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Roux-en-Y gastric bypass as a salvage procedure in complicated patients with failed fundoplication(s)

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Abstract

Background In symptomatic patients after failed fundoplication, reoperation is considered. In complex or obese patients, Roux-en Y gastric bypass (RYGB) may be the best operation. We sought to characterize the outcomes of patients with failed fundoplication to undergo salvage RYGB, and to compare these outcomes to patients undergoing reoperative fundoplication.

Methods A prospectively maintained database was queried for procedures performed at a single institution from 2011 to 2017. GERD health-related quality of life (HRQL) surveys were administered at defined intervals.

Results Thirty-six patients underwent salvage RYGB and 84 patients underwent reoperative fundoplication. The RYGB cohort had a higher BMI (35.5 ± 6.8 vs. 28.7 ± 5.3, $p < 0.01$), more gastroparesis (52.8% vs. 9.5%, $p < 0.01$), more esophagitis (42.9% vs. 20.2%, $p = 0.01$), and more prior fundoplications (1.9 vs. 1.2, $p < 0.01$). The incidence of gastroparesis and esophagitis was directly related to the number of failed fundoplications ($p < 0.05$). Operative times were longer with RYGB (332.7 ± 131.5 vs. 200.0 ± 67.6 min, $p < 0.01$) as was length of stay (4.3 ± 3.4 vs. 2.8 ± 1.5 days, $p = 0.02$), incidence of Clavien-Dindo complications ≥ Grade 3 (19.4% vs. 4.8%, $p = 0.01$), 30-day reoperation (11.1% vs. 1.2%, $p = 0.01$), and 30-day readmission (32.4% vs. 11.9%, $p < 0.01$). In five patients with three or more prior fundoplication attempts, an esophagojejunostomy was necessary. If these patients are excluded, there was no difference for RYGB with gastrojejunostomy compared to reoperative fundoplication for complications, reoperations, or readmissions. GERD-HRQL scores were similar prior to surgery in both cohorts and improved significantly and to a similar degree on long-term follow-up.

Conclusions In a complex cohort of patients with high rates of obesity and numerous failed previous fundoplication attempts, conversion to RYGB results in good symptomatic outcomes. Patients with three or more previous fundoplication attempts are more likely to require esophagojejunostomy. Complication rates in this subset of patients appear to be quite high.

Keywords Reoperative fundoplication · Roux-en-Y gastric bypass · Failed fundoplication · Recurrent GERD · Revisional antireflux surgery

Gastroesophageal reflux disease (GERD) is the most common gastrointestinal disease. When medical therapy fails to control symptoms, many patients will choose to undergo antireflux surgery, most often with a laparoscopic fundoplication. Unfortunately, anywhere from 2 to 30% of fundoplications fail, and ultimately 3–6% of patients require revisional surgery [1–16]. While reoperative fundoplication is the most commonly performed procedure, in certain patients, conversion of a failed fundoplication to Roux-en Y gastric bypass (RYGB) may be more appropriate [8, 12, 14, 15]. Potential indications for conversion to RYGB rather than reoperative fundoplication include more than two prior failed attempts, post-surgical gastroparesis, and morbid obesity. We have conducted RYGB as a salvage procedure for complicated patients with failed fundoplication(s) in a large cohort of patients. We sought to characterize the perioperative outcomes and overall effectiveness of this procedure, and to compare these outcomes to patients undergoing reoperative fundoplication.

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Materials and methods

A retrospective review of prospectively maintained data on patients undergoing laparoscopic conversion of failed fundoplication to RYGB between 2011 and 2017 was conducted. From the same database and in the same time interval, outcomes in consecutive patients undergoing reoperative fundoplication were also assessed. The same surgeon performed all procedures.

Data pertaining to demographics, operative details, and perioperative outcomes were reviewed. Postoperative complications were graded according to the Clavien–Dindo classification, with primary attention paid to those with a Grade 3 or higher complication [17]. A Grade 3 complication is defined as one that requires surgical, endoscopic, or radiological intervention. Symptomatic outcomes and quality of life were assessed prior to surgery and postoperatively during clinic visits or via mail survey using the GERD health-related quality of life (GERD-HRQL) questionnaire [18]. The GERD-HRQL composite score ranges from 0 to 50. A score of 0 indicates that all symptoms have resolved, whereas 50 indicates incapacitating symptoms related to GERD preventing normal activities of daily living. In addition, patient satisfaction at all time points was assessed qualitatively. Patients were asked to report whether they were satisfied, dissatisfied, or felt neutral about their current symptom control as related to their most recent antireflux operation.

All patients in this study had previously undergone a fundoplication, often with concurrent hiatal hernia repair. Nearly all cases were performed outside of our institution by different surgeons, and referred for revisional surgery. The majority of patients had GERD as the indication for their original surgery and the most common indication for reoperative surgery was GERD. Most patients had a hiatal hernia, usually recurrent, at the time of reoperative surgery. Preoperatively, all patients underwent an upper-GI series and an upper endoscopy (EGD). Patients selectively underwent pH studies when the diagnosis of GERD was in question and esophageal manometry when the procedure of choice was a reoperative fundoplication and in all cases with dysphagia or signs/symptoms of esophageal outflow obstruction. Nuclear medicine gastric emptying studies were performed in patients with symptoms consistent with delayed gastric emptying (bloating, early or prolonged satiety), or in patients with retained gastric contents present at the time of EGD. For patients undergoing RYGB as a salvage procedure for a failed fundoplication, the preoperative preparation and education was identical to what would be required for patients in our program's standard bariatric surgery pathway. Patients undergo extensive dietary screening and education as well as assessment by a health psychologist. They are part of the standard educational pathway for bariatric surgery patients. They participate in a 2-week high protein, low-calorie liquid diet as in our standard obesity surgery patients as well.

Patients were considered for conversion of a prior fundoplication to RYGB if they had two or more prior attempts at fundoplication, if they suffered from symptomatic postsurgical gastroparesis with documented delayed gastric emptying, or if they were morbidly obese with a body mass index (BMI) over 35 kg/m^2. Some patients with gastroparesis underwent a concurrent pyloroplasty and reoperative fundoplication rather than conversion to RYGB (especially if they were not obese or had < 2 prior attempts at repair). Decisions on reoperative fundoplication versus conversion to RYGB were always made prior to surgery.

The operative technique for conversion of a fundoplication to RYGB involved a primary laparoscopic approach in all patients. In patients with a hiatal hernia, the fundoplication was mobilized into the abdomen. In all cases, the esophagus was mobilized by high mediastinal dissection until the gastroesophageal junction was comfortably in the abdomen and ideally there was 4 cm of intra-abdominal esophageal length assessed without tension on the esophagus. The fundoplication was taken down after esophageal mobilization. This was typically performed with a combination of blunt and sharp dissection, and the use of a harmonic scalpel. The left gastric artery was identified, and a window made into the lesser sac on the lesser curve of the stomach just distal to the insertion of the left gastric and medial to the neurovascular bundle on the lesser curve. A linear stapler is used to create an isolated 20–30 mL gastric pouch. The fundus that is excluded from the pouch was often resected and retrieved from the abdomen in a specimen retrieval bag. In morbidly obese patients, a 50-cm biliopancreatic limb and a 100-cm Roux limb (150 cm for those with a BMI > 50 kg/m^2) were then constructed. In patients undergoing conversion to RYGB who were not obese, a shorter biliopancreatic limb (25 cm) and Roux limb (50 cm) were constructed. The gastric pouch was made to be the same size regardless of preoperative BMI. A linear stapled gastrojejunostomy is then created and the opening in the gastrojejunostomy was closed with sutures about a 32 French esophageal bougie. In cases where the fundoplication could not be taken down, where the tissue of the very proximal stomach and cardia was of questionable integrity, or when a gastrotomy was made near the esophagogastric junction or actually in the esophagus, the distal esophagus was transected and an esophagojejunostomy was constructed. In these cases, a 25-mm circular stapler anvil was passed trans-orally to create the esophagojejunostomy. This was then over-sewn with absorbable sutures. The hiatus was closed with permanent

sutures. We have discovered based on our experience that all patients determined intraoperatively to require an esophagojejunostomy rather than a gastrojejunostomy had three or more previous fundoplication procedures. We now council these patients prior to surgery about the possibility of an intraoperative decision to convert from a plan to create a gastrojejunostomy to an esophagojejunostomy. In all of these patients, we place a feeding jejunostomy tube at the time of surgery.

The operative technique in the cohort of patients to undergo reoperative fundoplication has been described previously [19]. This technique involves hiatal hernia repair and fundoplication takedown as described above for the RYGB conversion cases. Many reoperative fundoplications underwent construction of a Toupet partial fundoplication rather than a Nissen. This decision was based on the esophageal motility and whether the patient had dysphagia prior to reoperative surgery. The fundus was carefully assessed and the desired locations for the fundoplication on both the anterior and posterior fundus were marked with sutures. If a Nissen fundoplication was to be constructed, an esophageal bougie was passed at this point. A bougie was not used in the creation of Toupet fundoplications. The hiatus was re-approximated posteriorly with pledgeted, permanent braided sutures. In cases with a large hiatal defect and where a long posterior closure was felt to angle the esophagus anteriorly and excessively, one or two anterior hiatal sutures were placed. In cases where the hiatal repair was determined to be under tension, the hiatal repair was reinforced with a U-shaped piece of synthetic bioabsorbable mesh (Gore Bio-A, Flagstaff, AZ). In order to avoid bridging a hiatal defect with mesh, if the hiatal muscle could not be closed primarily, a right crural relaxing incision was performed to provide further medial mobilization of the crural muscle. Gastropexy sutures with braided permanent sutures between the fundoplication, the posterior hiatal repair, and the anterior left and right crural pillars were routinely placed. The fundoplication was always assessed intraoperatively with endoscopy to ensure that the fundoplication was in the correct location relative to the gastroesophageal junction (GEJ), that the endoscopic appearance of the fundoplication itself was correct, that the hiatus was easily traversed endoscopically, and that there were no unrecognized enterotomies.

Statistical analysis was conducted using SPSS, version 21 (IBM corp.). Continuous data were evaluated using independent samples *t* tests and are displayed with mean ± standard deviation. Categorical data were analyzed using Chi-square and ANOVA tests. Categorical data are represented with *n* (%). A *p* value of < 0.05 was considered statistically significant. Our Institutional Review Board approved this study.

Table 1 Baseline characteristics of the study population

	RYGB	Redo fundoplication	*p* value
n	36	84	–
Age (years)	53.5 ± 9.5	57.8 ± 12.1	0.06
Female gender	30 (83%)	58 (69%)	0.11
Preop BMI (kg/m^2)	35.4 ± 6.8	28.7 ± 5.3	< 0.01
Esophagitis	15 (42.9%)	17 (20.2%)	0.01
Gastroparesis	19 (52.8%)	8 (9.5%)	< 0.01
Barrett's esophagus	4 (11.4%)	15 (17.9%)	0.38
No. of prior fundoplications	1.9 ± 0.84	1.2 ± 0.38	< 0.01

Age, Preop BMI reported as: mean ± standard deviation

All other variables reported as: number of patients (% of total)

Table 2 Preoperative findings on endoscopy and gastric emptying

No. of prior fundoplications	1	2	3	*p* value
Preoperative esophagitis	17 (20.5%)	10 (38.5%)	7 (63.6%)	0.05
Barrett's esophagus	12 (14.5%)	6 (23.1%)	1 (10%)	0.50
Post-surgical gastroparesis	10 (12%)	10 (38.5%)	5 (50%)	< 0.01

Reported as: number of patients (% of total)

Results

There were 36 patients to undergo conversion of a failed fundoplication to RYGB during the study interval. The outcomes of these patients were compared to those of 84 patients to undergo reoperative fundoplication in the same interval. There was no difference in age or gender between patients to undergo either kind of procedure. (Table 1) In the reoperative fundoplication group, 50 patients underwent a Toupet and 34 underwent a Nissen.

From the entire cohort of 120 patients, 83 patients (69.1%) had one prior fundoplication procedure, 26 patients (21.7%) had two, and 11 patients (9.2%) had three or more prior fundoplication/hiatal hernia repair procedures. Of note, all patients with three or more prior attempts underwent conversion to RYGB. The mean number of prior fundoplication procedures in the RYGB group was higher. (Table 1) The most common procedures performed immediately prior to the last procedure recorded in this study was laparoscopic Nissen fundoplication (66.4%), open Nissen fundoplication (16.8%), and laparoscopic Toupet fundoplication (7.6%). When stratified by the number of prior fundoplication/hiatal hernia procedures, the incidence of preoperative esophagitis and post-surgical gastroparesis increased with increasing prior procedures. (Table 2).

When examining outcomes, operative times were longer in the conversion to RYGB group, as was the length of stay, 30-day readmission rate, and 30-day reoperation rate. The incidence of Clavien–Dindo complications ≥ Grade 3 was also higher in the RYGB cohort compared to the reoperative fundoplication group. No perioperative deaths occurred. (Table 3) In 19 cases (15.8%), an inadvertent gastrotomy or esophagotomy was created. In the salvage RYGB cohort, the enterotomy rate was higher ($n = 12$, 33.3% vs. $n = 8$, 9.5%; $p < 0.001$). Most gastrotomies occurred in the fundus or greater curve, and thus were easily managed with a wedge or partial gastrectomy. In the instances where the gastrotomy was near or at the angle of His/cardia, we typically performed an esophagojejunostomy. In the 31 patients who underwent RYGB with a gastrojejunostomy, two patients required ICU admission, one required an EGD within 30 days to assess persistent nausea and vomiting, and one underwent reoperation on postoperative day 4 for a bowel obstruction secondary a port site hernia at the site of a 5-mm trocar. In the reoperative fundoplication group, one patient required reoperation for a port site hernia, one required placement of a nasojejunal tube (NJT) by interventional radiology for acute gastric distention, and one patient was admitted to the ICU with Ogilvie syndrome to receive neostigmine. There was one patient in the reoperative fundoplication cohort readmitted with a gastric leak at the gastroesophageal junction. This was managed successfully with CT-guided drainage of the fluid collection and parental nutrition.

Given the increased complexity of the patients who ultimately required an esophagojejunostomy after three or more prior fundoplication/hiatal hernia repair procedures, we conducted a sub-analysis of this group. Of the five patients in this subgroup, three patients required reoperation. One patient presented with a leak at the esophagojejunal anastomosis managed by thoracotomy with decortication; one patient developed a colon perforation following administration of an enema and ultimately a duodenal stump leak; and one patient required laparotomy for small bowel pneumatosis and portal venous gas with normal intraoperative findings. A feeding jejunostomy tube was placed in all patients to undergo an esophagojejunostomy. In four of five patients, this j-tube was able to be removed at a median of 3 months postoperatively. One patient was still partially j-tube dependent for nutrition at 2 years. When we conducted our analysis excluding all patients to undergo an esophagojejunostomy and only evaluated patients to undergo salvage RYGB with a gastrojejunostomy, we found that there was no longer a difference in the rate of Grade 3 or higher Clavien-Dindo complications, 30-day reoperations, or 30-day readmissions when compared to the reoperative fundoplication group. (Table 3).

Table 3 Perioperative outcomes

	RYGB	Redo fundoplication	*p* value
Operative time (min)	332.7 ± 131.5	200.0 ± 67.6	< 0.01
LOS (days)	4.3 ± 3.4	2.8 ± 1.5	0.02
Readmission	11 (32.4%)	10 (11.9%)	0.01
Reoperation	4 (11.1%)	1 (1.2%)	0.01
Grade ≥ 3 complication	7 (19.4%)	4 (4.8%)	0.01
Excluding patients with esophagojejunostomy			
Readmission	8 (25.8%)	10 (11.9%)	0.07
Reoperation	1 (3.2%)	1 (1.2%)	0.46
Grade ≥ 3 complication	4 (12.9%)	4 (4.8%)	0.13

All other variables reported as: number of patients (% of total)

LOS length of stay, reported as: mean ± standard deviation

Early or late stricture at the gastrojejunostomy of the RYGB or narrowing/stenosis at the level of the fundoplication can be treated with EGD and balloon dilation. In our study, patients who underwent a RYGB were more likely to require postoperative dilation compared to those who underwent reoperative fundoplication ($n = 16$ (44.4%) vs. $n = 5$ (6%); $p < 0.0001$). The earliest dilation was performed at 3 weeks and the latest was performed at 5 years postoperatively.

At baseline, patients to undergo conversion to RYGB and reoperative fundoplication both suffered from severe GERD symptoms as assessed by the GERD-HRQL. There was no difference in baseline GERD-HRQL scores between patients who underwent salvage RYGB when compared to those who underwent reoperative fundoplication. GERD-HRQL scores improved substantially in both groups at 1 and 2 years following surgery. Response rate to the survey at 2 years was 45.8% (55/120). (Table 4).

At all postoperative time points, there was no difference in patient satisfaction between those who underwent RYGB or reoperative fundoplication. In follow-up a total of 93 patients, a response rate of 77.5%, reported their degree of satisfaction. At the last available contact, the majority of patients (75.3%) stated that they were either satisfied or felt neutral about their symptomatic outcome (Table 5).

Weight loss following these procedures occurred and varied by baseline BMI. From the entire cohort, 61% ($n = 22$) of patients had a BMI > 35 kg/m^2 at the time of the revisional surgery included in this analysis. Mean excess weight loss in the entire cohort at 1 year or more post-surgery was 68% ($n = 25$). When evaluating only the portion of the cohort with an initial BMI > 35, mean excess weight loss at 12 or more months postop was 64% ($n = 17$).

Table 4 Gastroesophageal reflux disease health-related quality of life (GERD-HRQL) outcomes

GERD HRQL data	RYGB	Redo fundoplication	*p* value
Baseline GERD HRQL ($n=75$)	22.2 (±10.3)	26.0 (±13.4)	0.21
1-year GERD HRQL ($n=42$)	3.7 (±3.1)	11.2 (±12.9)	0.04
2-year GERD HRQL ($n=55$)	10.4 (±12.7)	14.4 (±13.8)	0.39
p value (baseline vs. 2-year)	<0.01	<0.01	

n = number of respondents at each time interval

Reported as: mean ± standard deviation. GERD-HRQL scores range from 0 = high quality of life to 50 = low quality of life

Table 5 Patient satisfaction results

Satisfaction	RYGB	Redo fundoplication	*p* value
6 months	13 (86.7%)	23 (76.7%)	0.55
1 year	13 (92.8%)	23 (82.1%)	0.30
2 years	17 (81.0%)	30 (69.8%)	0.37
Overall (last available contact)	17 (77.3%)	53 (74.6%)	0.56

Reported as: number of patients (% of total respondents at that time interval)

Discussion

We have demonstrated that in complex patients with one or more failed previous fundoplication/hiatal hernia repair procedure, that conversion of the fundoplication to a RYGB is associated with good symptomatic outcomes, satisfaction, and acceptable morbidity rates. Outcomes are favorable in comparison to reoperative fundoplication procedures. In patients with three or more prior fundoplication/hiatal hernia repair procedures, an esophagojejunostomy is frequently required, and in these patients, morbidity rates can be high. Of interest, the number of failed prior fundoplication attempts was correlated with the presence of gastroparesis and erosive esophagitis.

After fundoplication, failure is often defined by persistence or recurrence of symptoms such as heartburn, regurgitation, or dysphagia. The rate of failure ranges in the literature from 2 to 30% and likely increases with each subsequent attempt at reoperative fundoplication [1–16]. The reasons for failure are numerous; however, most are related to anatomic issues such as a recurrent hiatal hernia, usually with herniation of the fundoplication into the chest. Primary failure may relate to wrong indication, closing the hiatus too tight, or improper construction of the fundoplication. A comprehensive review of reoperative fundoplications revealed that in 17 studies involving more than 1000 patients, the most common indication for reoperative fundoplication was recurrent GERD (59%), most often secondary to fundoplication herniation. The second most common indication for reoperative surgery was dysphagia (31%) [16]. Other studies have confirmed that at the time of revisional antireflux surgery the most common finding encountered intraoperatively is a recurrent hiatal hernia, seen as often as 85% in one series [8].

While many patients with failed fundoplication and recurrent GERD can be effectively managed non-operatively, approximately 3–6% eventually require reoperation. Reoperation can be technically challenging and may result in higher morbidity rates as the surgeon encounters altered or obscured anatomy, adhesions, scarring at the hiatus and changed esophageal and gastric motility. The proportion of patients who experience satisfactory symptom control or resolution after revisional antireflux surgery ranges from about 65 to 85%, and likely continues to decline with every re-intervention [6, 9, 15]. Singhal et al determined that each successive reoperative fundoplication was associated with decreased patient satisfaction and a higher likelihood of requiring acid suppression medications [6]. Reoperative fundoplication, more specifically reoperative Nissen fundoplication is the most commonly performed procedure for a failed fundoplication [2, 3, 9, 15].

In some patients, conversion of a failed fundoplication to a Roux-en-Y gastric bypass may be a more prudent option. The RYGB effectively ameliorates GERD by diverting the flow of acid and bile away from the esophagus, avoids the potential for dysphagia from an esophageal outflow obstruction as may occur with a reoperative fundoplication, and is especially beneficial if there is damage to the fundoplication or the GEJ [12, 15]. In addition, morbid obesity, poor esophageal motility, delayed gastric emptying, and multiple previous surgeries at the hiatus have been proposed as risk factors for a poor clinical outcome with reoperative fundoplication after failed fundoplication [8, 11, 13, 14]. Yamamato et al. retrospectively reviewed their experience of 119 reoperative fundoplications and 64 RYGB after a previous failed fundoplication attempt. Patients with the aforementioned risk factors underwent RYGB rather than an attempt at fundoplication. Despite the fact that patients undergoing RYGB had a significantly higher body mass index, higher number of risk factors, and higher preoperative severity of heartburn and regurgitation compared to the reoperative

fundoplication group, symptom severity improved to a similar degree following both procedures [13]. The largest series ($n=87$) to report outcomes after conversion to a RYGB for symptomatic failed fundoplications demonstrated complete resolution of symptoms at long-term follow-up in 87.3% of their patients. These investigators noted that this was accomplished with acceptable perioperative morbidity and the added benefit of weight loss (% excess weight loss of 80%) [8].

Perioperatively, the outcomes in our series parallel those in the literature after either conversion to a RYGB or reoperative fundoplication, which highlights the more complex nature of a revisional operation. An early complication rate of 42.9% was reported in a small series of patients undergoing conversion to RYGB [14]. Others have reported major complication rates in these conversions of approximately 30% [13, 15]. Intraoperatively, salvage RYGB is also accompanied by a higher risk of hollow viscus injury [8, 15]. Coakley et al. experienced one esophageal injury and four gastric injuries, a rate of 5.7%, in their cohort of RYGB conversions [8]. Among studies examining only reoperative fundoplication, postoperative morbidity ranges between 17 and 24% [2, 3, 9, 11, 16]. Intraoperative injuries can occur frequently in this population as well [2, 3, 16]. Finally, an esophagojejunal anastomosis can be associated with complications such as a contained anastomotic leak, pleural or mediastinal fluid collections, empyema, peritonitis, and a need for reoperation. Not unexpectedly, our complication rate was substantially higher in the five patients where an esophagojejunostomy was necessary. In our opinion, this was less related to a different risk for esophageal versus gastric anastomosis than it was related to the fact that these cases took place in patients with three or more previous GEJ procedures, and the tissue in this region was of questionable integrity and vascularity due to this fact.

A high incidence of post-surgical gastroparesis in the subgroup of patients with two or more previous failed attempts at fundoplication is also important to note. Following truncal vagotomy for peptic ulcer disease, the incidence of post-surgical gastroparesis may be as high as 5% [20]. The exact incidence of post-surgical gastroparesis in patients undergoing laparoscopic fundoplication is hard to define based on the literature. The fact that delayed gastric emptying can be a complication following laparoscopic antireflux surgery is well described based on numerous published case series of patients suffering from post-surgical gastroparesis [21–23]. These series are usually quite small and are often from large referral centers with patients collected from broad geographic regions. The presumed etiology of severe gastric dysfunction in these patients is vagal nerve injury. Given the extensive scarring encountered at the hiatus and around the esophagus in reoperative antireflux surgery, it is likely that the vagus nerves are injured more frequently and not surprising that the incidence of post-surgical gastroparesis is so high in this cohort. While reoperative fundoplication and pyloroplasty may be an option in some patients, given the escalating difficulty with subsequent procedures at the hiatus, we feel salvage RYGB is the best option in most.

There are several limitations to this study. This is a retrospective review of prospectively maintained data. A single surgeon performed all cases in this series. Some patients were lost to follow-up over time and this may impact our results with regard to symptomatic outcomes. Despite these limitations, we feel we have demonstrated that in complex patients with failed previous fundoplication(s), salvage RYGB is a viable option with acceptable morbidity and good symptomatic outcomes. In patients with three or more previous fundoplication attempts, it is frequently necessary to perform an esophagojejunostomy, and these procedures are associated with high morbidity rates in this context. For these reasons, we believe that patients should be referred to surgeons with significant experience in reoperative antireflux and RYGB surgery after the primary fundoplication fails the first time.

Compliance with ethical standards

Disclosures Dr. Gould is a consultant for Torax Medical/Ethicon. Dr. Weber, Ms. Helm, Mr. Kanani, and Dr. Schumm have nothing to disclose.

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