Acute Traumatic and Post-Operative Pain: A Retrospective Chart Review of Quality of Life Improvement

Conflict of Interest Disclosure

Mallincrodt Non-branded Speakers Bureau

Poor Pain Management

Multiple data indicates a high incidence of moderate to severe pain and poor analgesia in intensive care units as well as trauma floors associated with potentially devastating results.
Sleep disturbances
Tachycardia
Pulmonary complications
Increased stress response with thromboembolic incidents
Immunosuppression
Increased intensive care unit and hospital stays
Needless suffering

Hospital Consumer Assessment of HealthCare Providers and Systems (HCAHPS)
How do our patients evaluate their treatment of acute pain?

Patient Responses to Our Pain Management
Data from studies that indicate the patient responses to pain management over the past 20 to 25 years.
Opioids as a Cornerstone

Traditionally opioids have been the cornerstone of acute pain management, but is rife with potential negative effects. Sedation, confusion, respiratory depression, nausea, ileus, constipation, tolerance, opioid-induced hyperalgesia as well as potential for immunosuppression all of which are considered to be adverse events.

Opioids

- Oxycodone/Acetaminophen (Percocet)
- Hydromorphone (Dilaudid)
- Sublimaze (Fentanyl)
- Morphine Sulfate (MS Contin)
- Hydrocodone/Acetaminophen (Vicodin)

Opioids

- Opioids are one of the most frequently implicated drugs in adverse reactions\(^1\)
- Establishing and maintain an institutional pain performance improvement plan is a requirement\(^2\) of The Joint Commission.


Opioids

Common Reactions
- constipation
- abdominal pain
- nausea/vomiting
- libido decrease
- dizziness
- urinary retention
- diaphoresis
- paresthesia
- euphoria
- pruritus
- flushing
- xerostomia
- miosis
- edema
- somnolence
- headache

Serious Reactions
- respiratory depression
- apnea
- circulatory depression
- respiratory arrest
- hypotension, severe
- shock
- paralytic ileus
- seizures
- biliary spasm
- ICP incr.
- dependency, abuse
- bradycardia
- adrenal insufficiency
- biliary spasm
- opioid-induced androgen deficiency (long-term use)
- withdrawal symptoms if abrupt D/C (prolonged or long-term use)

Adverse Outcomes may result from the undertreatment of perioperative pain and include (but are not limited to) thromboembolic and pulmonary complications, additional time spent in an intensive care unit or hospital, hospital readmission for further pain management, needless suffering, impairment of health-related quality of life, and development of chronic pain. Adverse outcomes associated with the management of perioperative pain include (but are not limited to) respiratory depression, brain or other neurologic injury, sedation, circulatory depression, nausea, vomiting, pruritus, urinary retention, impairment of bowel function, and sleep disruption. Health-related quality of life includes (but is not limited to) physical, emotional, social, and spiritual well-being.

Multimodal Therapy

Multimodal techniques for pain management include the administration of two or more drugs that act by different mechanisms for providing analgesia. These drugs may be administered via the same route or by different routes. Multimodal therapy may be pharmacologic and/or nonpharmacologic.

Multimodal Therapy

Alternatively, multimodal therapy is increasingly recognized as an acute pain management approach, especially when combined with crucial conversations with patients, early nutrition and ambulation. This therapy is designed to improve functional recovery (rehabilitation) and decrease chronic pain conditions.

Considerations for Multimodal Therapy

<table>
<thead>
<tr>
<th>Acetaminophen (Oftirmev)</th>
<th>Liposomal bupivacaine (Exparel)</th>
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</thead>
<tbody>
<tr>
<td>Hydromorphone (Dilaudid)</td>
<td>Clonidine (Catapres)</td>
</tr>
<tr>
<td>Dextrometomidine (Precedex)</td>
<td>Morphine Sulfate (MS Contin)</td>
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<tr>
<td>Gabapentin (Neurontin)</td>
<td>Hydrocodone/Acetaminophen (Vicodin)</td>
</tr>
<tr>
<td>Pregabalin (Lyrica)</td>
<td>Bupivacaine (Marcaine)</td>
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<tr>
<td>Ibuprofen (Advil, Motrin IB)</td>
<td>Sublimaze (Fentanyl)</td>
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<tr>
<td>Ketorolac (Toradol)</td>
<td>Lidocaine (Xylocain)</td>
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<tr>
<td>Ketamine (Ketalar)</td>
<td>Tramadol (Ultram)</td>
</tr>
<tr>
<td>Celecoxib (Celebrex)</td>
<td></td>
</tr>
<tr>
<td>Oxycodone/Acetaminophen (Percocet)</td>
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</table>
**Gabapentinoids**

**Subclass:** Other Neurologics; Seizure Disorders  
**Mechanism of Action**  
exact mechanism of action unknown; blocks voltage-dependent calcium channels, modulating excitatory neurotransmitter release  
**Contraindications / Cautions:**  
- hypersens. to drug/class/compon.  
- caution if alcohol use  
- caution if renal impairment  
- caution if depression or hx  
- caution if CNS depressant use  
- avoid abrupt withdrawal  
- caution if drug abuse hx

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**Acetaminophen – Ofirmev**  
Approved for mild-to-mod pain and moderate-to-severe pain in combination with opioids  
3 active comparator studies found no significant difference in efficacy or adverse events;  
1 showed numerical ↓ in opioid consumption  
2 meta-analyses showed ~20% reduced morphine requirements on post-op day 1  
More expensive than alternatives: oral or rectal acetaminophen and IV ketorolac


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**Ketorolac/NSAIDS**

- **Black Box Warning**
- **Appropriate Use**  
  - for short term (<5 days in adults) tx of moderately severe acute pain requiring opioid-level analgesia and only as continuation of parenteral tx, if necessary; total combined duration should not exceed 5 days; not indicated for minor or chronic pain; oral tx not indicated in peds; max recommended total daily dose 40 mg PO and 120 mg IV/IM; doses above label recommendations incr. serious adverse event risk w/o improved efficacy

Epocrates Premium
Ketorolac/NSAIDS

- **Concomitant NSAID Use**
  - Contraindicated in combo w/ ASA or NSAIDs due to cumulative risk of serious NSAID-related side effects

- **Hypersensitivity Rxn**
  - Hypersensitivity rxns range from bronchospasm to anaphylactic shock, have appropriate tx available; contraindicated if previous ketorolac, ASA, or other NSAID hypersensitivity rxn

- **Special Populations**
  - Max total daily dose 60 mg IV/IM in pts 65 yo and older, if wt <50 kg, or moderately elevated Cr; max single dose 30 mg IM and 15 mg IV in pediatric patients

**GI Risk**
- Incr. serious GI adverse event risk, incl. bleeding, ulcer, and stomach or intestine perforation, which can be fatal; may occur at any time during use and w/o warning sx; elderly pts at greater risk for serious GI events; contraindicated in active PUD, recent GI bleeding or perforation, and PUD or GI bleeding hx

**Cardiovascular Risk**
- NSAIDs incr. risk of serious and potentially fatal cardiovascular thrombotic events, incl. MI and stroke; risk may occur early in tx and may incr. w/ duration of use; contraindicated for CABG peri-operative pain

**Renal Risk**
- Contraindicated if adv. renal impairment or if renal failure risk due to volume depletion

**Bleeding Risk**
- Contraindicated if suspected or confirmed cerebrovascular bleeding, hemorrhagic diathesis, incomplete hemostasis, or high bleeding risk because inhibits platelet function; contraindicated as prophylactic analgesic before major surgery

Ketotolac/NSAIDS

These drugs reduce inflammation but are not related to steroids which also reduce inflammation. They work by reducing the production of prostaglandins. Prostaglandins are chemicals that promote inflammation, pain, and fever. They also protect the lining of the stomach and intestines from the damaging effects of acid, promote blood clotting by activating blood platelets, and promote normal function of the kidneys.

The enzymes that produce prostaglandins are called cyclooxygenases (COX). There are 2 types of COX enzymes, COX-1 and COX-2. Both enzymes produce prostaglandins that promote inflammation, pain, and fever; however, only COX-1 produces prostaglandins that activate platelets and protect the stomach and intestinal lining.

NSAIDs block COX enzymes and reduce production of prostaglandins. Therefore, inflammation, pain, and fever are reduced since the prostaglandins that protect the stomach and promote blood clotting are also reduced. NSAIDs that block both COX-1 and COX-2 can cause ulcers in the stomach and intestines and increase the risk of bleeding.

Ketorolac is only used for short-term treatment of severe pain that usually requires opioid treatment.

Ketorolac causes ulcers more frequently than other NSAIDs and should not be used for more than five days.
Biofreeze topical analgesic can be used as an adjunct therapy.

**lidocaine topical patch**

**Subclass:** Analgesics Local

**Mechanism of Action**

inhibits Na ion channels, stabilizing neuronal cell membranes and inhibiting nerve impulse initiation and conduction (amide local anesthetic)

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Biofreeze

Biofreeze’s pain relieving mechanism has not yet been fully understood. However, scientists have come up with two ideas or this. One is based off of Gate Control Theory. This theory is founded on the idea that pain is transmitted to the brain along 2 different fibers of nerves. The first of these fibers is the A-delta fiber, which is large and carries pain messages that are usually quick and intense. The second is the “C” fiber, which is small and usually carries chronic pain messages. When someone is in pain, the “C” fiber sends a signal to the spinal cord, which sends neuron to the brain, which “produces” the sensation of pain. Basically, Gate Control Theory states that one can block the signals of the “C” fiber by activating the A-delta fiber to inhibit the perception of pain. As Biofreeze is applied, a sensation is sent through the A-delta fiber, which activates an inhibitory nerve. This inhibitory nerve blocks the pain message from the “C” fiber. Thus, the pain is blocked.

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Peppermint Essential Oil

**Mechanism of Action**

Gate Control Theory of Pain

This theory states that the peppermint or menthol (such as in Biofreeze) binds with temperature sensitive receptors on the A-delta fiber known as TRPM8 receptors. When the menthol binds, calcium ions are released. It is believed that these ions are what help modulate pain signals through the opioid system of the body. The binding also causes the brain to perceive cold sensations also.
To maintain freedom from pain, drugs should be given “by the clock”, that is every 3-6 hours, rather than “on demand.” This three-step approach of administering the right drug in the right dose at the right time is inexpensive and 80-90% effective. Surgical intervention on appropriate nerves may provide further pain relief if drugs are not wholly effective.

WHO’s Pain Relief Ladder

Freedom from pain
Opioid for moderate or severe pain
+/−Non opioid
+/−Adjunct

Pain persisting or increasing
Opioid for mild to moderate pain
+/−Non opioid
+/−Adjunct

Pain persisting or increasing
Non opioid
+/−Adjunct

Acute Trauma Pain Guidelines
The purpose of these Guidelines is to:
(1) facilitate the safety and effectiveness of acute pain management in the perioperative setting
(2) reduce the risk of adverse outcomes
(3) maintain the patient’s functional abilities, as well as physical and psychological well-being;
(4) enhance the quality of life for patients with acute pain during the perioperative period

Educating Trauma Team
Multimodal Pain Control

- WHAT: little or no use of order set - ACUTE TRAUMA PAIN
- WHEN: ADMIT or TERTIARY SURVEY or POSTOPERATIVELY
- WHO: ALL trauma patients (on Tertiary Survey template)
- WHY: REGULATORY REQUIREMENT (CDC, CMS, ASA)
- HOW:
  - scheduled & breakthrough meds = MULTIMODAL
  - bowel regimen: ALL pts on Opioids should have stool softener & laxative
  - white board communication write down
    - pain control info (scheduled & breakthrough);
    - give patient mobility goal each day

DOCUMENT IN PROGRESS
NOTES

Interprofessional Healthcare Team

Appropriate actions an interprofessional healthcare team can take to effectively manage patient pain and comfort levels and improve their level of physical function

MCNH Data

Our collected data supports the efficacy of multimodal pain management and successful rehabilitation and improved QOL.