

2025 ADS/ANZCA/GESA/NACOS clinical practice recommendations on the peri-procedural use of GLP-1/GIP receptor agonists

Anaesthesia and Intensive Care
2025, Vol. 53(5) 300–306
© The Author(s) 2025
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/0310057X251355288
journals.sagepub.com/home/aic



Samantha L Hocking^{1,2,3}, David A Scott^{4,5},
Matthew L Remedios⁶, Michael Horowitz^{7,8}, David A Story⁴ ,
Jerry R Greenfield^{9,10,11}, Alex Boussioutas^{12,13},
Benedict Devereaux^{14,15}, Sofianos Andrikopoulos¹⁶,
Jonathan E Shaw^{17,18} and Benjamin L Olesnicky^{2,19}

Abstract

Glucagon-like peptide-1 receptor agonists (GLP-IRAs) are widely used for the treatment of type 2 diabetes and/or obesity. The physiological actions of endogenous GLP-1, and synthetic GLP-IRAs include inhibition of gastric emptying. This has peri-procedural implications due to the potential increased risk of retained gastric contents which may result in pulmonary aspiration. There is a need for local evidence-based guidelines to best manage patients on GLP-IRAs and dual GLP-1 and glucose-dependent insulintropic polypeptide receptor co-agonists (GLP-1/GIPRAs) presenting for surgical and medical procedures requiring sedation or anaesthesia. A panel of experts was formed to consider the peri-procedural implications of GLP-IRA and GLP-1/GIPRA use and establish best practice recommendations based on the current evidence.

We recommend that all patients should be asked about glucagon-like peptide-1 receptor agonist (GLP-IRA) and dual GLP-1 and glucose-dependent insulintropic polypeptide receptor co-agonist (GLP-1/GIPRA) use prior to anaesthesia or sedation for surgical and endoscopic procedures and be informed of the benefits and risks. We also recommend that GLP-IRAs and GLP-1/GIPRAs be continued in the peri-procedural period. Preprocedural diet modification with a 24-h clear fluid diet, followed by standard 6-h fasting, should be recommended for all patients receiving GLP-IRAs or GLP-1/GIPRAs. In patients who have not completed or are unable to have a 24-h liquid diet, risk stratification using gastric ultrasound or minimally sedated gastroscopy to assess gastric contents is recommended, as is the use of intravenous

¹Charles Perkins Centre, University of Sydney, Camperdown, Australia

²Faculty of Medicine and Health, University of Sydney, Camperdown, Australia

³Department of Endocrinology, Royal Prince Alfred Hospital, Camperdown, Australia

⁴Department of Critical Care, University of Melbourne, Melbourne, Australia

⁵Department of Anaesthesia and Acute Pain Medicine, St Vincent's Hospital, Melbourne, Australia

⁶Department of Gastroenterology, Wesley Hospital, Brisbane, Australia

⁷Adelaide Medical School and Centre of Research Excellence in Translating Nutritional Science to Good Health, The University of Adelaide, Adelaide, Australia

⁸Endocrine and Metabolic Unit, Royal Adelaide Hospital, Adelaide, Australia

⁹Department of Diabetes and Endocrinology, St Vincent's Hospital, Sydney, Australia

¹⁰Clinical Diabetes, Appetite and Metabolism Laboratory, Garvan Institute of Medical Research, Sydney, Australia

¹¹School of Clinical Medicine, UNSW Medicine & Health, St Vincent's Healthcare Clinical Campus, University of New South Wales, Sydney, Australia

¹²Department of Medicine, Royal Melbourne Hospital, University of Melbourne, Parkville, Australia

¹³Department of Gastroenterology, The Alfred, Monash University, Melbourne, Australia

¹⁴School of Medicine, The University of Queensland, Brisbane, Australia

¹⁵Department of Gastroenterology and Hepatology, Royal Brisbane and Women's Hospital, Brisbane, Australia

¹⁶Australian Diabetes Society, Sydney, Australia

¹⁷Baker Heart and Diabetes Institute, Melbourne, Australia

¹⁸School of Public Health and Preventive Medicine, Faculty of Medicine, Nursing, and Health Sciences, Monash University, Melbourne, Australia

¹⁹Department of Anaesthesia, Pain, and Perioperative Medicine, Royal North Shore Hospital, St Leonards, Australia

Corresponding author:

Benjamin Olesnicky, Department of Anaesthesia, Pain and Perioperative Medicine, Royal North Shore Hospital, St Leonards, NSW, 2065, Australia.

Email: Benjamin.Olesnicky@health.nsw.gov.au

erythromycin. We cannot currently recommend using the absence of gastrointestinal symptoms for risk stratification, nor can we recommend an adequate cessation period for GLP-IRAs and GLP-1/GIPRAs to ensure gastric emptying has returned to baseline levels. This clinical guideline, developed by multiple professional bodies, outlines current best practice recommendations for patients taking GLP-IRAs and combined GLP-1/GIPRAs who require general anaesthesia, sedation and/or endoscopic procedures. The guide provides a structure for Australian and New Zealand primary health practitioners, gastroenterologists, surgeons, endocrinologists, anaesthetists and perioperative physicians to support clinical decisions in these patients.

Keywords

Aspiration, perioperative medicine, fasting, obesity, diabetes, glucagon like peptide agonist, pharmacology

Background

GLP-IRAs are registered in Australia for the management of type 2 diabetes and/or obesity. In Australia, available GLP-IRAs include liraglutide (Victoza, Saxenda), dulaglutide (Trulicity) and semaglutide (Ozempic, Wegovy). Tirzepatide (Mounjaro) is the only GLP-1/GIPRA registered in Australia. It is estimated that 0.7% of Australians are currently accessing semaglutide, with predictions that almost one in 10 Australians will be on a GLP-1RA by the year 2030.¹

Endogenous GLP-1 regulates blood glucose levels by augmenting glucose-dependent insulin release, by suppressing glucagon secretion and by slowing gastric emptying.^{2–6} Short acting (twice daily exenatide and lixisenatide) GLP-IRAs slow gastric emptying markedly in both healthy subjects^{7–10} and people with type 2 diabetes.^{8,9,11–16} It has been reported that the effects on gastric emptying are short lived, with infusions of GLP-1 leading to tachyphylaxis of effect.¹⁷ Leading from this, assumptions have been made that the gastric motility effects of longer acting GLP-IRAs are reduced with prolonged dosing. However, liraglutide, weekly exenatide and semaglutide have all been shown to profoundly inhibit gastric emptying, with both acute and sustained use.^{18–21} Tirzepatide has also been shown to delay gastric emptying in people with type 2 diabetes.²² Glucose-dependent insulintropic polypeptide (GIP), unlike GLP-1, has no effect on gastric emptying.²³ Common adverse effects of GLP-IRAs and GLP-1/GIPRAs are gastrointestinal, including nausea and vomiting. However, the relationship between upper gastrointestinal symptoms and slowing of gastric emptying by GLP-IRAs is weak.^{11,24}

There are increasing case reports and small case series of retained gastric contents and/or aspiration at the time of gastroscopy or anaesthesia in people with type 2 diabetes and/or obesity treated with GLP-1RAs.^{25–32} Case reports have revealed that retained gastric contents can be present despite extended fasting

following the consumption of a solid meal 20 h prior and a glass of water 8 h prior to a scheduled surgical procedure.²⁸ A large cohort study of patients undergoing endoscopy found the use of GLP-IRAs increased the risk of potentially life-threatening aspiration pneumonia peri-procedurally (0.83% *vs* 0.63% absolute risk increase 0.2%; hazard ratio 1.33; 95% confidence interval 1.02 to 1.74; $P = 0.036$).³³

Although case reports, retrospective observational studies and small prospective studies are usually insufficient to inform clinical practice, the safety concern regarding the peri-procedural use of GLP-1 RAs has recently led a number of overseas bodies to produce clinical practice recommendations regarding the peri-procedural use of GLP-IRAs.^{34–36} Specific Australian and New Zealand societal guidance was published in 2024, and is updated in this document.

Methods

Members of the Australian Diabetes Society (ADS), the Australian and New Zealand College of Anaesthetists (ANZCA), the Gastroenterological Society of Australia (GESA) and the National Association of Clinical Obesity Services (NACOS) met to develop best-practice peri-procedural recommendations based on the available published evidence surrounding GLP-IRAs and GLP-1/GIPRAs.

The members were asked prior to the meeting to consider:

1. The implications of GLP-IRAs and GLP-1/GIPRAs on gastric motility in both people with type 2 diabetes and without type 2 diabetes;
2. The duration of cessation of GLP-IRAs and GLP-1/GIPRAs needed to return to normal gastric function;
3. The effect of prolonged fasting and prolonged liquid-only diet while on GLP-IRAs and GLP-1/GIPRAs;

4. The effect of pro-motilic agents in patients administering GLP-1RA and GLP-1/GIPRAs;
5. Methods of assessment of gastric contents;
6. Practical management in patients undergoing both elective and emergency procedures.

Following the initial meeting, an abbreviated Delphi process was used whereby the summary of recommendations was circulated amongst the members of the guideline development group (together with specific questions) to develop an agreed set of guidelines. The initial guidelines were released in June 2024. The group again reviewed these guidelines in December 2024, with a review of both the available evidence and feedback from practising clinicians about the practical implementation of the guidelines.

Recommendations

The final recommendations are shown in Figure 1. The key points from the guidelines are summarised in Table 1.

Recommendation #1. All patients should be asked about the use of GLP-1RAs and GLP-1/GIPRAs prior

to anaesthesia or sedation for surgical and endoscopic procedures and be involved in discussion and planning regarding the risk of aspiration.

Patients might not report the use of GLP-1RA/ GLP-1/GIPRAs prior to their procedure owing to the effect of existing weight stigma on doctor–patient communication, the belief that weight loss drugs are not medications and because they might have obtained these medications through direct supply, rather than prescription supply.^{37,38}

Recommendation #2. Elective preprocedural cessation of GLP-1RA and GLP-1/GIPRAs is not recommended.

Omission of long-acting GLP-1RA and GLP-1/GIPRAs (dulaglutide, semaglutide and tirzepatide) for 1–2 weeks is unlikely to alter the GLP-1RA induced slowing of gastric emptying. Omission for an extended duration may delay urgent surgery and/or lead to poor glycaemic control with the consequent risk of perioperative hyperglycaemia, which has previously been associated with increased morbidity and length of stay³⁹ and potentially further deceleration of gastric emptying.⁴⁰ Additionally, GLP-1RAs have been shown to have both cardio-protective and reno-protective effects^{41–44} and the effects of withdrawal of

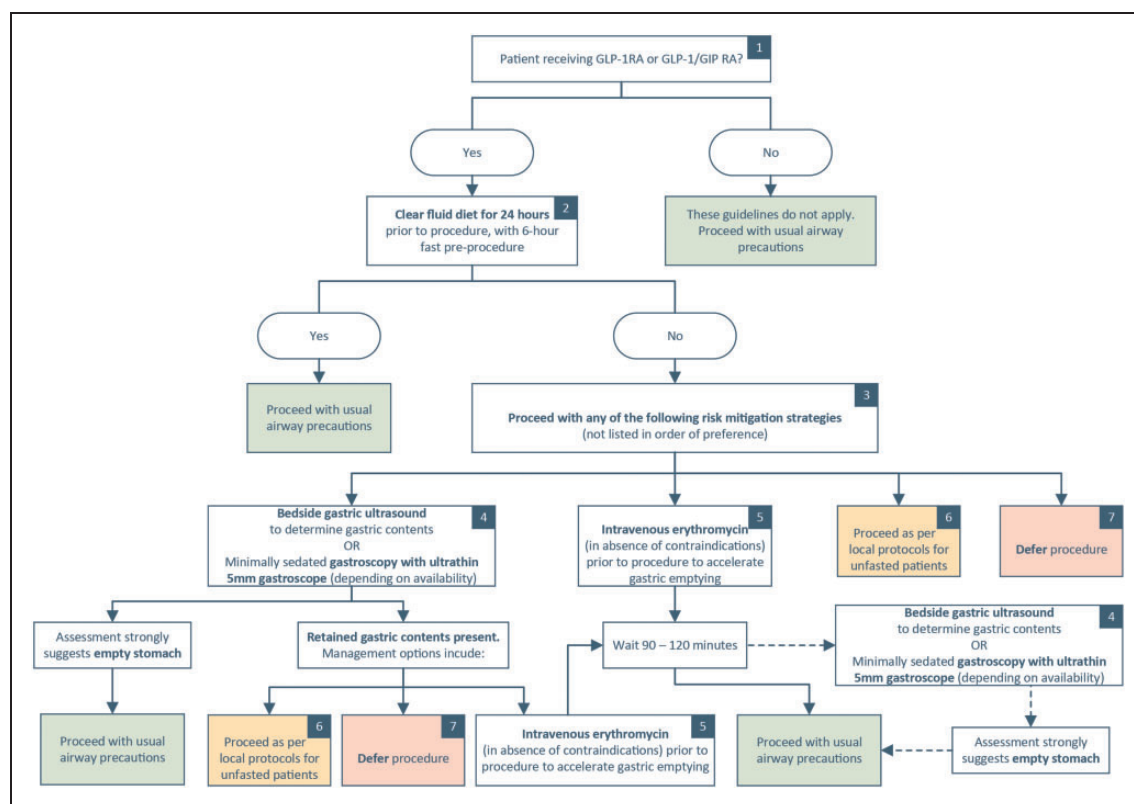


Figure 1. Clinical practice recommendation regarding use of glucagon-like peptide-1 (GLP-1) receptor agonists and dual GLP-1 and glucose-dependent insulinotropic polypeptide receptor co-agonists prior to anaesthesia for non-endoscopic procedures. GLP-1RA: glucagon-like peptide-1 receptor agonist; GLP-1/GIPRA: dual GLP-1 and glucose-dependent insulinotropic polypeptide receptor co-agonist.

Table 1. Key points regarding the use of glucagon-like peptide-1 (GLP-1) receptor agonists and dual GLP-1 and glucose-dependent insulinotropic polypeptide receptor co-agonists prior to surgical and endoscopic procedures.

1	All patients should be asked about the use of GLP-IRAs and GLP-1/GIPRAs prior to anaesthesia or sedation for surgical and endoscopic procedures and be involved in discussion and planning regarding the risk of aspiration.
2	Elective preprocedural cessation of GLP-IRA and GLP-1/GIPRAs is not recommended.
3	Preprocedural diet modification with 24-h clear fluid diet, followed by standard 6-h fasting, should be recommended for all patients receiving GLP-IRAs and GLP-1/GIPRAs.
4	Risk mitigation options should be undertaken for those who have not withheld solids for 24 h.
5	It is reasonable to use erythromycin to counteract GLP-IRA and GLP-1/GIPRA induced inhibition of gastric emptying.
6	In the absence of risk modification with a 24-h fluid fast or risk stratification with gastric ultrasound or ultrathin gastroscopy, all patients taking GLP-IRA and GLP-1/GIPRAs should be considered non-fasted/to have a full stomach.

GLP-IRA: glucagon-like peptide-1 receptor agonist; GLP-1/GIPRA: dual GLP-1 and glucose-dependent insulinotropic polypeptide receptor co-agonist.

these medications on peri-procedural morbidity is unknown. Substitution of a different class of glucose-lowering drug for several weeks is often challenging in practice and the omission of therapy for prolonged periods may compromise weight control where patients are taking GLP-IRAs for this indication.

Recommendation #3. Preprocedural diet modification consisting of a clear fluid diet on the day prior to the procedure, with standard 6-h fasting on the day of surgery, should be recommended for all patients receiving GLP-1 RAs and GLP-1/GIPRAs.

Systematic reviews have found an increased risk of retained gastric contents at oesophago-gastroduodenoscopy in GLP-IRA users compared with controls. In contrast, the rate of retained gastric contents in GLP-1RA users undergoing both oesophago-gastroduodenoscopy and colonoscopy was significantly reduced.^{45,46} This suggests that a prolonged clear fluid diet prior to GI endoscopy may mitigate the risk of retained gastric contents without discontinuing GLP-1RA therapy.

There was no specific prescriptive 'standard 6 h fast', with advice to follow the usual local protocols with reference to ANZCA PG07 'Guideline on pre-anaesthesia consultation and patient preparation'.⁴⁵ It should be noted that in this context, SipTilSend and similar limited fasting regimens may not be appropriate

for patients on GLP-1 RAs and GLP-1/GIPRA therapy.

Recommendation #4. Risk mitigation options should be undertaken for those who have not withheld solids for 24 h.

- a. Bedside point-of-care gastric ultrasound can be used to evaluate gastric content and volume to assess peri-operative aspiration risk and guide anaesthetic management. Solid, particulate, or thick fluid content, carrying a high aspiration risk, can be detected based on sonographic appearance.^{46,47}
- b. Unsedated gastroscopy using ultrathin 5–6-mm endoscopes is often well tolerated and allows preservation of airway protective reflexes.⁴⁸ Retained gastric contents can be directly visualised. It is important to note that patients may forcibly retch with use of the ultrathin endoscope and oral suction may be required in the event of pharyngeal contamination despite intact protective reflexes.
- c. The absence of gastrointestinal symptoms is an unreliable indicator of gastric emptying. The majority of studies that have evaluated the relationship between the effects of GLP-IRAs on gastric emptying and gastrointestinal symptoms in health, obesity or type 2 diabetes report no or low correlation between the appearance of symptoms and delayed gastric emptying.^{11,24,49}

Recommendation #5. It is reasonable to use erythromycin to counteract GLP-IRA and GLP-1/GIPRA induced inhibition of gastric emptying.

In healthy male subjects receiving a GLP-1 infusion, 200 mg of intravenous erythromycin completely reverses the GLP-1 induced deceleration of gastric emptying while other prokinetic drugs, including metoclopramide, cisapride and domperidone, have no effect.⁵⁰ Contraindications to the administration of erythromycin should be considered.

The effectiveness of intravenous erythromycin to accelerate gastric emptying in individuals on GLP-1RA-based therapy in the periprocedural setting has yet to be evaluated, so repeat gastric ultrasound or minimally sedated gastroscopy with ultrathin 5 mm gastroscope should be used where available to assess erythromycin effects on gastric contents.

Recommendation #6. In the absence of risk modification with a 24 h clear fluid diet or risk stratification with gastric ultrasound or ultrathin gastroscopy or administration of intravenous erythromycin, all patients taking GLP-1RA and GLP-1/GIPRAs should be considered non-fasted/to have a full stomach.

- a. If, after consideration of the risks and benefits, a decision is made to defer the procedure,

arrangements should be made for the patient to follow a clear fluid diet for 24 h prior to the rescheduled procedure. Consider a longer period of clear fluid diet if retained gastric contents were present despite following mitigation strategies.

- b. If, after consideration of the risks and benefits, a decision is made to proceed with the procedure, anaesthesia should be administered according to local practices for a non-fasted patient. Appropriate anaesthetic techniques should be applied to protect against pulmonary aspiration. Without being prescriptive, consideration should be given to regional anaesthetic techniques with minimal sedation and maintenance of upper airways reflexes, or rapid sequence induction for patients requiring general anaesthesia.

The evidence supporting these recommendations is based on case reports and retrospective data (low-quality evidence) and there remains uncertainty between the overall risks and benefits of continuing GLP-1RA and GLP-1/GIPRAs peri-procedurally. Therefore, these guidelines represent a 'conditional' GRADE recommendation for clinical practice.⁵¹

Given the uncertainty of the evidence and knowledge base surrounding GLP-1RAs and GLP-1RA/GIPRAs in the peri-procedural period, these guidelines are planned to be reviewed in 2026.

The final complete guidelines as approved by the organisations involved are publicly available on the websites of those organisations (anzca.edu.au, diabetesociety.com.au, gesa.org.au, nacos.org.au).

Conclusion

We have updated the first Australian and New Zealand multi-societal guidelines for the management of patients taking GLP-1RAs and GLP-1/GIPRAs in the perioperative and peri-procedural period. The guidelines are pragmatic, practical and evidence-based. These new guidelines have been endorsed by four national specialty bodies to help inform those managing these patients, with the aim to minimise the risk of potentially life-threatening aspiration of gastric contents.

Author Contribution(s)

Samantha L Hocking: Conceptualization; Formal analysis; Investigation; Methodology; Project administration; Validation; Visualization; Writing – original draft; Writing – review & editing.

David A Scott: Data curation; Formal analysis; Investigation; Project administration; Validation; Visualization; Writing – original draft; Writing – review & editing.

Matthew L Remedios: Conceptualization; Formal analysis; Investigation; Project administration; Validation; Visualization; Writing – original draft; Writing – review & editing.

Michael Horowitz: Conceptualization; Data curation; Formal analysis; Investigation; Project administration; Validation; Visualization; Writing – original draft; Writing – review & editing.

David A Story: Conceptualization; Formal analysis; Investigation; Project administration; Validation; Visualization; Writing – original draft; Writing – review & editing.

Jerry R Greenfield: Conceptualization; Data curation; Formal analysis; Investigation; Project administration; Validation; Visualization; Writing – original draft; Writing – review & editing.

Alex Boussioutas: Conceptualization; Formal analysis; Investigation; Project administration; Validation; Visualization; Writing – original draft; Writing – review & editing.

Benedict Devereaux: Conceptualization; Formal analysis; Investigation; Project administration; Validation; Visualization; Writing – original draft; Writing – review & editing.

Sofianos Andrikopoulos: Conceptualization; Formal analysis; Investigation; Project administration; Validation; Visualization; Writing – original draft; Writing – review & editing.

Jonathan E Shaw: Conceptualization; Formal analysis; Investigation; Project administration; Validation; Visualization; Writing – original draft; Writing – review & editing.

Benjamin L Olesnicky: Conceptualization; Formal analysis; Investigation; Project administration; Validation; Visualization; Writing – original draft; Writing – review & editing.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

David A Story  <https://orcid.org/0000-0002-6479-1310>

Benjamin L Olesnicky  <https://orcid.org/0000-0002-2650-7593>

References

1. Woodrow L. 'Turbocharged' \$160bn market for obesity drugs by 2030, <https://www.medicalrepublic.com.au/turbocharged-160bn-market-for-obesity-drugs-by-2030/1068252024> (accessed 16 June 2025).
2. Wettergren A, Schjoldager B, Mortensen PE, et al. Truncated GLP-1 (proglucagon 78–107-amide) inhibits gastric and pancreatic functions in man. *Dig Dis Sci* 1993; 38: 665–673. doi:10.1007/BF01316798
3. Nauck MA, Niedereichholz U, Ettler R, et al. Glucagon-like peptide 1 inhibition of gastric emptying outweighs its insulinotropic effects in healthy humans. *Am J Physiol* 1997; 273: E981–E988.

4. Little TJ, Pilichiewicz AN, Russo A, et al. Effects of intravenous glucagon-like peptide-1 on gastric emptying and intragastric distribution in healthy subjects: Relationships with postprandial glycemic and insulinemic responses. *J Clin Endocrinol Metab* 2006; 91: 1916–1923. doi:10.1210/jc.2005-2220
5. Meier JJ, Gallwitz B, Salmen S, et al. Normalization of glucose concentrations and deceleration of gastric emptying after solid meals during intravenous glucagon-like peptide 1 in patients with type 2 diabetes. *J Clin Endocrinol Metab* 2003; 88: 2719–2725. doi:10.1210/jc.2003-030049
6. Schirra J, Houck P, Wank U, et al. Effects of glucagon-like peptide-1(7-36)amide on antro-pyloro-duodenal motility in the interdigestive state and with duodenal lipid perfusion in humans. *Gut* 2000; 46: 622–631. doi:10.1136/gut.46.5.622
7. Blase E, Taylor K, Gao HY, et al. Pharmacokinetics of an oral drug (acetaminophen) administered at various times in relation to subcutaneous injection of exenatide (exendin-4) in healthy subjects. *J Clin Pharmacol* 2005; 45: 570–577. doi:10.1177/0091270004274432
8. Jones KL, Rigda RS, Butfield MDM, et al. Effects of lixisenatide on postprandial blood pressure, gastric emptying and glycaemia in healthy people and people with type 2 diabetes. *Diabetes Obes Metab* 2019; 21: 1158–1167. doi:10.1111/dom.13633
9. Marathe CS, Pham H, Wu T, et al. Acute administration of the GLP-1 Receptor agonist lixisenatide diminishes postprandial insulin secretion in healthy subjects but not in type 2 diabetes, associated with slowing of gastric emptying. *Diabetes Ther* 2022; 13: 1245–1249. doi:10.1007/s13300-022-01258-4
10. Raven LM, Brown C and Greenfield JR. Considerations of delayed gastric emptying with peri-operative use of glucagon-like peptide-1 receptor agonists. *Med J Aust* 2024; 220: 14–16. doi:10.5694/mja2.52170 [38009941]
11. Linnebjerg H, Park S, Kothare PA, et al. Effect of exenatide on gastric emptying and relationship to postprandial glycemia in type 2 diabetes. *Regul Pept* 2008; 151: 123–129. doi:10.1016/j.regpep.2008.07.003
12. DeFronzo RA, Okerson T, Viswanathan P, et al. Effects of exenatide versus sitagliptin on postprandial glucose, insulin and glucagon secretion, gastric emptying, and caloric intake: a randomized, cross-over study. *Curr Med Res Opin* 2008; 24: 2943–2952. doi:10.1185/03007990802418851
13. Rayner CK, Watson LE, Phillips LK, et al. Effects of sustained treatment with lixisenatide on gastric emptying and postprandial glucose metabolism in type 2 diabetes: A randomized controlled trial. *Diabetes Care* 2020; 43: 1813–1821. doi:10.2337/dc20-0190
14. Lorenz M, Pfeiffer C, Steinstrasser A, et al. Effects of lixisenatide once daily on gastric emptying in type 2 diabetes–relationship to postprandial glycemia. *Regul Pept* 2013; 185: 1–8. doi:10.1016/j.regpep.2013.04.001
15. Meier JJ, Menge BA, Schenker N, et al. Effects of sequential treatment with lixisenatide, insulin glargine, or their combination on meal-related glycaemic excursions, insulin and glucagon secretion, and gastric emptying in patients with type 2 diabetes. *Diabetes Obes Metab* 2020; 22: 599–611. doi:10.1111/dom.13935
16. Meier JJ, Rosenstock J, Hincelin-Mery A, et al. Contrasting effects of lixisenatide and liraglutide on postprandial glycemic control, gastric emptying, and safety parameters in patients with type 2 diabetes on optimized insulin glargine with or without metformin: A randomized, open-label trial. *Diabetes Care* 2015; 38: 1263–1273. doi:10.2337/dc14-1984
17. Nauck MA, Kemmeries G, Holst JJ, et al. Rapid tachyphylaxis of the glucagon-like peptide 1-induced deceleration of gastric emptying in humans. *Diabetes* 2011; 60: 1561–1565. doi:10.2337/db10-0474
18. Jensterle M, Ferjan S, Lezaic L, et al. Semaglutide delays 4-hour gastric emptying in women with polycystic ovary syndrome and obesity. *Diabetes Obes Metab* 2023; 25: 975–984. doi:10.1111/dom.14944
19. Jones KL, Huynh LQ, Hatzinikolas S, et al. Exenatide once weekly slows gastric emptying of solids and liquids in healthy, overweight people at steady-state concentrations. *Diabetes Obes Metab* 2020; 22: 788–797. doi:10.1111/dom.13956
20. Halawi H, Khemani D, Eckert D, et al. Effects of liraglutide on weight, satiation, and gastric functions in obesity: A randomised, placebo-controlled pilot trial. *Lancet Gastroenterol Hepatol* 2017; 2: 890–899. doi:10.1016/S2468-1253(17)30285-6
21. Maselli D, Atieh J, Clark MM, et al. Effects of liraglutide on gastrointestinal functions and weight in obesity: A randomized clinical and pharmacogenomic trial. *Obesity (Silver Spring)* 2022; 30: 1608–1620. doi:10.1002/oby.23481
22. Urva S, Coskun T, Loghin C, et al. The novel dual glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 (GLP-1) receptor agonist tirzepatide transiently delays gastric emptying similarly to selective long-acting GLP-1 receptor agonists. *Diabetes Obes Metab* 2020; 22: 1886–1891. doi:10.1111/dom.14110
23. Meier JJ, Goetze O, Anstipp J, et al. Gastric inhibitory polypeptide does not inhibit gastric emptying in humans. *Am J Physiol Endocrinol Metab* 2004; 286: E621–E625. doi:10.1152/ajpendo.00499.2003
24. Drucker DJ, Buse JB, Taylor K, et al. Exenatide once weekly versus twice daily for the treatment of type 2 diabetes: A randomised, open-label, non-inferiority study. *Lancet* 2008; 372: 1240–1250. doi:10.1016/S0140-6736(08)61206-4
25. Anazco D, Fansa S, Hurtado MD, et al. Low incidence of pulmonary aspiration during upper endoscopy in patients prescribed a glucagon-like peptide 1 receptor agonist. *Clin Gastroenterol Hepatol* 2024; 22: 1333–1335.e2. doi:10.1016/j.cgh.2023.11.024
26. Avraham SA, Hossein J, Somri F, et al. Pulmonary aspiration of gastric contents in two patients taking semaglutide for weight loss. *Anaesth Rep* 2024; 12: e12278.
27. Weber M, Siddarthan I and Mack PF. Clinically significant emesis in a patient taking a long-acting GLP-1

- receptor agonist for weight loss. *Br J Anaesth* 2023; 131: e37–e39. doi:10.1016/j.bja.2023.05.005
28. Gulak MA and Murphy P. Regurgitation under anesthesia in a fasted patient prescribed semaglutide for weight loss: A case report. *Can J Anaesth* 2023; 70: 1397–1400. doi:10.1007/s12630-023-02521-3
 29. Klein SR and Hobai IA. Semaglutide, delayed gastric emptying, and intraoperative pulmonary aspiration: A case report. *Can J Anaesth* 2023; 70: 1394–1396. doi:10.1007/s12630-023-02440-3
 30. Silveira SQ, da Silva LM, de Campos Vieira Abib A, et al. Relationship between perioperative semaglutide use and residual gastric content: A retrospective analysis of patients undergoing elective upper endoscopy. *J Clin Anesth* 2023; 87: 111091. doi:10.1016/j.jclinane.2023.111091
 31. Kobori T, Onishi Y, Yoshida Y, et al. Association of glucagon-like peptide-1 receptor agonist treatment with gastric residue in an esophagogastroduodenoscopy. *J Diabetes Investig* 2023; 14: 767–773. doi:10.1111/jdi.14005
 32. Raven LM, Stoita A, Feller RB, et al. Delayed gastric emptying with perioperative use of glucagon-like peptide-1 receptor agonists. *Am J Med* 2023; 136: e233–e234. doi:10.1016/j.amjmed.2023.07.016
 33. Yeo YH, Gaddam S, Ng WH, et al. Increased risk of aspiration pneumonia associated with endoscopic procedures among patients with glucagon-like peptide 1 receptor agonist use. *Gastroenterology* 2024; 167(2): 402–404. e3. doi:10.1053/j.gastro.2024.03.015
 34. Ushakumari DS and Sladen RN. ASA consensus-based guidance on preoperative management of patients on glucagon-like peptide-1 receptor agonists. *Anesthesiology* 2024; 140: 346–348. doi:10.1097/ALN.0000000000004776
 35. Hashash JG, Thompson CC and Wang AY. AGA rapid clinical practice update on the management of patients taking GLP-1 receptor agonists prior to endoscopy: Communication. *Clin Gastroenterol Hepatol* 2024; 22: 705–707. doi:10.1016/j.cgh.2023.11.002
 36. Jones PM, Hobai IA and Murphy PM. Anesthesia and glucagon-like peptide-1 receptor agonists: Proceed with caution! *Can J Anaesth* 2023; 70: 1281–1286. doi:10.1007/s12630-023-02550-y
 37. Talay LA and Vickers M. Why people seek obesity care through digital rather than in-person services: A quantitative multinational analysis of patients from a large unsubsidized digital obesity provider. *Cureus* 2024; 16: e75603. doi:10.7759/cureus.75603
 38. Payne H. No doctor, no script: No worries here's your ozempic, www.medicalrepublic.com.au, <https://www.medicalrepublic.com.au/no-doctor-no-script-no-worries-heres-your-ozempic/107426> (2024, accessed 16 June 2025).
 39. Ross G, Stranks S, Lee T, et al. ADS-ANZCA perioperative diabetes and hyperglycaemia guidelines (adults) 2022, <https://www.diabetessociety.com.au/ads-anzca-perioperative-hyperglycaemia-guidelines-adults/> (accessed 26 June 2025).
 40. Woerle HJ, Albrecht M, Linke R, et al. Impaired hyperglycemia-induced delay in gastric emptying in patients with type 1 diabetes deficient for islet amyloid polypeptide. *Diabetes Care* 2008; 31: 2325–2331. doi:10.2337/dc07-2446
 41. Youssef N, Noureldein M, Njeim R, et al. Reno-protective effect of GLP-1 receptor agonists in type1 diabetes: Dual action on TRPC6 and NADPH oxidases. *Biomedicine* 2021; 9: 1360. doi:10.3390/biomedicine9101360
 42. Zhao TC. Glucagon-like peptide-1 (GLP-1) and protective effects in cardiovascular disease: A new therapeutic approach for myocardial protection. *Cardiovasc Diabetol* 2013; 12: 90. doi:10.1186/1475-2840-12-90
 43. Le R, Nguyen MT, Allahwala MA, et al. Cardiovascular protective properties of GLP-1 receptor agonists: More than just diabetic and weight loss drugs. *J Clin Med* 2024; 13: 4674. doi:10.3390/jcm13164674
 44. Sattar N, Lee MMY, Kristensen SL, et al. Cardiovascular, mortality, and kidney outcomes with GLP-1 receptor agonists in patients with type 2 diabetes: A systematic review and meta-analysis of randomised trials. *Lancet Diabetes Endocrinol* 2021; 9: 653–662. doi:10.1016/S2213-8587(21)00203-5
 45. Australian and New Zealand College of Anaesthetists. PG07 Guideline on pre-anaesthesia consultation and patient preparation 2024. <https://www.anzca.edu.au/safety-and-advocacy/standards-of-practice/professional-documents/> (accessed 26 June 2025).
 46. Van de Putte P and Perlas A. Ultrasound assessment of gastric content and volume. *Br J Anaesth* 2014; 113: 12–22. doi:10.1093/bja/aeu151
 47. Wang J, Yu X, Wang Y, et al. Ultrasonic assessment of gastric solid contents in patients undergoing upper endoscopy with sedation. *BMC Anesthesiol* 2024; 24: 317. doi:10.1186/s12871-024-02688-2
 48. Garcia RT, Cello JP, Nguyen MH, et al. Unsedated ultrathin EGD is well accepted when compared with conventional sedated EGD: A multicenter randomized trial. *Gastroenterology* 2003; 125: 1606–1612. doi:10.1053/j.gastro.2003.08.034
 49. Jalleh RJ, Plummer MP, Marathe CS, et al. Clinical consequences of delayed gastric emptying with GLP-1 receptor agonists and tirzepatide. *J Clin Endocrinol Metab* 2024; 110: 1–15. doi:10.1210/clinem/dgae719
 50. Meier JJ, Kemmeries G, Holst JJ, et al. Erythromycin antagonizes the deceleration of gastric emptying by glucagon-like peptide 1 and unmasks its insulinotropic effect in healthy subjects. *Diabetes* 2005; 54: 2212–2218. doi:10.2337/diabetes.54.7.2212
 51. Guyatt GH, Oxman AD, Vist GE, et al. GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. *BMJ* 2008; 336: 924–926. doi:10.1136/bmj.39489.470347.AD