

FAST FACTS AND CONCEPTS #373
PALLIATIVE MANAGEMENT PEARLS FOR POST-BARIATRIC SURGERY PATIENTS
Jennifer Gabbard MD, Candace Breznau MD, Buddy Marterre MD, MDiv

Background Bariatric surgery is becoming increasingly more common (1). This *Fast Fact* provides pearls on providing symptom management for seriously ill patients who have undergone bariatric surgery.

Basics of bariatric surgery (2-5) There are multiple types of bariatric surgeries.

- Gastric banding is a reversible procedure which involves the placement of an adjustable silicone band around the upper portion of the stomach; it can lead to band erosion (~5%), band slippage / gastric prolapse (~10%), esophageal dilatation, and esophagitis.
- Sleeve gastrectomy involves the removal of up to 90% of the stomach and the creation of a small remnant 'sleeve'; it can present late with sleeve stenosis (gastric outlet obstruction), and GE reflux.
- Roux-en-Y gastric bypass (RYGB) is both restrictive and malabsorptive as it involves the creation of a gastric pouch about the size of an egg, which is then attached to a limb of jejunum. Complications include stomal stenosis, marginal ulcers, symptomatic cholelithiasis, fistulas, ventral hernias, small bowel obstruction, dumping syndrome, nutritional deficiencies, and alterations in drug absorption.

Pharmacokinetic changes after bariatric surgery (6-7)

- Decreased gastrointestinal (GI) surface area, especially after a RYGB, can limit drug bioavailability, particularly for extended-release, delayed-released, and enteric- or film-coated oral formulations.
- Decreased GI surface area results in diminished time available for medication and B12 absorption, decreased intrinsic factor availability, decreased gastric acid, and increased gastric pH.
- Protein malabsorption and hypoalbuminemia can occur resulting in decreased binding of highly protein bound acidic medications. This can lead to increased free drug and potential toxicity.

Palliative management pearls in patients who have undergone bariatric surgery

- Tablets, especially those > 10 mm in diameter, can get stuck and remain undissolved in the gastric pouch of RYGB patients. Capsules, liquid formulations, and soft gels are preferred (6-7).
- Immediate-release dosage forms are generally preferred over extended- and delayed-release and enteric- or film-coated product preparations. Notably, however, no dose adjustment seems to be needed for extended-release morphine nor venlafaxine when prescribed for RYGB patients (7-9).
- Marginal ulcers can occur after all types of bariatric procedures but are far more common after RYGB (reported in up to 25% of RYGB patients) (3). *It is recommended to avoid NSAIDs after all bariatric procedures* due to the increased risk of anastomotic ulcerations and perforations (2-4). If an oral NSAID cannot be avoided, celecoxib, a cyclooxygenase-2 inhibitor, is preferred because it has a lower risk of causing upper gastrointestinal bleeding and perforations compared with other NSAIDs and should be co-administered with a proton pump inhibitor (2). Similarly, glucocorticoids should be avoided in these patients (2). Aspirin should only be used when strongly indicated should be co-administered with a proton pump inhibitor.
- The bioavailability of serotonin reuptake inhibitor antidepressant medications and second-generation antipsychotics are reduced after RYGB (9-12). Increased risk of suicide has been reported in post-bariatric surgery patients (11). Patients with depression may be at risk for acute depressive symptoms after surgery and should be monitored closely.
- Common deficiencies include folic acid, iron, calcium, thiamine, vitamin B12, fat soluble vitamins (A, D, E, K), copper, and zinc. These levels should be monitored yearly unless prognosis is short, and goals of care are comfort, but even then, these deficiencies should be considered in the differential if unusual symptoms emerge (14-15). In RYGB patients with symptoms of neuropathy or fatigue, vitamin B12, iron, and TSH levels should be assessed. Bioavailability of levothyroxine is altered after RYGB, so patients receiving levothyroxine need TSH levels monitored more closely.
- The risk of osteoporosis is higher in RYGB patients (14-18). Fragility fractures should be considered in patients who complain of bone pain/back pain.

- Abdominal pain is extremely common after RYGB and has a unique differential diagnosis, including marginal ulcers, dumping syndrome, a fistula, dysmotility, obstruction, and hernia development (4).
- Ranitidine is recommended by experts for patients who experience delayed gastric emptying or mechanical bowel obstruction, though never specifically studied in the bariatric population (19).

Summary Patients with serious illnesses who have undergone bariatric surgery will have alterations in the gastric emptying time, pH and mucosal exposition, which can affect absorption of orally administered drugs, and have unique long-term complications.

References

1. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of obesity among adults and youth: United States, 2015–2016. National Center for Health Statistics data brief. 2017;288.
2. Siddique SS, Feuerstein JD. Gastrointestinal Complications of Roux-en-Y Gastric Bypass Surgery. *OA Minimally Invasive Surgery*. 2104;2(1):1.
3. Coblijn, U.K., Goucham, A.B., Lagarde, S.M. et al. Development of Ulcer Disease After Roux-en-Y Gastric Bypass, Incidence, Risk Factors, and Patient Presentation: A Systematic Review. *Obes Surg* (2014) 24: 299
4. Schulman AR, Thompson CC. Abdominal Pain in the Roux-en-Y Gastric Bypass Patient. *Am J Gastroenterol*. 2018;113(2):161-166.
5. Quidley AM, Bland CM, Bookstaver PB, Kuper K. Perioperative management of bariatric surgery patients. *American Journal of Health-System Pharmacy*. 2014;71:1253-1264.
6. Padwal R, Brocks D, Sharma A. A systematic review of drug absorption following bariatric surgery and its theoretical implications. *Obesity Reviews*. 2010;11:41-50.
7. Miller AD, Smith KM. Medication and nutrient administration considerations after bariatric surgery. *Am J Health Syst Pharm*. 2006;63(19):1852-1857.
8. Hachon L, Reis R, Labat L, et al. Morphine and metabolites plasma levels after administration of sustained release morphine in Roux-en-Y gastric bypass subjects versus matched control subjects. *Surgery for Obesity and Related Diseases: Official Journal of the American Society for Bariatric Surgery*. 2017;13(11):1869-1874.
9. Krieger CA, Cunningham JL, Reid JM, et al. Comparison of Bioavailability of Single-Dose Extended-Release Venlafaxine Capsules in Obese Patients Before and After Gastric Bypass Surgery. *Pharmacotherapy*. 2017;37(11):1374-1382.
10. Mechanick J, Youdim A, Jones D, et al. Clinical Practice Guidelines for the Perioperative Nutritional, Metabolic, and Nonsurgical Support of the Bariatric Surgery Patient-2013 Update: Cosponsored by American Association of Clinical Endocrinologists, The Obesity Society, and American Society for Metabolic & Bariatric Surgery. *Obesity*. 2013;21:S1-S27.
11. Hamad GG, Helsel JC, Perel JM, et al. The effect of gastric bypass on the pharmacokinetics of serotonin reuptake inhibitors. *Am J Psychiatry*. 2012;169(3):256-263.
12. Roerig JL, Steffen KJ, Zimmerman C, Mitchell JE, Crosby RD, Cao L. A comparison of duloxetine plasma levels in postbariatric surgery patients versus matched nonsurgical control subjects. *Journal of Clinical Psychopharmacology*. 2013;33(4):479-484.
13. Adams TD, Gress RE, Smith SC, et al. Long-term mortality after gastric bypass surgery. *The New England Journal of Medicine*. 2007;357(8):753-761.
14. Carpenter, M; Pisano,M; Bland,C. Implications of Bariatric Surgery on absorption of nutrients and medications. *US Pharm*. 2016;41(12):HS2-HS8.
15. Stein J, Stier C, Raab H, Weiner R. Review article: The nutritional and pharmacological consequences of obesity surgery. *Alimentary Pharmacology & Therapeutics*. 2014;40(6):582-609.
16. Axelsson KF, Werling M, Eliasson B, et al. Fracture Risk After Gastric Bypass Surgery: A Retrospective Cohort Study. *J Bone Miner Res*. 2018.
17. Shanbhogue VV, Støving RK, Frederiksen KH, et al. Bone structural changes after gastric bypass surgery evaluated by HR-pQCT: a two-year longitudinal study. *European Journal of Endocrinology*. 2017;176(6):685-693.
18. Corbeels K, Verlinden L, Lannoo M, et al. Thin bones: Vitamin D and calcium handling after bariatric surgery. *Bone reports*. 2018;8:57-63.
19. Veevers AE, Oxberry SG. Ranitidine: forgotten drug of delayed gastric emptying. *BMJ Support Palliat Care*. 2017;7(3):255-257.

Authors' Affiliations: Wake Forest School of Medicine

Conflicts of Interest: None

Version History: Originally edited by Drew A Rosielle MD; first electronically published in February 2019.

Fast Facts and Concepts are edited by Sean Marks MD (Medical College of Wisconsin) and associate editor Drew A Rosielle MD (University of Minnesota Medical School), with the generous support of a volunteer peer-review editorial board, and are made available online by the [Palliative Care Network of Wisconsin](#) (PCNOW); the authors of each individual *Fast Fact* are solely responsible for that *Fast Fact*'s content. The full set of *Fast Facts* are available at [Palliative Care Network of Wisconsin](#) with contact information, and how to reference *Fast Facts*.

Copyright: All *Fast Facts and Concepts* are published under a Creative Commons Attribution-NonCommercial 4.0 International Copyright

(<http://creativecommons.org/licenses/by-nc/4.0/>). *Fast Facts* can only be copied and distributed for non-commercial, educational purposes. If you adapt or distribute a *Fast Fact*, let us know!

Disclaimer: *Fast Facts and Concepts* provide educational information for health care professionals. This information is not medical advice. *Fast Facts* are not continually updated, and new safety information may emerge after a *Fast Fact* is published. Health care providers should always exercise their own independent clinical judgment and consult other relevant and up-to-date experts and resources. Some *Fast Facts* cite the use of a product in a dosage, for an indication, or in a manner other than that recommended in the product labeling. Accordingly, the official prescribing information should be consulted before any such product is used.