

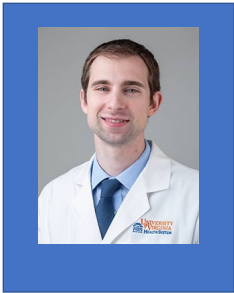


Outpatient • Office Based • Non-Operating Room

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May 2-4, 2024



Preop Considerations for Ambulatory Orthopedic Surgery

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Disclosures

None



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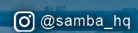
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Learning objective



- Cultivate a patient pathway where education and patient-appropriate pre-operative medications and multimodal analgesics are standardized and provided routinely.

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Patient Education



- Taking ownership and partnering with surgical clinics
 - Broach topics of:
 - Anesthetic type (especially neuraxial)
 - Nerve block
 - Provide resources if needed
 - e.g. ERAS Pathway booklet, or more targeted
 - Avoid new conversations on day of surgery

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Patient Education



- Patient Selection, Dispo expectations
 - Same day discharge, backup admission?
 - Degree of comorbidities is predictive of early discharge
 - E.g. Meneghini 2017: Outpatient Arthroplasty Risk Assessment score
 - Low risk value (<59) was 81.6% predictive of early discharge, vs 56.4% for ASA score 1-2

Comorbidity Areas	Possible Points
General medical	180
Hematological	325
Cardiac	385
Endocrine	165
Gastrointestinal	185
Neurologic/psychological	185
Renal/urology	220
Pulmonary	250
Infectious disease	65

OARA, Outpatient Arthroplasty Risk Assessment.

R. Michael Meneghini, Mary Ziembra-Davis, Marshall K. Ishmael, Alexander L. Kuzma, Peter Caccavallo, Safe Selection of Outpatient Joint Arthroplasty Patients With Medical Risk Stratification: the "Outpatient Arthroplasty Risk Assessment Score", The Journal of Arthroplasty, Volume 32, Issue 8, 2017, Pages 2325-2331, ISSN 0883-5403, <https://doi.org/10.1016/j.arth.2017.03.004>.

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Patient Education



- Logistics matter:
 - Site familiarity: right location at right time
 - Consider facility tour- anecdotal correlation with improved arrivals, patient comfort, overall satisfaction
 - What is available on site vs other locations: Pharmacy, PT, Labs?
- Day of Surgery:
 - Pre-op nurses typically provide overview
 - PT education (e.g. sling fitting, crutch teaching) preop?



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Preop Medications

- Jimenez, 2020: “Causes of unplanned admission after orthopaedic procedures in ambulatory surgery”
 1. 😞 Pain
 2. 🤒 Surgical Complication
 3. 🤢 Nausea/Vomiting

Jiménez Salas B, Ruiz Frontera M, Seral García B, García-Álvarez García F, Jiménez Bernadó A, Albareda Albareda J. Causes of unplanned admission after orthopedic procedures in ambulatory surgery. Rev Esp Cir Ortop Traumatol (Engl Ed). 2020 Jan-Feb;64(1):50-56. English, Spanish. doi: 10.1016/j.recot.2019.09.001. Epub 2019 Nov 1. PMID: 31679991.

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Preop Analgesics

- Acetaminophen
 - PO or IV both found beneficial for TJA (Sun)
 - PO: usually more cost-effective, timing appropriate for most outpatient procedures
- NPO/Aspiration risk implications
 - Minimal evidence available
 - 50% emptying time for water cited as 12 mins (Hunt)

Sun L, Zhu X, Zou J, et al. Comparison of intravenous and oral acetaminophen for pain control after total knee and hip arthroplasty: a systematic review and meta-analysis. Medicine (Baltim) 2018

HUNT JN. Some properties of an alimentary osmoreceptor mechanism. J Physiol. 1956 May 28;132(2):267-88. doi: 10.1113/jphysiol.1956.sp005524. PMID: 13320397; PMCID: PMC1363495.

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Preop Analgesics



- Gabapentinoids
 - No significant analgesic benefit found for TKA patients (Hamilton)
 - Has fallen out of favor in ERAS protocols
 - Still in consideration:
 - Continuing if a home med
 - If neuropathic pain anticipated (and not amenable to regional block)

Hamilton TW, Strickland LH, Pandit HG. A meta-analysis on the use of gabapentinoids for the treatment of acute postoperative pain following total knee arthroplasty. J Bone Joint Surg Am 2016

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Preop Analgesics: NSAIDs



- Nonselective: e.g. ibuprofen, naproxen, ketorolac
- Selective Cox-2 inhibitors: e.g. celecoxib
 - Reduced GI side effects
- Celecoxib is a mainstay in many protocols due to safety and efficacy (Geng)
 - Decreased pain scores at 24, 48, 72 hrs after TKA
 - Small decrease in morphine consumption, increase in active ROM at 48 hrs

Geng X, Zhou S, Zhang X, Liu X, Cheng X, Jiang L, Zhang D. The Efficacy and Safety of Celecoxib for Pain Management After Total Knee Arthroplasty: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Front Surg. 2022 Jan 28;9:791513. doi: 10.3389/fsurg.2022.791513. PMID: 35155555; PMCID: PMC8831328.

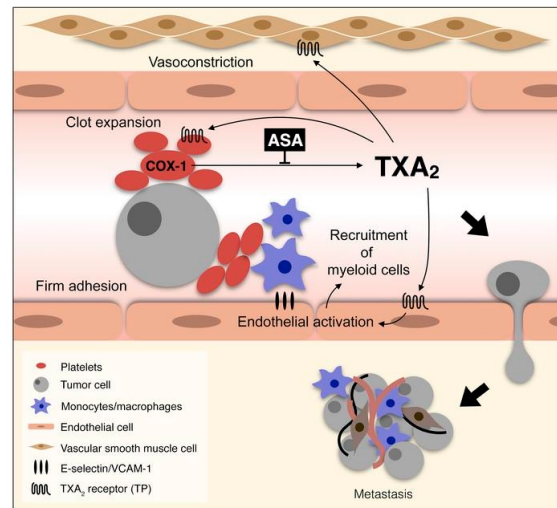
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Preop Analgesics: NSAIDs

- (all) NSAIDs are associated with small increase in absolute risk of adverse perioperative CV events
 - Selective COX-2 inhibition effect at the vascular endothelium:
 - reduces prostaglandin I2 (PGI2 or prostacyclin) production but not platelet thromboxane A2 production (pro-thrombotic)



Coxib and traditional NSAID Trialists' (CNT) Collaboration; Bhala N, Emberson J, Merhi A, Abramson S, Arber N, Baron JA, Bombardier C, Cannon C, Farkouh ME, FitzGerald GA, Goss P, Halls H, Hawk E, Hawkey C, Hennekens C, Hochberg M, Holland LE, Kearney PM, Laine L, Lanus A, Lance P, Laupacis A, Oates J, Patrono C, Schnitzer TJ, Solomon S, Tugwell P, Wilson K, Wittes J, Baigent C. Vascular and upper gastrointestinal effects of non-steroidal anti-inflammatory drugs: meta-analyses of individual participant data from randomised trials. Lancet. 2013 Aug 31;382(9894):769-79. doi: 10.1016/S0140-6736(13)60900-9. Epub 2013 May 30. PMID: 23726390; PMCID: PMC3778977.

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Preop Analgesics: NSAIDs

- CV risk varies with patient and dosing characteristics
- Without cardiovascular hx: small increase in adverse vascular events of 2 per 1000 patients per year
- In general: increased risk with higher doses, increased duration, patient hx CV disease

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Coxib and traditional NSAID Trialists' (CNT) Collaboration; Bhala N, Emberson J, Merhi A, Abramson S, Arber N, Baron JA, Bombardier C, Cannon C, Farkouh ME, FitzGerald GA, Goss P, Halls H, Hawk E, Hawkey C, Hennekens C, Hochberg M, Holland LE, Kearney PM, Laine L, Lanus A, Lance P, Laupacis A, Oates J, Patrono C, Schnitzer TJ, Solomon S, Tugwell P, Wilson K, Wittes J, Baigent C. Vascular and upper gastrointestinal effects of non-steroidal anti-inflammatory drugs: meta-analyses of individual participant data from randomised trials. Lancet. 2013 Aug 31;382(9894):769-79. doi: 10.1016/S0140-6736(13)60900-9. Epub 2013 May 30. PMID: 23726390; PMCID: PMC3778977.

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Intraop multimodal anesthesia adjuncts

- Completion of preop plan: acetaminophen, NSAID, judicious opioid
- Ketamine
 - Low dose (0.1-0.5 mg/kg) decreases pain and opioid requirements in first 24 hrs after painful orthopedic surgery (Riddell)
- Magnesium: Improved analgesia (including specific to orthopedics)
 - Potential improvement in PONV, shivering
 - Hypotension with rapid administration
- Dexmedetomidine: useful as sedation, may provide analgesic benefit
 - May prolong peripheral nerve blocks (decreased need for rescue opioid)

Peng YN, Sung FC, Huang ML, Lin CL, Kao CH. The use of intravenous magnesium sulfate on postoperative analgesia in orthopedic surgery: A systematic review of randomized controlled trials. *Medicine (Baltimore)*. 2018 Dec;97(50):e13583. doi: 10.1097/MD.00000000000013583. PMID: 30558026; PMCID: PMC6319973.

Riddell JM, Trummel JM, Onakpoya U. Low-dose ketamine in painful orthopaedic surgery: a systematic review and meta-analysis. *Br J Anaesth*. 2019 Sep;123(3):325-334. doi: 10.1016/j.bja.2019.05.043. Epub 2019 Jul 18. PMID: 31327465.

Donatiello, V., Alfieri, A., Napolitano, A. et al. Opioid sparing effect of intravenous dexmedetomidine in orthopaedic surgery: a retrospective analysis. *J Anesth Analg Crit Care* 2, 49 (2022). <https://doi.org/10.1186/s44158-022-00076-1>

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Antiemetics

- PONV affects approximately 30% of the general population
 - Ortho: 41% nausea, 17% vomiting (Ursavas)
- A top concern for patients (Macario)
 - Rated as "most undesirable"
 1. Vomiting
 2. Gagging on ETT
 3. Incisional pain
 4. Nausea

Ursavas FE, Baksi A, Sarica E. Postoperative Nausea and Vomiting After Orthopaedic Surgery: Prevalence and Associated Factors. *Orthop Nurs*. 2023 May-Jun 01;42(3):179-187. doi: 10.1097/NOR.0000000000000945. PMID: 37262378.

Liu, Yingchao MM^a; Chen, Xinli MM^a; Wang, Xiaohua MM^a; Zhong, Huohu MM^b; He, Hefan MD^a; Liu, Yibin MM^a; Liao, Yuewen MM^a; Pan, Zhigang MM^c; Hu, Weipeng MD^c; Liu, Weifeng MD^c; Zheng, Feng MD^c. The efficacy of aprepitant for the prevention of postoperative nausea and vomiting: A meta-analysis. *Medicine* 102(29):p e34385, July 21, 2023. | DOI: 10.1097/MD.00000000000034385

Macario A, Weinger M, Carney S, Kim A. Which clinical anesthesia outcomes are important to avoid? The perspective of patients. *Anesth Analg*. 1999 Sep;89(3):652-8. doi: 10.1097/0000539-199909000-00022. PMID: 10475299.

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Antiemetics

- Preop:
 - Scopolamine (transdermal patch)
 - Onset to detectable levels ~4hours, peak 24 hrs
 - Anticholinergic side effects: sedation, dry mouth, blurred vision, central cholinergic sx, confusion
 - Aprepitant
 - Highly effective, evidence suggesting strongest anti-emetic effect for any single drug
 - Combo with dexamethasone and ondansetron superior to dexamethasone and ondansetron
 - Drawbacks: expensive, availability

Antor MA, Uribe AA, Erminy-Falcon N, Werner JG, Candiotti KA, Pergolizzi JV, Bergese SD. The effect of transdermal scopolamine for the prevention of postoperative nausea and vomiting. *Front Pharmacol*. 2014 Apr 9;5:55. doi: 10.3389/fphar.2014.00055. PMID: 24782768; PMCID: PMC3988383.
Liu, Yingchao MM; Chen, Xinli MM; Wang, Xiaohua MM; Zhong, Huohu MM; He, Hefan MD; Liu, Yibin MM; Liao, Yuewen MM; Pan, Zhigang MM; Hu, Weipeng MD; Liu, Weifeng MD; Zheng, Feng MD^{*}. The efficacy of aprepitant for the prevention of postoperative nausea and vomiting: A meta-analysis. *Medicine* 102(29):p e34385, July 21, 2023. | DOI: 10.1097/MD.00000000000034385

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Antiemetics

- Intraop:
 - Dexamethasone: antiemetic and some analgesic benefit
 - Ondansetron
- Rescue:
 - Phenergan
 - Droperidol vs Haloperidol
 - Tigan (IM)



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GLP-1 agonists

- Risk mitigation?



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Mitigating Aspiration Risk

- Is there a role for more routine use of famotidine, metoclopramide, sodium citrate, etc?

Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration: Application to Healthy Patients Undergoing Elective Procedures: An Updated Report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration. *Anesthesiology* 2017; 126:376–393
doi: <https://doi.org/10.1097/ALN.0000000000001452>

B. Pharmacologic Recommendations

Medication Type and Common Examples	Recommendation
<i>Gastrointestinal stimulants:</i>	
• Metoclopramide	May be used/no routine use
<i>Gastric acid secretion blockers:</i>	
• Cimetidine	May be used/no routine use
• Famotidine	May be used/no routine use
• Ranitidine	May be used/no routine use
• Omeprazole	May be used/no routine use
• Lansoprazole	May be used/no routine use
<i>Antacids:</i>	
• Sodium citrate	May be used/no routine use
• Sodium bicarbonate	May be used/no routine use
• Magnesium trisilicate	May be used/no routine use
<i>Antiemetics:</i>	
• Ondansetron	May be used/no routine use
<i>Anticholinergics:</i>	
• Atropine	No use
• Scopolamine	No use
• Glycopyrrolate	No use
<i>Combinations of the medications above:</i>	No routine use

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Conclusion

- Outpatient orthopedic surgery patients can benefit from patient education and a multi-pronged strategy to pre-emptively address pain and nausea.

