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Editorial comment

## Comment on: Optimizing the use of Upper GI Endoscopy after Laparoscopic Roux-en-Y Gastric Bypass

The optimal role for upper gastrointestinal endoscopy (EGD) before and after bariatric surgery continues to be one of the more important unanswered questions in our field. In this study, Boerlage et al. [1] attempted to better define indications for diagnostic EGD after laparoscopic Roux-en-Y gastric bypass (LRYGB). They reviewed a cohort of >3300 patients who had undergone either primary or revisional LRYGB at their institution. A prospective endoscopy database (Endobase; Olympus Europe, Hamburg, Germany) was then used to identify 250 patients who underwent diagnostic EGD after LRYGB.

This study is unique both in the number of patients and the scope of variables examined. The authors examined EGD findings based not only on patient demographic characteristics, but also risk factors, previous radiologic studies, and time interval from index LRYGB. The study excluded those undergoing therapeutic EGDs, which importantly narrowed the focus to those patients with more generalized symptoms. Over 60% of these patients were found to have normal postsurgical anatomy, which is markedly more than previous studies by Huang et al. [2] (43%) and Wilson et al. [3] (44%). This may be because of the exclusion of patients undergoing planned therapeutic EGDs. The Boerlage et al. [1] findings confirm that marginal ulcer (18.4%) and stomal stenosis (10.4%) are the most common findings in patients undergoing diagnostic EGD after LRYGB. The authors compared patients with pathologic findings with those with normal postsurgical anatomy.

So, does this study direct us toward a more effective evaluation of patients with upper gastrointestinal complaints after LRYGB? These findings do provide a number of clinically important pearls to direct our evaluation of this patient group. Symptoms, including dysphagia, nausea, vomiting, and bleeding, were predictive of marginal ulcer. Marginal ulcer was most common in the first 3 months after LRYGB. Neither upper gastrointestinal X-ray, abdominal computed tomography scan, or abdominal ultrasound was predictive of marginal ulcer. Combined with patient risk factors, such as nonsteroidal antiinflammatory drug use, smoking, and alcohol use, this may identify a group of patients who would benefit from early EGD and importantly could forgo other radiologic testing. This may also support a strategy of empiric proton pump inhibitor therapy in this group

of patients because those not using proton pump inhibitors were more likely to develop marginal ulcers.

Stomal stenosis was significantly associated with those patients in the first 3 months after LRYGB, experiencing dysphagia and with an abnormal upper gastrointestinal X-ray, but was not reported in this study after the first 3 months postoperative. Stomal stenosis was not associated with marginal ulcer risk factors, such as nonsteroidal antiinflammatory drug use, smoking, and alcohol use. It is unclear whether this is because of more aggressive management of marginal ulcers in this patient group. However, this study supports the use of upper gastrointestinal X-ray to direct EGDs in patient with dysphagia after LRYGB.

A minority of patients presenting with abdominal pain have a relevant finding at upper endoscopy, and the number of relevant findings was even lower in those with nausea or vomiting. Still, EGDs were performed in 7.6% of patients in this study with a mean of 1.6 EGDs per patient [1]. While adverse events associated with diagnostic EGDs are low, there is little standardization for reporting these events. Most EGDs are performed with patients under moderate or deep sedation and approximately 60% of adverse events are related to sedation and analgesia. Cardiopulmonary complication rates are reported between 1:170 to 1:10,000. Transient bacteremia after EGD has been reported as high as 8%. Prospective, multicenter registries report perforation rates of 1:2500 to 1:11,000. Mallory-Weiss tears occur in <.5% of diagnostic EGDs and usually are not associated with significant bleeding [4]. The rate of aspiration is more difficult to identify without uniform reporting. The most comprehensive review to date identified 35 articles describing  $\geq 1$  occurrences of pulmonary aspiration during procedural sedation. Of the 292 occurrences during gastrointestinal endoscopy, there were 8 deaths [5].

Another important consideration is the cost of EGD. The Medicare cost of a diagnostic EGD in Pennsylvania is \$392 in an ambulatory surgical center and \$761 in an outpatient department [6]. However, these costs vary widely across the country by region and payor. Some costs are passed on to patients because indications authorizing EGD vary widely among payors. In many areas, patients receive bills from centers using “out-of-network” anesthesia services. Patients reports of out-of-pocket charges of \$10,000 or more for endoscopy services are captioned with terms

such as “outrageous,” “highway robbery,” and “outright wrong” [7].

The Corona virus 2019 healthcare crisis has forced the rationing of both urgent and elective healthcare in the United States for the first time in our modern medical history. While this study is limited by the retrospective design, the findings do help narrow the paradigm for value-based utilization of diagnostic EGD after LRYGB.

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## References

- [1] Boerlage TCC, Wolvers PJD, Bruin SC, et al. Upper endoscopy after Roux-en-Y gastric bypass: diagnostic yield and factors associated with relevant findings. *Surg Obes Relat Dis*. Epub 2020 Mar 12.
- [2] Huang CS, Forse RA, Jacobson BC, Farraye FA. Endoscopic findings and their clinical correlations in patients with symptoms after gastric bypass surgery. *Gastrointest Endosc* 2003;58(6): 859–66.
- [3] Wilson JA, Romagnuolo J, Byrne TK, Morgan K, Wilson FA. Predictors of endoscopic findings after Roux-en-Y gastric bypass. *Am J Gastroenterol* 2006;101(10):2194–9.
- [4] ASGE Standards of Practice Committee, Ben-Menachem T, Decker GA. Adverse events of upper GI endoscopy. *Gastrointest Endosc* 2012;76(4):707–18.
- [5] Green SM, Mason KP, Krauss BS. Pulmonary aspiration during procedural sedation: a comprehensive systematic review. *Br J Anaesth* 2017;118(3):344–54.
- [6] Biopsy of the esophagus, stomach, and/or upper small bowel using an endoscope [homepage on the Internet]. Lawrence: Medicare; [updated 2019; cited 2020 Mar 29]. Available from: <https://www.medicare.gov/procedure-price-lookup/cost/43239/>.
- [7] How much does EGD cost [homepage on the Internet]. Campbell: CostHelper, Inc.; c2020 [cited 2020 Mar 29]. Available from: <https://health.costhelper.com/upper-endoscopy.html#extres1>.

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