ANESTHETIC MANAGEMENT FOR ORTHOPEDIC PATIENTS ON GLP-1 THERAPY

Ryan Ivie MD

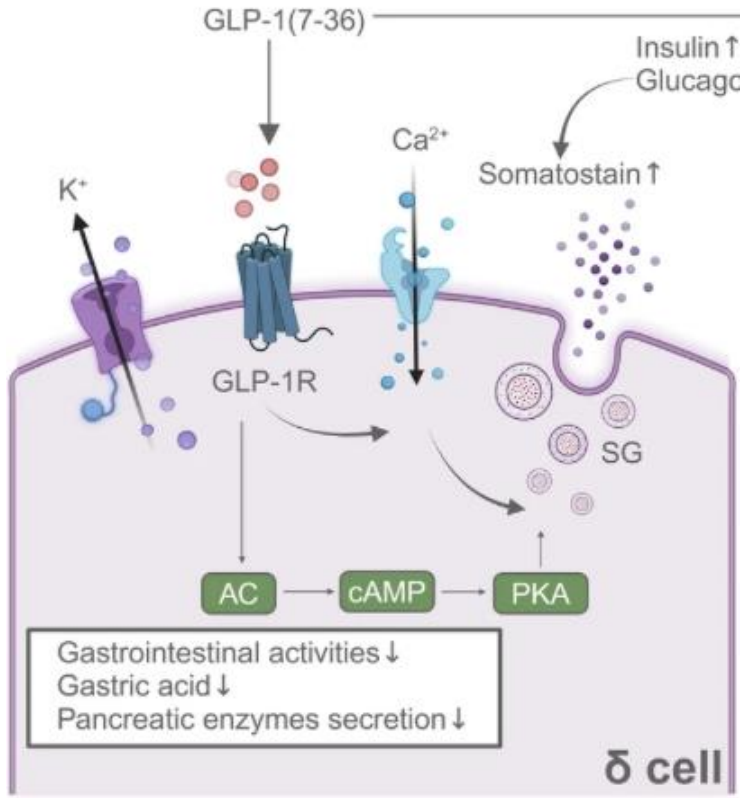
Assistant Professor
Anesthesiology and Perioperative Medicine
Director of Regional Anesthesia
Oregon Health and Science University

DISCLOSURES

None

BENEFITS

- For both diabetes and obesity treatment, reduction in:
  - Major adverse cardiovascular events (MACE)
  - All-cause death
  - Myocardial infarction
- Many downstream perioperative benefits of weight loss and glycemic control



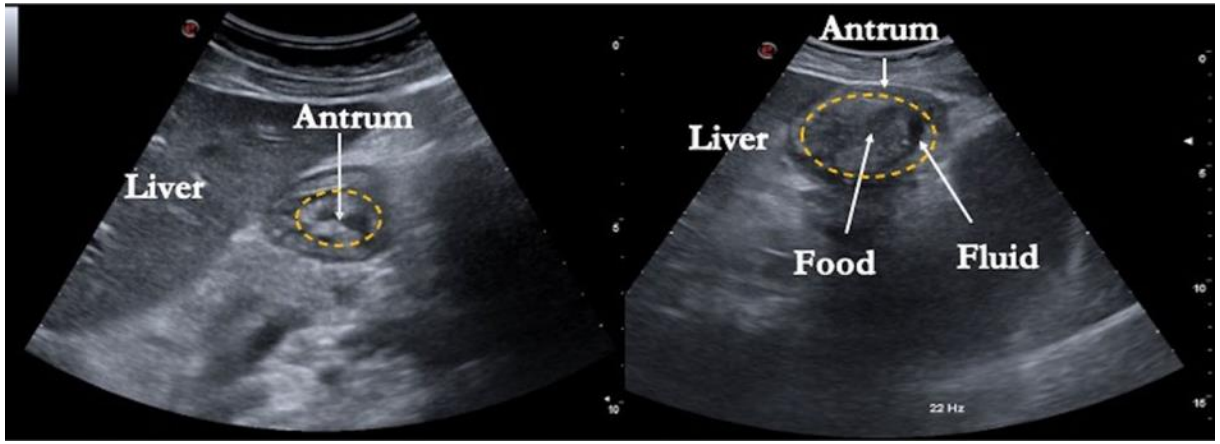
Zheng et al. 2024

GASTRIC EFFECTS

- Delayed gastric emptying
  - Slows gastric motility
    - Pro: appetite suppression
    - Con: perioperative aspiration risk
  - Increased residual gastric content after standard NPO time
    - 3-7x increase in stomach contents on ultrasound or endoscopy after overnight fasting
    - 1.5x longer to empty by 50%
- Common side effects
  - Nausea, vomiting, abdominal pain
  - Tachyphylaxis: typically resolve by 4 weeks after initiation or dose escalation
  - Persistent vomiting or gastroparesis possible

GASTRIC ULTRASOUND

- Curvilinear transducer, supine vs. right lateral
  - Solids = hyperechoic
  - Gastric secretions = hypoechoic
- Full stomach if high volume clear fluid or solids
  - Safe if empty or low volume clear fluids
- Visualizes residual solids after overnight fast in patients taking GLP-1
  - 40-90% in various studies
- Theoretically more appealing than reality
  - Challenging exam, especially in obesity
  - Only a subset of anesthesiologists
  - Adds time, especially finding personnel



DOSING

- Semaglutide dosing regimen for weight loss
  - Weeks 1-4 0.25 mg once/week
  - Weeks 5-8 0.5 mg once/week
  - Weeks 9-12 1 mg once/week
  - Weeks 13-16 1.7 mg once/week
  - Weeks 17+ 2.4 mg once/week
- Many different regimens
  - DM: stop at 0.5 mg once/week, increase to 1 or 2 mg/week for better glycemic control
  - Hims/Hers stops at 1.25 mg once/week
  - "Microdosing" ≥0.25 mg once/week
- "Higher" dose = ≥2 mg weekly
- Gastric effects are dose dependent, more severe with dose initiation and escalation
- Semaglutide half life ~ 1 week

ASPIRATION

- Aspiration is rare and no clear data of GLP-1 agonists increasing incidence
  - 0.02-0.07% incidence in general surgical population
  - Retrospective studies do not demonstrate increased risk
    - Dixit et al. 2024, >23,000 patients, 3500 on GLP-1 – no association with increased aspiration pneumonitis, respiratory failure or ICU admission in emergency surgery, likely RSI
    - Klonoff et al. 2024, >13,000 patients, 2250 on GLP-1 – no increase in periop respiratory complications in elective + emergency surgery
    - Welk et a. 2024, >48,000, 3830 on GLP-1 – no association with pneumonia in elective surgery
    - Meta-analyses in endoscopy demonstrate increased gastric contents but no difference in aspiration rates
  - Unclear how much aspiration reduction is due to anesthetic technique modifications

INITIAL PERIOP GUIDANCE

American Society of Anesthesiologists (ASA) June 2023

Daily GLP-1 agonists — **Hold day of surgery**

Weekly GLP-1 agonists — **Hold 1 week prior to surgery**

Standard fasting guidelines

EMERGING DATA

Choski et al. 2025
THA/TKA Patients

- Retrospective, >200,000 patients
- Presented at AAOS 2025 Annual Meeting

- **Discontinuation 14 days prior: less aspiration, less conversion to GA/ETT**
- Discontinuation 7 days prior: less aspiration pneuomonitis

Sen et al. 2025
Gastric ultrasound study

- Standard pre-procedure fasting guidelines
- GLP-1 use associated with 30% higher prevalence of increased residual gastric contents

- **No association between gastric contents and discontinuation duration (up to 7 days)**
- May need longer hold period to effect a change in gastric volume

EMERGING DATA

- Santos et al. 2024 – Endoscopic Study

  1094 patients, retrospective, standard fasting guidelines

  Discontinuation <14 days insufficient to decrease residual gastric contents

  Normal gastric content volume with discontinuation of

  >14 days with no GI symptoms

  >21 days with GI symptoms

- *Need multiple half lives for residual effects on gastric emptying to fully resolve*

NEWER GUIDANCE

ASA / AGA / ASMBS / ISPCPO / SAGES coalition October 2024

Continue GLP-1 if low risk of delayed gastric emptying

- Assess again for symptoms on day of surgery

High risk patients on liquid diet for 24 hours

- Anesthesia that minimizes aspiration risk vs. delay until GI symptoms resolve

High risk patients defined as

- Dose-escalation phase
- Higher doses
- Active GI symptoms (e.g. nausea, vomiting, abdominal pain, dyspepsia)
- Medical conditions that might delay gastric emptying
- Long acting GLP-1s (e.g. weekly semaglutide)

NEWER GUIDANCE

Recommendation 1	Standardized preoperative assessment for risk of delayed gastric emptying (yes/no): 1. Presence of gastrointestinal symptoms suggesting delayed gastric emptying; recent dose increases, higher doses, and weekly administered medications may increase the risk of gastrointestinal symptoms 2. Medical conditions beyond GLP-1RA usage, which may also delay gastric emptying
Recommendation 2	Selective preoperative care plan based on delayed gastric emptying assessment and shared decision-making: 1. Continue GLP-1RA therapy preoperatively if there is no concern for delayed gastric emptying 2. If elevated risk of delayed gastric emptying exists: a. Recommend liquid only diet for at least 24 h before procedure with usual recommended fasting protocol, or b. Evaluation of the feasibility of medication bridging if GLP-1RAs need to be discontinued
Recommendation 3	On the day of procedure, reassess for delayed gastric emptying and mitigate risk if clinical concern: 1. Proceed with procedure as planned if there is no concern for delayed gastric emptying 2. If elevated risk of delayed gastric emptying exists: a. Consider point-of-care gastric ultrasound and/or b. Consider rapid sequence induction of general anesthesia, if appropriate c. Minimize procedure cancellation when possible

GLP-1RA, glucagon-like peptide-1 receptor agonist.

ASA / AGA / ASMBS / ISPCPO / SAGES coalition

October 2024

SPAQI CONSENSUS STATEMENT 2025

- Society of Perioperative Assessment and Quality Improvement (SPAQI) Jan. 2025
- Systematic review and modified Delphi process
- Recommendations
  - **Continue GLP-1** for patients without significant GI symptoms
  - **Fast 24 hours** (clear liquids only)
  - **Fast 8 hours for high carbohydrate liquids** (≥10% glucose)
  - **Fast 4 hours for low carbohydrate liquids**

SPAQI CONSENSUS STATEMENT

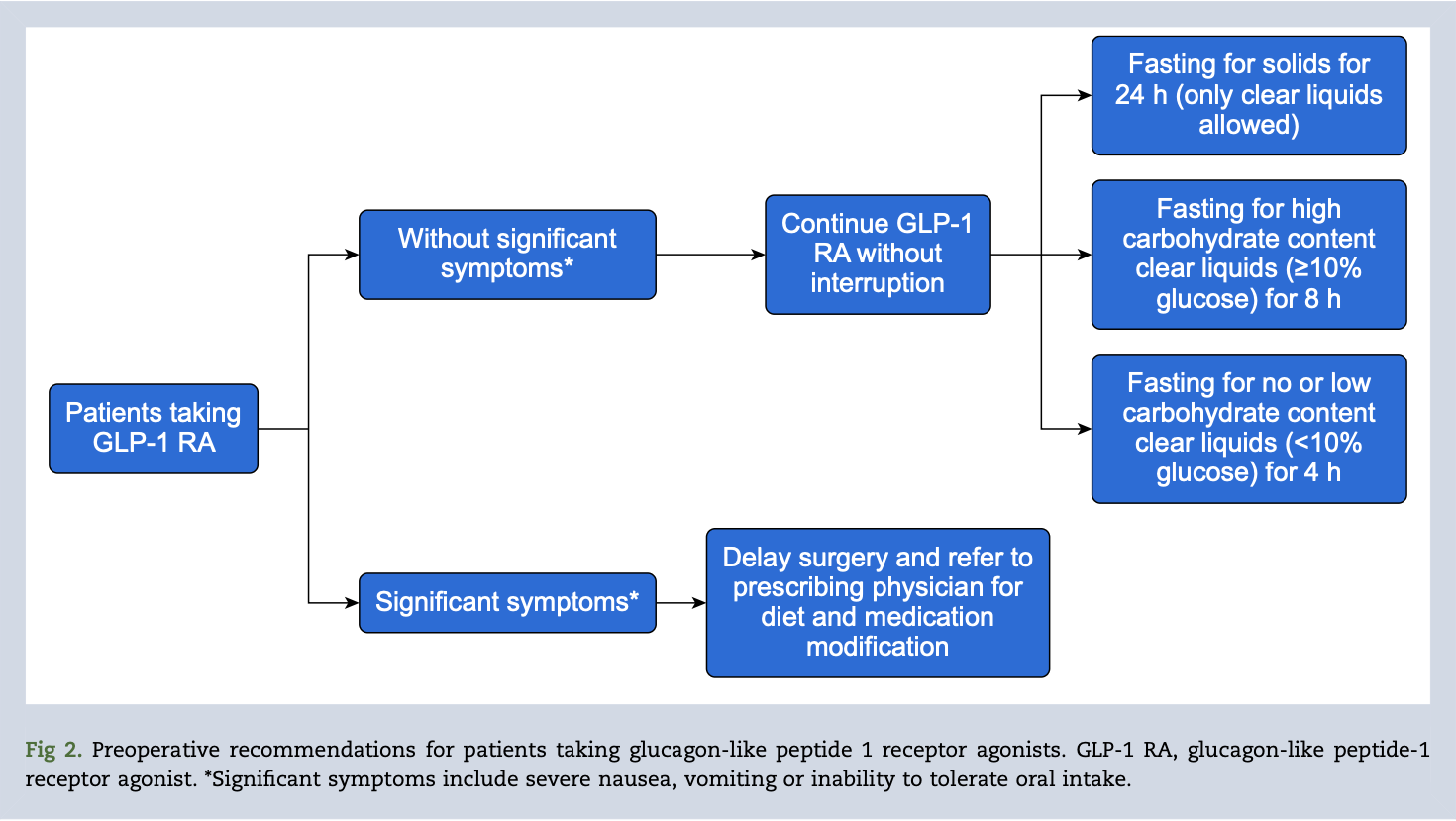


Fig 2. Preoperative recommendations for patients taking glucagon-like peptide 1 receptor agonists. GLP-1 RA, glucagon-like peptide-1 receptor agonist. *Significant symptoms include severe nausea, vomiting or inability to tolerate oral intake.

OHSU RECOMMENDATIONS

If daily dosing, hold day of surgery

If weekly dosing, hold for a week prior to surgery

If medication not held appropriately

- Consider rescheduling elective cases; one may consider the risk of aspiration to the patient, including evaluation of symptoms, using gastric ultrasound, etc., to aid in decision making if case/situation holds some urgency.
- Case Elective and GI symptoms present (N/V, bloating, GERD, etc.), reschedule.
- Case not elective, inform patient & surgeon of increased aspiration risk & proceed as if full stomach.
- Case not elective and GI symptoms present (N/V, bloating, GERD, etc.), proceed as if full stomach

Standard NPO guidelines

RATIONALE

- Holding GLP1 agonist avoids preoperative assessment of GI symptoms and determination of patient specific medication hold instructions
  - Allows for uniform fasting guidelines (e.g. 8 hours solids)
  - All patients get same hold instructions and same fasting guidelines
  - Increased odds of failure to hold appropriately resulting in DOS conundrum
    - Leaves room for case-based decision
    - Alternative approaches with complex fasting guidelines also have significant risk of non-compliance

OHSU STUDY

- Drs. Ryland Kagan and Michael Benson and collaborators
- Prospective observational study comparing the residual gastric contents (based on preoperative gastric ultrasound exam) between THA & TKA patients taking GLP-1 agonists and those not taking GLP-1 agonists
- All subjects following institutional recommendations for GLP-1 discontinuation, standard NPO guidelines, and ERAS protocol including clears until 2 hours preop

ANESTHETIC OPTIONS

	Minimal Sedation Anxiolysis	Moderate Sedation/ Analgesia ("Conscious Sedation")	Deep Sedation/ Analgesia	General Anesthesia
Responsiveness	Normal response to verbal stimulation	Purposeful** response to verbal or tactile stimulation	Purposeful** response following repeated or painful stimulation	Unarousable even with painful stimulus
Airway	Unaffected	No intervention required	Intervention may be required	Intervention often required
Spontaneous Ventilation	Unaffected	Adequate	May be inadequate	Frequently inadequate
Cardiovascular Function	Unaffected	Usually maintained	Usually maintained	May be impaired

- **General anesthesia**
  - Highest risk
  - Mitigated by ETT (vs. LMA) and Rapid Sequence Intubation (RSI)
- **Deep sedation**
  - May be just as risky as airway reflexes blunted
  - Sedation is a continuum - can easily become GA without a protected airway
- **Moderate sedation**
  - Intermediate risk
- **Minimal sedation**
  - Lower risk, but can oversedation can shift to deeper levels of anesthesia
- **Regional anesthesia** (e.g. spinal anesthesia, "surgical" block PNB)
  - Facilitates lighter levels of sedation by reducing/eliminating afferent input
  - Level of sedation is the actual determinant of aspiration risk

RISKS OF GLP-1 MISMANAGEMENT

- Aspiration is rare but can be devastating
  - Aspiration pneumonitis (chemical) ~50%
    - Hypoxemia, bronchospasm, rarely ALI/ARDS/respiratory failure
    - Prolonged recovery but resolves in 24-48 hours with supportive care
  - Aspiration pneumonia (infectious) ~20%
    - Fever, leukocytosis, consolidation
    - Evolves over 24-72 hours, treated with antibiotics
    - 90-day mortality ~28%
- Risk of discontinuation: glycemic control, weight, cardiac protection
- Risk of OR efficiency disruption is high regardless of strategy
  - Institution specific limitations

BEST PRACTICE?

- Discontinue 7-14 days vs. continue perioperatively
  - 7 days likely insufficient
  - 14+ days is disruptive to GLP-1 therapy
  - Continuation requires symptom assessment preoperatively
- Fasting 24 hours vs. standard NPO guidelines
  - 24 hours better aligns with gastric impacts but introduces periop instruction variation
  - Standard fasting likely insufficient, especially if GLP-1 not discontinued
- If deviation from institutional guidance, make case-based decision considering
  - GI symptoms, gastroparesis, high-dose opioids
  - Dose stability, > 4 weeks of treatment
  - Gastric ultrasound
  - Full stomach precautions (regional anesthesia + minimal sedation vs. GA/ETT with RSI)
  - Discuss potential additional risk with patient

REFERENCES

- Dixit AA, Bateman BT, Hawn MT, Odden MC, Sun EC. Preoperative GLP-1 receptor agonist use and risk of postoperative respiratory complications. Jama. 2024 May 21;331(19):1672-3.
- Joshi GP, LaMasters T, Kindel TL. Preprocedure care of patients on glucagon-like peptide-1 receptor agonists: a **multisociety clinical practice guidance**. Anesthesiology. 2024 Dec 1;141(6):1208-9.
- Kindel TL, Wang AY, Wadhwa A, Schulman AR, Sharaiha RZ, Kroh M, Ghanem OM, Levy S, Joshi GP, LaMasters T. **Multi-society clinical practice guidance** for the safe use of glucagon-like peptide-1 receptor agonists in the perioperative period. Surgical endoscopy. 2025 Jan;39(1):180-3.
- Klonoff DC, Kim SH, Galindo RJ, Joseph JI, Garrett V, Gombar S, Aaron RE, Tian T, Kerr D. Risks of peri-and postoperative complications with glucagon-like peptide-1 receptor agonists. Diabetes, Obesity and Metabolism. 2024 Aug;26(8):3128-36.
- Oprea AD, Ostapenko LJ, Sweitzer B, Selzer A, Irizarry-Alvarado JM, Andrade MD, Mendez CE, Kelley KD, Stewart E, Robles CR, Chadha RM. Perioperative management of patients taking glucagon-like peptide 1 receptor agonists: Society for Perioperative Assessment and Quality Improvement (***SPAQI***) multidisciplinary consensus statement. British journal of anaesthesia. 2025 May 16.
- Santos LB, Mizubuti GB, da Silva LM, Silveira SQ, Nersessian RS, Abib AD, Bellicieri FN, de Oliveira Lima H, Ho AM, Dos Anjos GS, de Moura DT. Effect of various perioperative semaglutide interruption intervals on residual gastric content assessed by esophagogastroduodenoscopy: a retrospective single center observational study. Journal of Clinical Anesthesia. 2024 Dec 1;99:111668.
- Sen S, Potnuru PP, Hernandez N, Goehl C, Praestholm C, Sridhar S, Nwokolo OO. Glucagon-like peptide-1 receptor agonist use and residual gastric content before anesthesia. JAMA surgery. 2024 Jun 1;159(6):660-7.
- Vetrugno L, Deana C, Da Porto A, Boero E, Bellini V, Biasucci DG, Bignami EG. A narrative review of glucagon-like peptide-1 receptor agonists prior to deep sedation or general anesthesia. Journal of Anesthesia, Analgesia and Critical Care. 2025 Mar 28;5(1):16.
- Welk B, McClure JA, Carter B, Clarke C, Dubois L, Clemens KK. No association between semaglutide and postoperative pneumonia in people with diabetes undergoing elective surgery. Diabetes, Obesity and Metabolism. 2024 Sep;26(9):4105-10.
- Zheng Z, Zong Y, Ma Y, Tian Y, Pang Y, Zhang C, Gao J. Glucagon-like peptide-1 receptor: mechanisms and advances in therapy. Signal transduction and targeted therapy. 2024 Sep 18;9(1):234.