Patient Safety Tip of the Week

July 31, 2018

Surgery and the Opioid-Tolerant Patient

We've done a lot of columns about opioid-induced respiratory depression in the perioperative period (see the full list of columns below). But one topic we've not done enough on is how to manage the opioid-tolerant patient in the perioperative period. More and more patients are coming to surgery alreay taking opioids, often in high doses, and present unique challenges.

An observational study of patients undergoing surgery at a tertiary care academic medical center (Hilliard 2018) identified preoperative opioid use in 23.1%. And the most common opioids used were hydrocodone bitartrate (59.4%), tramadol hydrochloride (21.2%), and oxycodone hydrochloride (18.3%). Preoperative opioid use was most commonly reported by patients undergoing orthopedic (65.1%) and neurosurgical spinal (55.1%) procedures and least common among patients undergoing thoracic procedures (15.7%). Factores independently associated with preoperative opioid use were age 31 to 40 years, former or current tobacco use, illicit drug use, higher pain severity, depression, higher Fibromyalgia Survey scores, lower life satisfaction, and more medical comorbidities.

In addition, in the perioperative period, higher opioid prescription is associated with an increase in most postoperative complications, with the strongest effect observed in thromboembolic, infectious and gastrointestinal complications, cost, and length of stay (Cozowicz 2017). The increase in complication risk occurred in a stepwise fashion, suggesting a dose-response gradient.

And it is also known that pre-operative opioid use is a strong predictor of chronic post-operative opioid use (Goesling 2016).

Not only do such patients present the need for careful monitoring for opioid-induced respiratory depression and opioid side effects, but we must also pay attention to adequate pain management and the risk of opioid withdrawal syndromes, often while dealing with the complexities of opioid dose conversion.

Fortunately, the BJA Education series recently had an excellent review by Simpson and Jackson on the perioperative management of the opioid-tolerant patient (Simpson 2017). They note goals of the pain management plan for opioid tolerant in the perioperative period are:

1. to prevent opioid withdrawal
2. to provide effective analgesia
3. to ensure continuity of care in the community after discharge from hospital

They note the risk of an adverse event is higher among patients prescribed >50 mg oral morphine equivalent per day. Patients receiving > 50 or >100 mg per day have 3.7- and 8.9-fold increases, respectively, in risk of an overdose compared with patients receiving doses <20 mg per day.

Below are some of the recommendations from Simpson and Jackson:

Multimodal Opioid-Sparing Techniques

Regularly prescribed paracetamol, non-steroidal anti-inflammatory drugs, or COX-2's should be used unless contraindicated and local anaesthetic techniques including wound infiltration, regional, or neuroaxial block should be used where possible. They also discuss potential roles for ketamine, gabapentinoids, and IV lidocaine infusions. (But see our November 2017 What's New in the Patient Safety World column "Bad Combination: Gabapentin and Opioids" regarding potential dangerous interactions between gabapentinoids and opioids.)

Prevention of Withdrawal

The authors note that opioid withdrawal symptoms can occur if a drug is suddenly stopped, reversed, reduced too quickly, or fails to reach its intended site of action. They recommended that the patient's baseline opioid (usually a sustained-release form) be continued in the postoperative period and that acute post-surgical pain is managed with the addition of appropriate doses of IR opioids. They recommend that transdermal opioids be continued at their baseline doses but caution about several issues with transdermal patches. Patch positioning may be important. For example, direct heat applied to the patch via perioperative warming devices may enhance drug administration, whereas the use of a patch over an area of poor-perfusion or reduced temperature can reduce drug delivery.

They note that many patients may be unable to take oral opioids post-operatively and provide a table for converting to an equivalent IV.dose of morphine and/or use of PCA pumps.

They have a good discussion about how to calculate the total opioid dose when additional opioids are needed post-op and a good discussion about opioid "rotation". They provide opioid equivalence/conversion tables to assist with this.

Converting from IV back to Oral Opioid

Converting from IV back to an oral opioid is also potentially complex and they provide guidelines for this.

Opioid Tolerance/Opioid-Induced Hyperalgesia

They have an excellent discussion about opioid tolerance and the opioid-induced hyperalgesia phenomenon, noting the two may be difficult to distinguish from each other or from progression of the underlying condition.

Substance abuse and substitution therapy
They also have a discussion about the roles of drugs like methadone, buprenorphine, and naltrexone in substance abuse therapy.

Discharge Plan
They stress it is of paramount importance to formulate and communicate a plan for onward-care after discharge from hospital. This may typically involve a discussion with the outpatient physician who will be primarily managing the patient and a carefully documented discharge letter highlighting the importance of reducing and stopping treatment if it is ineffective or no longer required. Inclusion of a pharmacist may also be worthwhile.

The only thing missing from the Simpson article is a section on monitoring. But you can go to our numerous columns on perioperative monitoring of patients on opioids listed below. Obviously, all such patients merit full monitoring, including continuous pulse oximetry and capnography.

In an editorial accompanying the Hilliard study, Ashburn and Fleisher (Ashburn 2018) note the importance of perioperative multimodal pain care, using regional anesthesia and non-opioid pain medications, avoidance of opioid overprescribing, and prompt referral to specialty care when problems associated with opioid use occur after surgery.

In our multiple columns on hydromorphone issues (see, for example, our June 20, 2017 Patient Safety Tip of the Week "Dilaudid Dangers #4") we've made a case that prescription of certain opioids in the hospital should be done under supervision of pain management services. The same arguments apply to prescription of a whole host of extended release or long-acting opioid formulations. However, not all hospitals are fortunate enough to have such services or even have professional staff who are expert in pain management.

The VA healthcare system has some interesting tools to help in management of patients on chronic opioid therapy (Raghunathan 2017). One is the Opioid Therapy Risk Report (OTRR), a patient database that contains details regarding opioid prescriptions (e.g., duration, amount and type over the past 12 months), pain scores over the past 12 months and most recent urine drug test results. It also notes certain factors that increase risks, such as concomitant use of benzodiazepines, diagnoses of Obstructive Sleep Apnea (OSA), and mental illnesses like depression, PTSD or substance use and whether naloxone has been dispensed. They also have a tool called STORM (Stratification Tools for Opioid Risk Mitigation), which apparently had been developed for use in behavioral health but is being adapted for use in surgery. The STORM surgery tool aims to better coordinate medication handoffs by adding additional risk estimates tailored to the perioperative environment and patient populations, including risk of prolonged opioid use after surgery.

Many states, such as New York, have databases containing information regarding opioid prescriptions for patients that should be accessed by any physician considering

prescribing an opioid for a patient. But such databases currently lack the other vital integrated medical data found in the comprehensive VA database. But databases with information similar to the VA's OTRR database might be available through large medical systems or insurers. It clearly would be valuable to have such information available prior to surgery so that rational plans could be developed for managing opioid-tolerant patients before, during, and after surgery.

And, of course, there has been a focus on reducing the likelihood of persistent opioid use following surgery, even for patients who were opioid-naïve prior to surgery. A recent study (Brummett 2017) showed that new persistent opioid use after surgery is common and is not significantly different between minor and major surgical procedures but rather associated with behavioral and pain disorders. The rates of new persistent opioid use were similar between the 2 groups, ranging from 5.9% to 6.5%. The authors propose that new persistent opioid use should be considered a surgical complication that is both common and previously underappreciated.

One factor contributing to the opioid epidemic has been prescribing amounts of opioids (i.e. the number of pills dispensed) far in excess of what is actually needed by patients. In another recent study, Brat and colleagues (Brat 2018) identified opioid-naive patients undergoing surgery from a linked medical and pharmacy administrative database. They found that each refill and week of opioid prescription is associated with a large increase in opioid misuse among opioid naive patients. The data from this study suggest that duration of the prescription rather than dosage is more strongly associated with ultimate misuse in the early postsurgical period. You'll recall that several states have been addressing the opioid epidemic by limiting initial prescriptions for opioids to very short timeframes (for example, 7 days). One recent study showed that lowering the default number of opioid pills prescribed in an EMR system is a simple, effective, cheap, and potentially scalable intervention to change prescriber behavior and decrease the amount of opioid medication prescribed after procedures (Chin 2018).

Attempts have been made to develop guidelines for the optimal amount and duration of opioid prescriptions following surgery. Scully et al. analyzed prescription and refill data on patients in the Department of Defense Military Health System Data Repository who had undergone one of 8 common surgeries (Scully 2018). They then did modeling and found the patterns varied based upon the nature of the surgery. They suggested that the optimal length of opioid prescriptions lies between the observed median prescription length and the early nadir, or 4 to 9 days for general surgery procedures, 4 to 13 days for women's health procedures, and 6 to 15 days for musculoskeletal procedures.

But those suggestions were for opioid-naïve patients. In a comment on the Scully study, Hah and Hernandez-Boussard (Hah 2018) note that 41.7% of patients in that data set were excluded because they had received a prescription for opioids within the 6 months prior to surgery. That, of course, highlights the problem of trying to fit all post-op patients into nice categories. There are no good current guidelines for discharge opioid prescribing in patients who had been taking opioids prior to their surgery.

In an ISMP Canada article primarily on safe storage and disposal of medications (ISMP Canada 2018) we came across a useful information tool for patients receiving opioids after surgery, developed by multiple Canadian organizations participating in an opioid safety collaborative.

We hope that you'll also read some of our prior columns on opioid safety in the perioperative period and those on other safety issues associated with some specific opioid agents.

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"
- Tools: PCA Pump Audit Tool and the PCA Pump Criteria

Our prior articles pertaining to long-acting and/or extended release preparations of opioids:

- April 2010 "RCA: Epidural Solution Infused Intravenously"
- July 13, 2010 "Postoperative Opioid-Induced Respiratory Depression"
- January 18, 2011 "More on Medication Errors in Long Term Care"
- April 12, 2011 "Medication Issues in the Ambulatory Setting"
- June 28, 2011 "Long-Acting and Extended-Release Opioid Dangers"
- September 13, 2011 "Do You Use Fentanyl Transdermal Patches Safely?"
- November 8, 2011 "WHO's Multi-Professional Patient Safety Curriculum Guide"
- May 2012 "Another Fentanyl Patch Warning from FDA"
- July 24, 2012 "FDA and Extended-Release/Long-Acting Opioids"
- September 2012 "Joint Commission Sentinel Event Alert on Opioids"
- March 2013 "Try Googling Fentanyl Accidents"
- September 2013 "ISMP Outreach on Fentanyl Patch Safety"
- October 2013 "Opioid Safety Actions and Resources"
- February 24, 2015 "More Risks with Long-Acting Opioids"
- February 2017 "FDA Approves Even More Long-Acting Opioids"

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"
- October 13, 2015 "Dilaudid Dangers #3"
- June 20, 2017 "Dilaudid Dangers #4"

Some of our other Patient Safety Tips of the Week regarding fentanyl and fentanyl patches:

- April 2010 "RCA: Epidural Solution Infused Intravenously"
- July 13, 2010 "Postoperative Opioid-Induced Respiraatory Depression"
- January 18, 2011 "More on Medication Errors in Long Term Care"
- April 12, 2011 "Medication Issues in the Ambulatory Setting"
- June 28, 2011 "Long-Acting and Extended-Release Opioid Dangers"
- September 13, 2011 "Do You Use Fentanyl Transdermal Patches Safely?"

- November 8, 2011 "WHO's Multi-Professional Patient Safety Curriculum Guide"
- May 2012 "Another Fentanyl Patch Warning from FDA"
- July 24, 2012 "FDA and Extended-Release/Long-Acting Opioids"
- September 2012 "Joint Commission Sentinel Event Alert on Opioids"
- March 2013 "Try Googling Fentanyl Accidents"
- September 2013 "ISMP Outreach on Fentanyl Patch Safety"
- October 2013 "Opioid Safety Actions and Resources"
- February 24, 2015 "More Risks with Long-Acting Opioids"

References:

Hilliard PE, Waljee J, Moser S, et al. Prevalence of Preoperative Opioid Use and Characteristics Associated With Opioid Use Among Patients Presenting for Surgery. JAMA Surg 2018; Published online July 11, 2018
https://jamanetwork.com/journals/jamasurgery/article-abstract/2687237?utm_source=silverchair&utm_medium=email&utm_campaign=article_alert-jamasurgery&utm_content=olf&utm_term=071118

Cozowicz C, Olson A, Poeran J, et al. Opioid prescription levels and postoperative outcomes in orthopedic surgery. Pain 2017; 158(12): 2422-2430
https://journals.lww.com/pain/Fulltext/2017/12000/Opioid_prescription_levels_and_postoperative.16.aspx

Goesling J, Moser SE, Zaidi B, et al. Trends and predictors of opioid use after total knee and total hip arthroplasty. Pain 2016; 157(6): 1259-1265
https://journals.lww.com/pain/Abstract/2016/06000/Trends_and_predictors_of_opioid_use_after_total.12.aspx

Simpson GK, Jackson M. Perioperative Management of Opioid-tolerant Patients. BJA Education 2017; 17(4): 124-128
https://academic.oup.com/bjaed/article-abstract/17/4/124/2454796

Ashburn MA, Fleisher LA. Perioperative Opioid Management—An Opportunity to Put the Genie Back Into the Bottle. JAMA Surg 2018; Published online July 11, 2018
https://jamanetwork.com/journals/jamasurgery/article-abstract/2687231?utm_source=silverchair&utm_medium=email&utm_campaign=article_alert-jamasurgery&utm_content=olf&utm_term=071118

Raghunathan K, Mudumbai S, Barbeito A, Trafton J. Tools to Reduce Perioperative Opioid-Related Risks. TIPS Topics in Patient Safety® 2017; 17(2): 7-8
https://www.patientsafety.va.gov/docs/TIPS/2017_April_May_June_TIPS_Internet_FINAL.pdf#page=7

Brummett CM, Waljee JF, Goesling J, et al. New Persistent Opioid Use After Minor and Major Surgical Procedures in US Adults. JAMA Surg 2017; 152(6): e170504
https://jamanetwork.com/journals/jamasurgery/fullarticle/2618383?utm_source=silverchair&utm_medium=email&utm_campaign=article_alert&utm_term=mostread&utm_content=olf-widget_07112018

Brat GA, Agniel D, Beam A, et al. Postsurgical prescriptions for opioid naive patients and association with overdose and misuse: retrospective cohort study. BMJ 2018; 360: j5790
http://www.bmj.com/content/360/bmj.j5790

Chin AS, Jean RA, Hoag JR, et al. Association of Lowering Default Pill Counts in Electronic Medical Record Systems With Postoperative Opioid Prescribing. JAMA Surg 2018; Published online July 18, 2018
https://jamanetwork.com/journals/jamasurgery/article-abstract/2688235?utm_source=silverchair&utm_medium=email&utm_campaign=article_alert-jamasurgery&utm_content=olf&utm_term=071818

Scully RE, Schoenfeld AJ, Jiang W, et al. Defining Optimal Length of Opioid Pain Medication Prescription After Common Surgical Procedures. JAMA Surg 2018; 153(1): 37-43
https://jamanetwork.com/journals/jamasurgery/article-abstract/2654949

Hah J, Hernandez-Boussard T. Defining Postoperative Opioid Needs Among Preoperative Opioid Users. JAMA Surg 2018; 153(7): 689-690
https://jamanetwork.com/journals/jamasurgery/article-abstract/2676725?utm_source=silverchair&utm_medium=email&utm_campaign=article_alert-jamasurgery&utm_content=etoc&utm_term=071818

ISMP Canada. Safe Storage and Disposal of Medications. ISMP Canada Safety Bulletin 2018; 18(5): 1-4 June 27, 2018
https://www.ismp-canada.org/download/safetyBulletins/2018/ISMPCSB2018-06-StorageDisposal.pdf
information tool for patients prescribed opioids after surgery

https://www.ismp-canada.org/download/OpioidStewardship/OpioidsAfterSurgery-EN.pdf

http://www.patientsafetysolutions.com/

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