Compass SHARP

Postoperative Management

July 9th, 2025

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Learning Objectives

- Review the essential elements of immediate postoperative care, including monitoring vital signs, managing pain, and preventing complications.
- Explain strategies for promoting patient recovery and rehabilitation after surgery, including early mobilization, wound care, and nutritional support.
- Review multimodal analgesia, with emphasis on medication options and efficacy.
- Outline methods for discharge planning and patient education, ensuring a smooth transfer from hospital to home and providing patients with the information and resources they need for continued healing and self-care.

Disclaimer

Comprehensive Acute & Perioperative Pain Management

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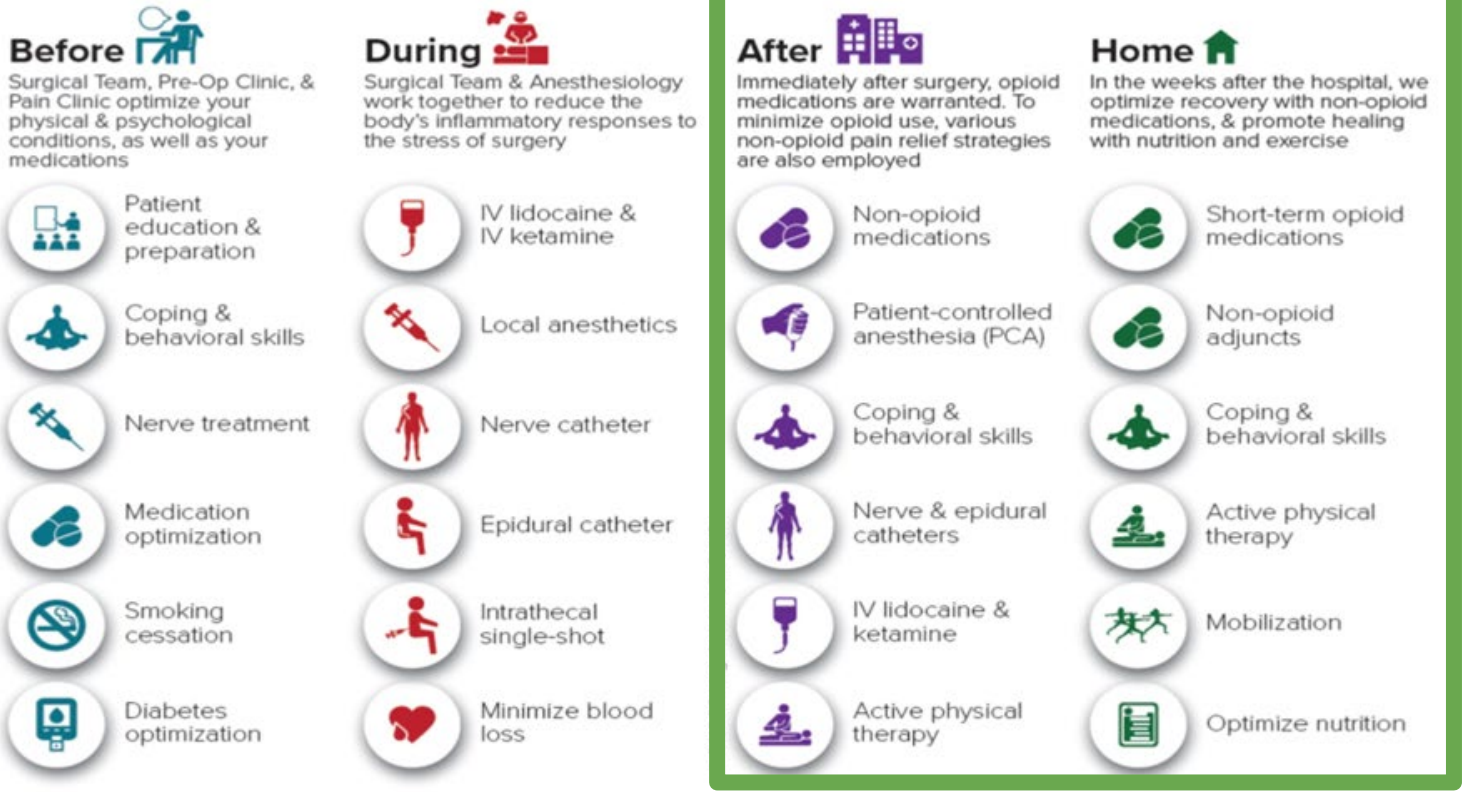


The 5 Medicines:

1. Mind is Medicine
2. Movement is Medicine
3. Sleep / Rest is Medicine
4. Food is Medicine
5. Medicine is Medicine

ERAS Principles

- Multidisciplinary collaboration
- ERAS reduces opioid requirements, LOS, and costs across a range of procedures
- Four pillars:
  - Early mobility
  - Optimized nutrition and enteral feeding
  - Multimodal non-narcotic analgesia
  - Goal-directed fluid therapy
- **https://erassociety.org/guidelines/**

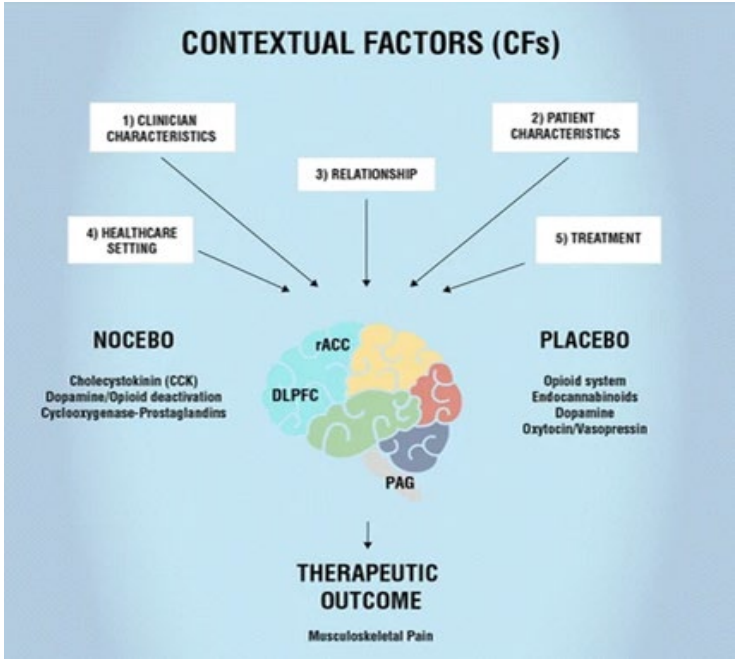
(TABLE 5)

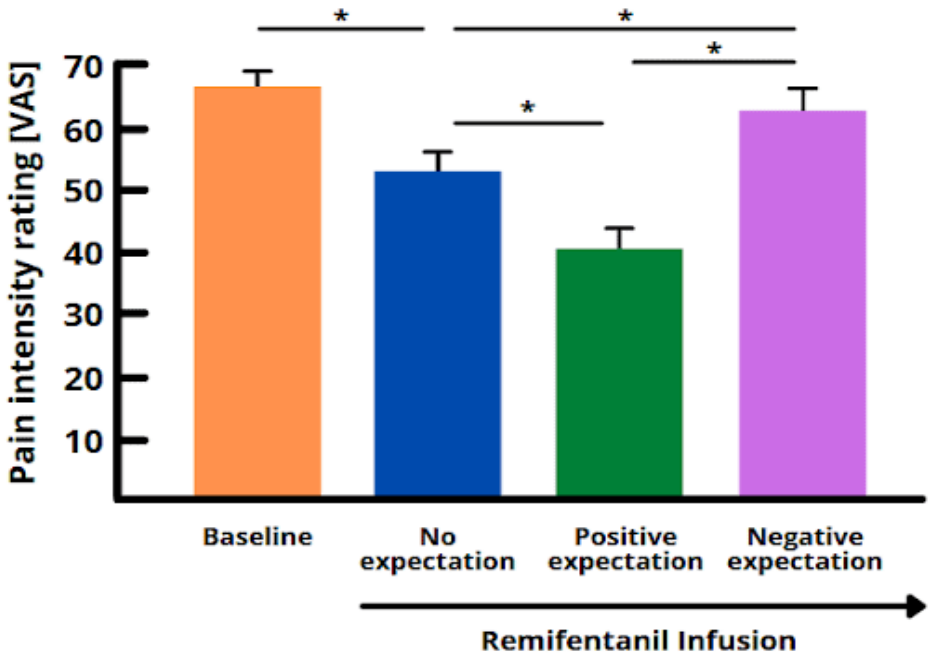
Key Elements of Enhanced Recovery Protocols[188]

Active Patient Involvement		
Pre-operative	**Intra-operative**	**Post-operative**
Pre-admission education	Active warming	Early oral nutrition
Early discharge planning	Opioid-sparing technique	Early ambulation
Reduced fasting duration	Surgical techniques	Early catheter removal
Carbohydrate loading	Avoidance of prophylactic NG tubes & drains	Use of chewing gum
No/selective bowel prep		Defined discharge criteria
Venous thromboembolism prophylaxis	Goal directed peri-operative fluid management	
Antibiotic prophylaxis	Pain & nausea management	
Pre-warming		
Audit of compliance & outcomes		
Whole Team Involvement		

SOURCE: *Pędziwiatr M, Mavrikis J, Witowski J, et al. Current status of enhanced recovery after surgery (ERAS) protocol in gastrointestinal surgery. Med Oncol. 2018;35(6):95. Published 2018 May 9. doi:10.1007/s12032-018-1153-0*

Mind is Medicine: Coping & Behavioral Skills





Source: https://www.iasp-pain.org/resources/fact-sheets/placebo-and-nocebo-effects-the-importance-of-treatment-expectations-and-patient-physician-interaction-for-treatment-outcomes/

Movement is Medicine: Early Mobilization

- **Benefits:** reduced postoperative complications, shorter length of stay, improved functional outcomes
- **Initiate mobilization as early as possible (within 24 hours after surgery:**
  - Colorectal surgery: mobilization ranging from initiation within 24 hours of surgery to 8 hours of activity by POD2 (PMID:36515513)
- **Multidisciplinary:** nursing, PT, medical staff
  - Ensure safety, address barriers to mobilization (e.g. pain, lines)
- **Pain management:** multimodal analgesia, opioid-sparing
- **Patient and Family Education:** introduce expectations before surgery to improve compliance
- **Risk factors for delayed ambulation:** poor functional status, malnutrition, systemic opioids
- PMID: 23364567

Food is Medicine: Postoperative Nutrition

- **Initiate ASAP with oral route preferred**
- **Within 24 hours of elective colorectal surgery** (reduced LOS, earlier return of GI function, reduced infectious complications) PMID:36515747
- **Goals:** 25-30 kcal/kg/day, 1.2g protein/kg/day
- **Consider use of oral nutritional supplements**
- **Enteral nutrition (tube feeding):**indicated within 24-48 hours in setting of critical illness, malnutrition, ENT surgery, severe trauma
- **Parenteral nutrition:** indicated if patients cannot ingest 50-60% of energy needs via enteral route for 7 days
- PMID: 38647684

Medicine is Medicine.
Multimodal Analgesia Components

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- NSAIDS - Acetaminophen - Gabapentinoids - Alpha-2 Agonists - Magnesium - Lidocaine	- Ketamine - Dextromethorphan - Suzetrigine - Corticosteroids - Muscle Relaxants

Multimodal Analgesia (MMA) Benefits

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- Significant improvement in postoperative pain
- Reduced incidence of postoperative complications
- Promotes rapid patient recovery
- Increased patient satisfaction
- Opioid-sparing
- Nationwide, the likelihood of surgical patients receiving a single nonopioid analgesic ranges from **43**-99%, two nonopioids ranges from **8**-92% during hospitalization

Multimodal Analgesia-NSAIDS

- **Mechanism:** inhibit COX-1 and COX-2 enzymes, decreases prostaglandin production (which sensitizes afferent nerve fibers), COX-1 widely distributed in body while COX-2 is found in areas of inflammation
- **Risks:** GI bleeding (esp. ketorolac), renal dysfunction, delayed wound healing, CV events
- Overall, current evidence of NSAID-induced perioperative AKI is inconclusive (PMID: 39613528)
- COX-2 selective NSAIDS have a lower risk of GI and bleeding SEs but higher risk of cardiac sides effects (MI, stroke)

Pre- and Postoperative NSAIDS

- COX-2 inhibitors (celecoxib) more effective than placebo for postoperative pain in TKA
- Numerous RCTs: COX-2 inhibitors immediately before incision as well as over the 24 hours prior to surgery exhibits positive postoperative outcomes
- Ketorolac **reduces opioid consumption 25-45%**, reducing ileus, nausea, vomiting
- Topical (diclofenac 1% gel)- 2g around surgical site 4 times daily less effective than systemic NSAIDS, more favorable safety profile, can be considered for discharge

GI Bleeding? Use NSAIDS & Mitigate risk.

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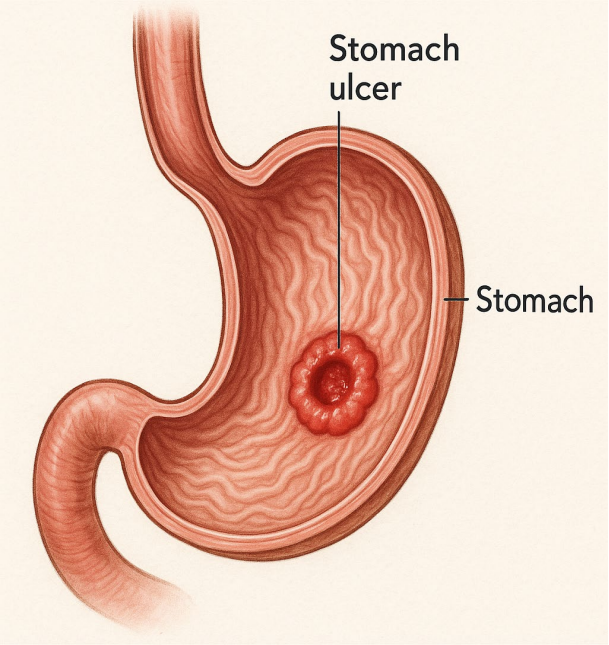
(TABLE 11)

GI Risk Factor Assessment and NSAID Therapy[563]

GI RISK FACTOR ASSESSMENT	TREATMENT
HIGH RISK History of previously complicated ulcer, especially recent ***OR*** more than two risk factors: • Age >65 years • High-dose NSAID therapy • Previous history of uncomplicated ulcers or • Concurrent use of aspirin, corticosteroids or anticoagulants	Alternative therapy or COX-2 inhibitor + PPI
MODERATE RISK • 1 - 2 risk factors	NSAID + PPI
LOW RISK • No risk factors	NSAID alone

SOURCE: American College of Gastroenterology Guidelines, 2009

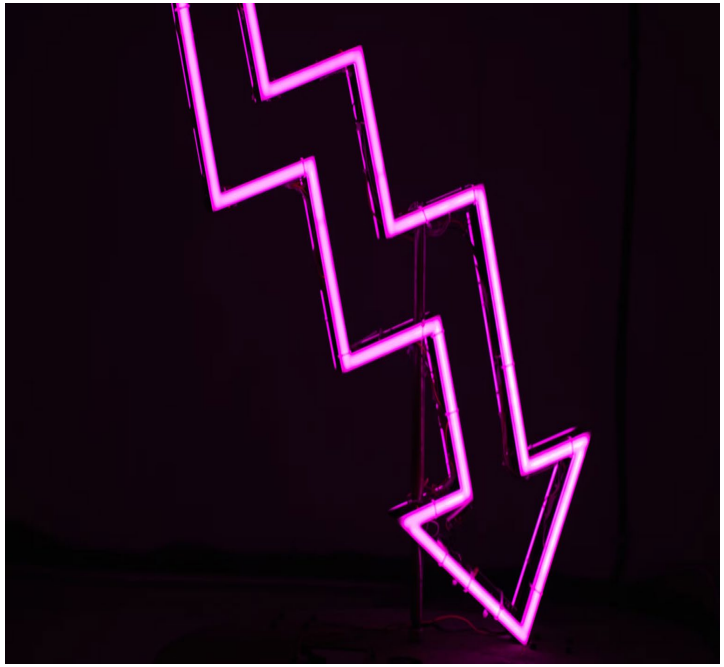


Multimodal Analgesia-Acetaminophen

- **Mechanism:** serotonin, opioid, prostaglandin, nitric oxide systems, inhibiting COX activity within the CNS
- low cost, minimal side effects
- NNT for pain relief =4
- Reduce postoperative opioid use 30%
- **IV:** high bioavailability, but oral remains more economical, no difference in analgesia
- Hepatic dosing in vulnerable pts
- Risks: Liver toxicity

Multimodal Analgesia-Gabapentinoids

- Mechanism: blocks alpha-2-delta subtype of presynaptic VGCCs, decreases release of excitatory neurotransmitters in the CNS
- Possibly no decrease in postoperative opioid intake
- Pulmonary complications following colorectal and orthopedic surgery
- Increased risk of ORADEs and overdose when used with opioids
- **Gabapentin clinically meaningful analgesic effect, not routinely recommended**



Multimodal Analgesia-Gabapentinoids Continued

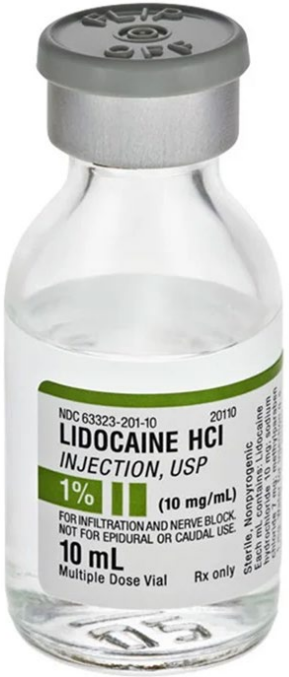
- Pregabalin- 6 times more potent than gabapentin, rapidly effective, some evidence supporting efficacy in single and multi-doses for reducing post-TJA pain and opioid dependence
- Adverse effects: drowsiness, dizziness, risk of sedation and respiratory depression when combined with opioids
- **Maybe benefit from Pregabalin**

Multimodal Analgesia- Alpha-2 Agonists

- **Clonidine** reduces opioid requirements 12-24 hours postoperatively by 25%
- AE: bradycardia, hypotension, abrupt discontinuation after prolonged use may precipitate withdrawal symptoms (agitation, headache, rebound HTN)
- **Tizanidine**: centrally acting a2-agonist, muscle relaxant, possible activity at imidazoline receptors (reduce facilitation of spinal motor neurons) preferred in patients with spastic disorders
- Tizanidine administered prior to laparoscopic **cholecystectomy** reduced pain scores, analgesic use, and duration of stay in recovery room
- hr prior to surgery and twice daily for one week after **inguinal hernia repair**- decreased postoperative pain and analgesic requirements

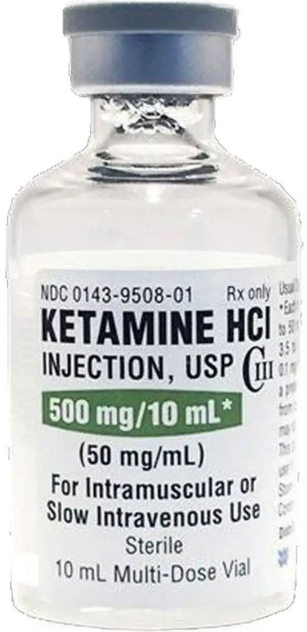
Multimodal Analgesia- IV Lidocaine

- Inhibits spontaneous impulse generation from injured nerve fibers suppresses inflammation
- **Caution:** unstable CAD, recent MI, heart failure, cirrhosis, arrhythmias, seizure disorders
- VAS scores, and opioid use at 24 and 72 hours reduced reduced PMID: 38199928
- Reduces length of hospital stay by 8-24 hours
- Lower risk of ileus compared to opioids, better analgesia than placebo, reduction in opioids after **laparoscopic cholecystectomy**



Multimodal Analgesia-Ketamine

- Noncompetitive N-methyl-D-aspartate glutamate receptor antagonist and a sodium channel blocker
- Elimination half life= 80-180 min.
- Metabolized in the liver by CYP3A4, CYP2B6 and CYP2C9 to norketamine (via N-demethylation)Advantages
- Less respiratory depression, ileus, etc than opioids
- Analgesia at plasma concentrations of 100-150 ng/ml
- Overall, appears to have efficacy for procedures longer than 90 min in duration and operations with more trauma (TJA)



Multimodal Analgesia-Suzetrigine (VS-548)

- NaV1.8 Inhibitor (not expressed in CNS). Voltage gated Na expressed in nociceptors where its role is to transmit pain signals in peripheral sensory nerves
- Binds to VSD2 of NaV1.8 as an allosteric channel inhibitor and is not a channel blocker
- Additive to local anesthetics
- Phase II &v phase III trials show decrease in pain scores compared to placebo, but no significant difference in pain scores compared vs hydrocodone-acetaminophen in abdominoplasty

Multimodal Analgesia-Corticosteroids

- Multiple RCTS demonstrate systemic and locally administered corticosteroids pre, intra, and postop effectively and safely reduce pain scores and opioid consumption after TJA
- 1-3 doses dexamethasone, prednisone, hydrocortisone, methylprednisolone (short course does not confer risk for infection and delayed wound healing)
- Periarticular corticosteroids with LA improves ROM and functional status in early recovery PMID 39597962
- AE: gastric irritation, impaired wound healing, impaired glucose homeostasis, sodium retention
- Significantly higher rate of anastomotic leaks in patients who receive corticosteroids 6.8% vs. 3.3%

Hospital to Home Transition

- **Patient and Caregiver Education**
  - Pain medication schedule
  - Recognizing and managing side effects
  - Emphasize non-opioid pain management first, opioids: "Take as little as necessary."
  - Safe medication storage/disposal
  - Pain is part of the healing process.
  - You can do this, we're here if you need us.
  - Consider no opioids if no need in hospital 24 hrs prior to dc
  - Adopt standards for your practice!

Stop: "Get ahead of your pain, take your medications before you need them.

Start: "Listen to what your body is telling you. Pain is a guide".

Procedure	Oxycodone 5mg tablets*
Breast Cancer Surgery	
Breast Biopsy or Lumpectomy	0-5
Lumpectomy + Sentinel Lymph Node Biopsy	0-5
Sentinel Lymph Node Biopsy Only	0-5
Simple Mastectomy + Sentinel Lymph Node Biopsy	0-20
Modified Radical Mastectomy + Sentinel Lymph Node Biopsy	0-30
Thoracic Surgery	
Cardiac Surgery via Median Sternotomy	0-25
Lung Cancer Resection - Minimally Invasive	0-15
Lung Cancer Resection - Open	0-20
Dentistry	
Dental Extraction	0
Obstetrics and Gynecology	
Hysterectomy - Vaginal or Laparoscopic/Robotic or Abdominal	0-10
Cesarean Section	0-20
Orthopaedic Surgery	
Total Hip Arthroplasty	0-30
Total Knee Arthroplasty	0-40
Urology	
Prostatectomy	0-10
Vascular Surgery	
Carotid Endarterectomy	0-5

Procedure	Oxycodone 5mg tablets*
General Surgery	
Anti-reflux (Nissen) - Laparoscopic	0-5
Enterolysis - Laparoscopic	0-5
Excision of Rectal Tumor - Transanal	0-5
Thyroidectomy	0-5
Appendectomy	0-10
Cholecystectomy - Laparoscopic or Open	0-10
Colectomy - Laparoscopic or Open	0-10
Donor Nephrectomy - Laparoscopic	0-10
Enterostomy Closure - Laparoscopic	0-10
Gastrorrhaphy	0-10
Hernia Repair - Minor or Major	0-10
Ileostomy/Colostomy Creation, Re-sitting, or Closure	0-10
Pancreatectomy	0-10
Sleeve Gastrectomy	0-10
Small Bowel Resection or Enterolysis - Open	0-10
Melanoma Surgery	
Sentinel Lymph Node Biopsy Only	0-5
Wide Local Excision + Sentinel Lymph Node Biopsy	0-20

Credit: Michigan OPEN
https://michigan-open.org/wp-content/uploads/2024/08/All-Adult-Prescribing-Recs.pdf.pdf

Hospital to Home Transition Continued

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Prescribe naloxone to patients at elevated risk

- Discharge prescription for more than 50mg MME
- Those receiving chronic opioid therapy
- Known or suspected OUD
- Concurrent benzodiazepine and sedative use
- History of opioid rotation due to adverse effects
- Medical comorbidities (tobacco use, COPD, emphysema, asthma, sleep apnea, pulmonary disease, renal/liver disease, cardiac,HIV/AIDS, antidepressant use)

Conclusions

- Postoperative management continues the care plan initiated prior to surgery with an emphasis on early mobility, optimized nutrition, multimodal opioid-sparing analgesia, and goal-directed fluid therapy.
- Multimodal analgesia represents the contemporary framework for postoperative pain management emphasizing non-opioid medications, regional and neuraxial analgesia, physical therapy, mental health interventions, and patient education.
- Patient education should include a plan for prioritizing continued multimodal analgesia after hospital discharge and opioid tapering as postoperative pain resolves.

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Resources

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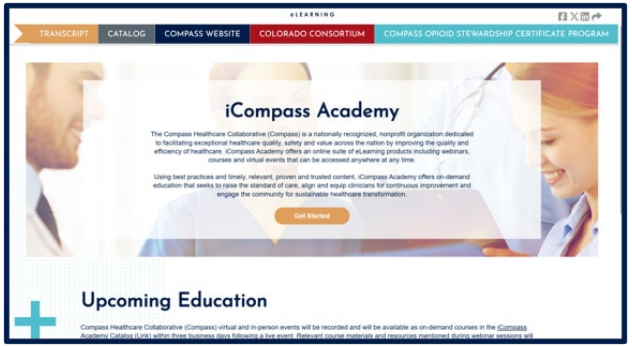

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