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Multimodal Analgesia

The use of several classes of analgesics with varying mechanisms of action to:

- Improve pain control
- Decrease reliance on opioids ←
- Reduce opioid side effects
- Reduce side effects associated with each class of medication

Goldberg SE, et al. Practical management of a regional anesthesia-driven acute pain service. Adv Anesth 2017; 31(1):151-171.

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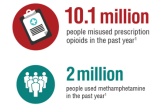
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Decrease Reliance on Opioids

THE OPIOID EPIDEMIC BY THE NUMBERS

- 2017: Public Health Emergency declared by US HHS
- Decrease reliance on opioids perioperatively
- Decrease long term opioid use after surgery



<https://www.hhs.gov/opioids/about-the-epidemic/index.html>

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Multimodal Analgesia

- A. Acetaminophen
- B. Nonsteroidal Anti-Inflammatory drugs (NSAIDs)
- C. Regional anesthesia or Local Anesthetics

- D. Gabapentanoids
- E. N-methyl-D-aspartate receptor modulators

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Acetaminophen

- Most commonly used analgesic in the perioperative period
- Few contraindications
- Unless contraindicated, we prescribe routinely for inpatient and outpatient surgery
- Oral or intravenous

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Nonsteroidal Anti-inflammatory Drugs (NSAIDs)

- Cox-2-inhibitors (celecoxib)
- Ketorolac
- Effective
- Often administered routinely similar to acetaminophen

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Nonsteroidal Anti-inflammatory Drugs (NSAIDs)

- Bone Healing
- Coronary Artery disease
- Chronic Kidney disease
- Gastrointestinal ulcers
- Bleeding Risk

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**Nonsteroidal Anti-inflammatory Drugs (NSAIDs)
(bleeding risk)**

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RESEARCH PAPERS

Hematoma Risks of Nonsteroidal Anti-inflammatory Drugs Used in Plastic Surgery Procedures
A Systematic Review and Meta-analysis

Wahles, Nicholas J. MD¹, Jones, Veronica M. MD², Kraljic, Lauren³, Chen, Haijing PhD⁴, Ruyuan, Christopher M. MD, PhD⁵ **Author Information** @

Annals of Plastic Surgery June 2019 • Volume 82 • Issue 05 • p 5437-5445
doi:10.1097/SAP.0000000000000898

Toradol following Breast Surgery: Is There an Increased Risk of Hematoma?

Brittain N. Nguyen, M.D.
Ruth J. Bara, M.D.
Christine E. Stewart, M.D.
Cherie A. Heinrich, M.D.
Mississippi, Miss.

Background: Ketorolac (toramethamine (Toradol), a nonsteroidal anti-inflammatory drug, is used with increased frequency given its success in postoperative pain control and the subsequent decreased need for narcotics. Its use has been limited in plastic surgery for fear of postoperative bleeding and hematoma formation. In this study of breast surgery patients, the authors investigated whether ketorolac increased the risk of postoperative hematoma formation.

JAMA Surgery | Review
Postoperative Multimodal Analgesia Pain Management With Nonopioid Analgesics and Techniques A Review
Elizabeth C. Wink, MD, Michael C. Gure, MD, Christopher L. Wink, MD

10.1001/jama.2019.2888
10.1001/jama.2019.2888
10.1001/jama.2019.2888

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**Nonsteroidal Anti-inflammatory Drugs (NSAIDs)
(bleeding risk)**

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Ann Surg Oncol (2021) 28:5134-5140
https://doi.org/10.1245/s10434-021-09722-4

Annals of
SURGICAL ONCOLOGY
OFFICIAL JOURNAL OF THE SOCIETY OF SURGICAL ONCOLOGY

ORIGINAL ARTICLE - BREAST ONCOLOGY

Intraoperative Ketorolac is Associated with Risk of Reoperation After Mastectomy: A Single-Center Examination

Patrick J. McCormick, MD, MEng^{1,2}, Melissa Assel, MS³, Kimberly J. Van Zee, MS, MD, FACS^{4,5}, Andrew J. Vickers, PhD^{6,7}, Jonas A. Nelson, MD, MPH^{8,9}, Monica Morrow, MD, FACS^{1,2}, Hanac K. Tokita, MD¹, Brett A. Simon, MD, PhD^{1,2}, and Rebecca S. Twersky, MD, MPH^{1,2}

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Local Anesthetics

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Regional Anesthesia
Local anesthetic infiltration

Systems Based Approach
Educating anesthesia personnel
Adequate support staff and equipment

Shoulder Arthroscopy → Interscalene single shot injection
Shoulder Arthroplasty → Interscalene continuous catheter

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Dexamethasone

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PAIN MEDICINE

Perioperative Single Dose Systemic Dexamethasone for Postoperative Pain
A Meta-analysis of Randomized Controlled Trials

Gilberto S. De Oliveira, Jr., M.D.,¹ Marcelo D. Almeida, M.D.,¹ Honorio T. Benzon, M.D.,¹ Robert J. McCarthy, Pharm.D.²

Anesthesiology, 2011 Sep;115(3):575-88. PMID: 21799397.

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Gabapentanoids

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- Strongly recommended in a 2016 Practice Guideline by the American Pain Society and ASRA
- Common in multimodal pain control regimens

1 Pain, 2016 Feb;17(2):131-57

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Gabapentanoids

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Preoperative Gabapentin Decreases Anxiety and Improves Early Functional Recovery from Knee Surgery
Christopher Hargreaves, MD, PhD¹, Adnan, MD², Bruce Glickman, MD³, Daniel J. Swisher, MD, and Marcel Charvin, MD⁴

Perioperative Oral Pregabalin Reduces Chronic Pain After Total Knee Arthroplasty: A Prospective, Randomized, Controlled Trial

Arachane Ramanathan, MD **BACKGROUND:** Despite the extensive use of oral knee arthroplasty, chronic postoperative pain remains a significant problem.

British Journal of Anaesthesia 100 (3): 361-3 (2008)
doi:10.1093/bja/aen244 Advance Access publication August 20, 2008

BJA

Evaluation of a single preoperative dose of pregabalin for attenuation of postoperative pain after laparoscopic cholecystectomy
A. Agarwal¹, S. Cantam¹, D. Gupta¹, S. Agarwal¹, P. K. Singh² and U. Singh²

Perioperative Pregabalin Improves Pain and Functional Outcomes 3 Months After Lumbar Discectomy
Sun M. Burke, MD, and George D. Shores, PhD

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ANESTHESIOLOGY


Perioperative Use of Gabapentinoids for the Management of Postoperative Acute Pain

A Systematic Review and Meta-analysis

Michael Vermet, M.D., M.Sc., François Lauzier, M.D., M.Sc., Ryan Zarychanski, M.D., M.Sc., Caroline Perron, M.Sc., Xavier Savard, M.D. candidate, Anne-Marie Poirard, M.D., M.Sc., Guillaume Leblanc, M.D., M.Sc., Marie-Josée Cossé, Ph.D., Xavier Nivou, M.Sc., Alexis F. Turgeon, M.D., M.Sc., and the Canadian Perioperative Anesthesia Clinical Trials (PACT) Group*

ANESTHESIOLOGY 2020; 133:265-79

“Clinical Agnosticism”



Anesthesiology 2020 Aug;133(2):265-279

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N-methyl-D-aspartate Receptor Antagonists

- Ketamine (and Magnesium)
- Consider if:
 - Patient is opioid tolerant
 - Painful Surgery
- Often avoided in Ambulatory Surgery
 - Adjuvant in sedation cases

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Opioids

▼ PAIN MEDICATIONS (PAIN SCORE/INTENSITY 1 - 3)

☐ acetaminophen tab (5)

650 mg, oral, EVERY 4 HOURS PRN for 3 days, mild pain (pain score 1-3). "Give as needed for mild pain (PAIN SCORE / INTENSITY 1-3)" "Minimize opioid use in patients over 70 years old"

*Acetaminophen MAX dose is 4 g per 24 hours from ALL sources

▼ PAIN MEDICATIONS (PAIN SCORE / INTENSITY 4 - 6)

☐ hydrocodone 5 mg with acetaminophen 325 mg (NORCO) - choose for patients over 60 years old (5)

2 Tab, oral, EVERY 4 HOURS PRN, Starting 4/8/21 for 3 days, mod pain (pain score 4-6). "Give PRN for moderate pain (PAIN SCORE/INTENSITY 4-6)" "Acetaminophen MAX dose is 4 g per 24 hours from ALL sources" "Minimize opioid use in patients over 70 years old"

☐ hydrocodone 10 mg with acetaminophen 325 mg (NORCO) (5S)

2 Tab, oral, EVERY 4 HOURS PRN, Starting 4/8/21 for 3 days, mod pain (pain score 4-6). "Give PRN for moderate pain (PAIN SCORE / INTENSITY 4-6)" "Acetaminophen MAX dose is 4 g per 24 hours from ALL sources" "Minimize opioid use in patients over 70 years old"

▼ PAIN MEDICATIONS (PAIN SCORE 7 OR ABOVE)

☐ morphine injection (5S)

1 mg, intravenous, EVERY 3 HOURS PRN, Starting 4/8/21 for 3 days, "Give PRN for severe pain (PAIN SCORE 7 or above)." "Give no more than 5 doses" "If pain is not relieved after 3 doses, consider changing to PCA (preferred method for parenteral analgesia)" "Minimize opioid use in patients over 70 years old"

☐ hydromorphone (DILAUDID) inj (5S)

0.2 mg, intravenous, EVERY 3 HOURS PRN, Starting 4/8/21 for 3 days

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Opioids

- System based approach to implementation
 - Ambulatory surgery center
 - Service Line
- ▼ ASC MILD ORAL POST-OP PAIN MANAGEMENT: CHOOSE ONE
 - ☐ acetaminophen tab
 - 650 mg, oral, ONCE PRN, Starting 4/8/21 for 1 dose, mild pain (pain score 1-3). "When able to take oral pain medications", Recovery (only)
 - ☐ buprenorphine tab
 - oral, ONCE PRN for 1 dose, mild pain (pain score 1-3). "When able to take oral pain medications", Recovery (only)
- Flexibility to tailor to individual patient needs

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Orthopaedic Multimodal Analgesia

☐ Acute Pain Service Consult

☐ For performance and management of regional anesthesia for postoperative pain control, Preprocedure

☐ Preop Medications

☐ Acetaminophen tablet 975mg

☐ Celecoxib capsule 200mg

☐ Oxycodone CR tablet 10mg

☐ Ketamine injection 30mg. To be given by anesthesia

☐ Gabapentin

☐ Gabapentin capsule 600mg for CrCl 15 or greater

☐ Gabapentin capsule 300mg for CrCl under 15

☐ Gabapentin is contraindicated for this patient

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Management of the Ambulatory Chronic Pain Patient and Perioperative Analgesia

Michael O'Rourke, MD, FASA


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Anesthesiologist, Edward Hines, Jr VA Hospital

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Thank you



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