



Multi-society clinical practice guidance for the safe use of glucagon-like peptide-1 receptor agonists in the perioperative period

Tammy L. Kindel¹ · Andrew Y. Wang² · Anupama Wadhwa^{3,10} · Allison R. Schulman⁴ · Reem Z. Sharaiha⁵ · Matthew Kroh⁶ · Omar M. Ghanem⁷ · Shauna Levy⁸ · Girish P. Joshi³ · Teresa LaMasters⁹ · Representing the American Gastroenterological Association, American Society for Metabolic and Bariatric Surgery, American Society of Anesthesiologists, International Society of Perioperative Care of Patients with Obesity, and the Society of American Gastrointestinal and Endoscopic Surgeons

Accepted: 9 September 2024 / Published online: 29 October 2024

© The Author(s). Published by Elsevier Inc on behalf of American Society for Metabolic and Bariatric Surgery (ASMBS) and the American Gastroenterological Association, and Springer Science+Business Media, LLC, part of Springer Nature on behalf of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES). This is an open access article under the CC BY NC ND license <https://creativecommons.org/licenses/by-nc-nd/4.0/2024>

Scope of problem and purpose

Glucagon-like peptide-1 receptor agonists (GLP-1RAs) have revolutionized the care of patients with metabolic disease due in part to the agonists' unique combination of effects, including decreasing hyperglycemia and enhancement of satiety [1, 2]. GLP-1, a naturally secreted polypeptide, acts on the GLP-1R in multiple organs, including the pancreas, brain, heart, kidney, and stomach [3]. In the gastrointestinal tract, GLP-1 signals are part of the “ileal brake,” increasing gastric emptying time.

An increasing safety concern has developed amongst providers regarding the perioperative use of GLP-1RA due to

delayed gastric emptying and subsequent residual gastric contents on the day of the procedure despite traditional fasting [4–6]. There have been reports of pulmonary aspiration of gastric contents in patients on GLP-1RAs undergoing procedural sedation and/or general anesthesia [7–9]. Further, GLP-1RAs induce common side effects of nausea, vomiting, abdominal pain, and constipation, which may complicate the diagnosis and treatment of pre- and post-operative disease states that share these symptoms [10].

Despite limited data to construct evidence-based guidelines, multiple clinical organizations have recognized the need to provide practice guidance regarding the use of GLP-1RAs in the perioperative period [4, 11, 12]. There have been inconsistencies in these clinical care documents, leading to uncertainty with providers on how to provide safe, effective, and disease-equitable surgical and procedural care to patients taking GLP-1RAs. Therefore, the purpose of this clinical practice guide is to offer unified, multi-society guidance for safely managing patients needing GLP-1RA therapy

This paper was jointly developed by Surgery for Obesity and Related Diseases, Clinical Gastroenterology and Hepatology and Surgical Endoscopy and jointly published by Elsevier Inc and Springer Science+Business Media, LLC, part of Springer Nature. The articles are identical except for minor stylistic and spelling differences in keeping with each journal's style. Either citation can be used when citing this article.

✉ Tammy L. Kindel
tkindel@mcw.edu

- 1 Department of Surgery, Medical College of Wisconsin, 8700 Watertown Plank Road, Milwaukee, WI 53226, USA
- 2 Division of Gastroenterology and Hepatology, University of Virginia, Charlottesville, VA, USA
- 3 Department of Anesthesiology and Pain Management, University of Texas Southwestern Medical Center, Dallas, TX, USA
- 4 Division of Gastroenterology and Hepatology, University of Michigan, Ann Arbor, MI, USA

- 5 Department of Medicine, Weill Cornell Medical College, New York, NY, USA
- 6 Digestive Disease Institute, Cleveland Clinic, Cleveland, OH, USA
- 7 Department of Surgery, Mayo Clinic, Rochester, MN, USA
- 8 Department of Surgery, Tulane University, New Orleans, LA, USA
- 9 Medical Director UnityPoint Clinic Weight Loss Specialists, University of Iowa, West Des Moines, IA, USA
- 10 Outcomes Research Consortium, University of Texas, Houston, USA

regardless of indication, which currently includes type 2 diabetes, overweight and obesity, and heart failure, during the perioperative period.

Recommendations

1. Recommendation 1. Use of GLP-1RAs in the perioperative period should be based on shared decision-making of the patient with procedural, anesthesia, and prescribing care teams balancing the metabolic need for the GLP-1RA with individual patient risk. This can be achieved by developing multidisciplinary protocols/procedures appropriate for individual practices.

a) Care teams should consider the following variables as elevating the risk of delayed gastric emptying and aspiration with the perioperative use of GLP-1RA:

1. *Escalation phase*: The escalation phase, versus the maintenance phase, is associated with a higher risk of delayed gastric emptying with GLP-1RA usage [10–13].
2. *Higher dose*: The higher the dose of GLP-1RA, the more likely the risk of gastrointestinal side effects [10–13].
3. *Weekly dosing*: Gastrointestinal side effects are more common with weekly compared to daily formulation compounds [14].
4. *Presence of gastrointestinal symptoms*: Symptoms suggestive of delayed gastric emptying and intestinal transit times may include nausea, vomiting, abdominal pain, dyspepsia, and constipation [5].
5. *Medical conditions beyond GLP-1RA usage which may also delay gastric emptying*: Patients on GLP-1RA should be evaluated for other medical conditions which may exacerbate gastrointestinal symptoms and delay gastric emptying, such as but not limited to bowel dysmotility, gastroparesis, and Parkinson's disease.

The assessment for these risk factors should occur with enough advance time prior to surgery to allow adjustments in pre-operative care if indicated, including diet modification and evaluation of the feasibility of medication bridging if GLP-1RA discontinuation is indicated.

b) GLP-1RA therapy may be continued pre-operatively in patients without elevated-risk of delayed gastric emptying and aspiration based on Recommendation 1a. When an elevated risk of delayed gastric

emptying and aspiration exist, withholding of GLP-1RAs should be balanced with the surgical and medical risk of inducing the potential for a hazardous, metabolic disease state, like hyperglycemia. Further, bridging therapy off a GLP-1RA may be resource-intensive, cost or insurance prohibitive, and risk other adverse side effects like hypoglycemia. Finally, withholding GLP-1RA perioperatively only for patients with the diseases of overweight and obesity, without an indication as described in Recommendation 1a, could constitute overweight and obesity bias, which should be avoided.

c) If the decision to hold GLP-1RAs is indicated given an unacceptable safety profile following shared decision making in the pre-operative period, the duration to hold therapy is unknown [7]. At this time, it is suggested to follow the original guidance of the American Society of Anesthesiologists, holding the day of surgery for daily formulations, and a week prior to surgery for weekly formulations [4]. All patients should still be assessed on the day of procedure for symptoms suggestive of delayed gastric emptying.

2. Recommendation 2. The safe use of GLP-1RAs in the perioperative period should include efforts to minimize the aspiration risk of delayed gastric emptying. This can be achieved by preoperative diet modification and/or altering anesthesia plan to consider rapid sequence induction of general anesthesia for tracheal intubation.

a) Preoperative diet modification (preoperative liquid diet for at least 24 h, as performed in patients undergoing colonoscopy and bariatric surgery) can be utilized in patients when there is concern for delayed gastric emptying based on clinical symptom review as described in Recommendation 1a [5, 11, 15].

b) When clinical concern for retained gastric contents exists on the day of the procedure, point-of-care gastric ultrasound could be used to assess aspiration risk. This technology may be clinically limited based on institutional resources, inter-user variability, and credentialing requirements [4, 16].

c) When clinical concern for retained gastric contents exists or is confirmed on the day of the procedure, providers should engage patients in a shared-decision-making model and consider the benefits and risks of rapid sequence induction of general anesthesia for tracheal intubation to minimize aspiration risk versus procedure cancellation [4, 11].

Safe continuation of surgery and gastrointestinal endoscopy, and prevention of procedure cancellation, for patients on GLP-1RAs can be prioritized following the recommendations above, as would occur for other patient populations with gastroparesis.

Conclusion

While there has been an exponential increase in the clinical use of GLP-1RAs for various metabolic disease states in the past several years, little evidence exists to guide the best approach to managing these therapeutics perioperatively. This document may need modification with future generations of anti-obesity medications, including dual and triple agonists, and as additional evidence on the periprocedural management of these therapeutics is developed. However, at this time based on pharmacology and clinical experience, the following recommendations may be applied for current medications containing a GLP-1RA. For this reason, this multi-society clinical practice document should be considered guidance, and not an evidence-based guideline, focusing on shared-decision making and balancing safety processes with therapeutic metabolic need for the safe continuation of surgical and procedural care in patients taking GLP-1RAs.

Acknowledgements This document was approved by the American Gastroenterological Association Institute Governing Board in May 2024, the American Society for Metabolic and Bariatric Surgery Board of Directors in May 2024, the International Society of Perioperative Care of Patients with Obesity Board of Directors in April 2024, and the Society of American Gastrointestinal and Endoscopic Surgeons Board of Directors in June 2024. The American Society of Anesthesiologists Administrative Council affirmed the value of this document in May 2024.

Declarations

Disclosures Tammy Kindel and Anupama Wadhwa have no disclosures. Girish Joshi has received honoraria for consultation from Merck Sharpe and Dohme Inc. and Vertex Pharmaceuticals. Teresa LaMasters has received honoraria for consulting and speaking from WL Gore, Intuitive Surgical, Novo Nordisk, and Ethicon Endosurgical. Shauna Levy is a consultant for Novo Nordisk. Omar Ghanem is a consultant for Medtronic and Olympus. Allison Schulman is a consultant for Apollo Endosurgery, Boston Scientific, Olympus, MicroTech, Fractyl, and has received research/grant support from GI Dynamics and Fractyl. Andrew Wang discloses owning publicly traded stock in GE HealthCare Technologies and Pfizer. Reem Sharaiha is a consultant for Boston Scientific, Intuitive Surgical, and Olympus. Matthew Kroh is a consultant for Intuitive Surgical, Levita, and Momentis, and on the advisory board for Endolumik, Kintsugi, Medtronic and FastPathway.

Open Access This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and

reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

References

- Blundell J, Finlayson G, Axelsen M et al (2017) Effects of once-weekly semaglutide on appetite, energy intake, control of eating, food preference and body weight in subjects with obesity. *Diabetes Obes Metab* 19:1242–1251
- Nauck MA, Wollschläger D, Werner J et al (1996) Effects of subcutaneous glucagon-like peptide 1 (GLP-1 [7-36 amide]) in patients with NIDDM. *Diabetologia* 39:1546–1553
- Deacon CF, Nauck MA, Toft-Nielsen M, Pridal L, Willms B, Holst JJ (1995) Both subcutaneously and intravenously administered glucagon-like peptide I are rapidly degraded from the NH₂-terminus in type II diabetic patients and healthy subjects. *Diabetes* 44:1126–1131
- Joshi GP, Abdelmalak BB, Weigel WA, et al (2023) American society of anesthesiologists consensus-based guidance on preoperative management of patients (adults and children) on glucagon-like peptide-1 (GLP-1) receptor agonists. Accessed 10 Feb 2024 <https://www.asahq.org/aboutasa/newsroom/news-releases/2023/06/american-society-of-anesthesiologists-consensus-based-guidance-on-preoperative-management-of>
- Silveira SQ, da Silva LM, de Campos Vieira Abib A, et al (2023) Relationship between perioperative semaglutide use and residual gastric content: a retrospective analysis of patients undergoing elective upper endoscopy. *J Clin Anesth* 87:111091
- Sherwin M, Hamburger J, Katz D et al (2023) Influence of semaglutide use on the presence of residual gastric solids on gastric ultrasound: a prospective observational study in volunteers without obesity recently started on semaglutide. *Can J Anaesth* 70:1300–1306
- Joshi GP (2024) Anesthetic considerations in adult patients on glucagon-like peptide-1 receptor agonists: gastrointestinal focus. *Anesth Analg* 138(1):216–220
- Gulak MA, Murphy P (2023) Regurgitation under anesthesia in a fasted patient prescribed semaglutide for weight loss: a case report. *Can J Anesth* 70:1397–1400
- Klein SR, Hobai IA (2023) Semaglutide, delayed gastric emptying, and intraoperative pulmonary aspiration: a case report. *Can J Anesth* 70:1394–1396
- Sorli C, Harashima SI, Tsoukas GM et al (2017) Efficacy and safety of once-weekly semaglutide monotherapy versus placebo in patients with type 2 diabetes (SUSTAIN 1): a double-blind, randomised, placebo-controlled, parallel-group, multinational, multicentre phase 3a trial. *Lancet Diabetes Endocrinol* 5(4):251–260
- Hashash J, Thompson CC, Wang AY (2023) AGA rapid clinical practice update on the management of patients taking GLP-1 receptor agonists prior to endoscopy: communication. *Clin Gastroenterol Hepatol* S1542–3565(23):00869–00878
- AASLD/ACG/AGA/ASGE/NASPGHAN Multisociety Statement (2023) No data to support stopping GLP-1 agonists prior

- to elective endoscopy. Accessed 10 Feb 2024 <https://gastro.org/news/gi-multi-society-statement-regarding-glp-1-agonists-and-endoscopy>
13. Camilleri M, Carlson P, Dilmaghani S (2024) Prevalence and variations in gastric emptying delay in response to GLP-1 receptor agonist liraglutide. *Obesity* 32(2):232–233
 14. Ahmann AJ, Capehorn M, Charpentier G et al (2018) Efficacy and safety of once-weekly semaglutide versus exenatide ER in subjects with type 2 diabetes (SUSTAIN 3): a 56-week, open-label. *Random Clin Trial Diabetes Care* 41:258–266
 15. Hiramoto B, McCarty T, Lodhia N et al (2024) Quantified metrics of gastric emptying delay by glucagon-like peptide-1 agonists: a systematic review and meta-analysis with insights for periprocedural management. *Am J Gastroenterol* 119(6):1126–1140
 16. Sen S, Potnuru PP, Hernandez N et al (2024) Glucagon-like peptide-1 receptor agonist use and residual gastric content before anesthesia. *JAMA Surg.* <https://doi.org/10.1001/jamasurg.2024.2307>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.