/HYDROmorphone Still Problematic”](#)

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”](#)
- December 2015 [“Opioid Alert Fatigue”](#)
- March 2016 [“Guideline for Management of Postoperative Pain”](#)
- June 14, 2016 [“Nursing Monitoring of Patients on Opioids”](#)
- October 11, 2016 [“New Guideline on Preop Screening and Assessment for OSA”](#)
- December 6, 2016 [“Postoperative Pulmonary Complications”](#)
- May 2017 [“Another Twist in Opioid-Induced Respiratory Depression”](#)

- June 2017 [“Masterpiece: Monitoring for Opioid-Induced Respiratory Depression”](#)
- June 20, 2017 [“Dilaudid Dangers #4”](#)
- October 3, 2017 [“Respiratory Compromise: One Size Does Not Fit All”](#)
- November 2017 [“Bad Combination: Gabapentin and Opioids”](#)
- November 21, 2017 [“OSA, Oxygen, and Alarm Fatigue”](#)
- July 31, 2018 [“Surgery and the Opioid-Tolerant Patient”](#)
- February 12, 2019 [“2 ER Drug Studies: Reassurances and Reservations”](#)
- March 2019 [“Gabapentin and Pregabalin on the Radar Screen”](#)
- June 18, 2019 [“Found Dead in a Bed”](#)
- January 2020 [“FDA Warning on Gabapentinoids”](#)
- January 2020 [“Opioids and Apnea: Not Just Surgical Patients”](#)
- October 6, 2020 [“Successfully Reducing Opioid-Related Adverse Events”](#)
- October 20, 2020 [“More on Post-operative Risks for Patients with OSA”](#)
- January 2021 [“Gabapentinoids Again”](#)
- January 5, 2021 [“Dilaudid/HYDROMorphone Still Problematic”](#)
- October 26, 2021 [“Opioid-Induced Respiratory Depression Costly in Fiscal as Well as Human Terms”](#)
- Tools: [PCA Pump Audit Tool](#) and the [PCA Pump Criteria](#)

References:

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Aguirre J, Campos R, Carroll J, Villarreal M. Dozens of Mistakes Caused Death of Young Hospital Patient, Court Rules. NBCBayArea.com 2022; May 5, 2022 <https://www.nbcbayarea.com/investigations/dozens-of-mistakes-caused-death-of-young-hospital-patient-court-rules/2881877/>

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H.R.5932 - Inpatient Opioid Safety Act of 2021

<https://www.congress.gov/bill/117th-congress/house-bill/5932/text?r=6&s=1>

Hospital Response to NBC Bay Area Nov. 2, 2021

<https://www.documentcloud.org/documents/21857280-ucsf-statement>

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