Endoscopic Predictors of Persistent GERD Following Conversion of Sleeve Gastrectomy to Roux-en-Y Gastric Bypass

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Introduction

New or worsening gastroesophageal reflux disease (GERD) is a relatively common consequence of sleeve gastrectomy (SG) with a reported incidence of up to 30%. Conversion of sleeve gastrectomy to Roux-en-Y gastric bypass (RYGB) has been described as a means to combat GERD in this setting, but such intervention is not universally effective.

It was our goal to evaluate the impact of SG to RYGB conversion on GERD symptoms and to identify possible pre-revision endoscopic factors that may predict resolution or persistence of GERD following conversion.

Methods

A chart review was performed of all patients who underwent revisional bariatric surgery at our institution over a 6-year period from October 1st, 2013 to October 1st, 2019. Criteria for inclusion in this study were history of conversion from SG to RYGB, GERD noted as an indication for conversion on office or operative documentation, and availability of pre-revision endoscopy reports for review.

For patients that met these criteria, pre-revision endoscopy reports were analyzed and significant findings were recorded. These included esophagitis, gastritis, patulous LES, hiatal hernia, retained fundus, sleeve angulation/twisting/stenosis, and bile reflux. Clinic notes were also reviewed and GERD symptoms and medications were noted. The primary outcome in this study was continued used of anti-reflux medication at two year or earlier final follow up.

Odds Ratios (OR) with their 95% Confidence Intervals (CI) were calculated for endoscopic findings to evaluate their relationship to the primary outcome.

Results

A total of 289 patients underwent revisional bariatric surgery during the specified timeframe. Of those, 47 patients had undergone conversion from SG to RYGB with GERD as an indication and 46 had pre-operative endoscopy available for review and were evaluated in this study.

The mean Body Mass Index (BMI) at initial operation, revision, and final follow up were 49.1, 38.3, and 33.8 kg/m^2 respectively. Average time from SG to revision was 43 months.

Twelve patients (26%) had persistent GERD symptoms despite anti-reflux medication. Nineteen patients (41%) had resolution of GERD symptoms *with* anti-reflux medication use. Resolution of GERD symptoms *without* anti-reflux medication was seen in 15 patients (33%).

Sleeve dilation was seen in 16% of patients who remained on reflux medications and 47% of patients with medication free symptom resolution (OR 0.22, 95% CI [0.05, 0.89], P = 0.033). Sleeve angulation or stenosis was observed in 32% of patients who remained on medications and 67% of patients with medication free symptom resolution (OR 0.24, 95% CI [0.06, 0.88], P = 0.032). A patulous lower esophageal sphincter (LES) was noted in 32% of patient who remained on anti-reflux medications and 27% of patients with medication free symptom resolution (OR 1.31, 95% CI [0.33, 5.15], P = 0.700).

Demographic information	Patients remaining on anti-reflux medication (n= 31)	Patients with GERD resolution off anti-reflux medication (n=15)	P
Mean age at revision	46.9 years	47.5 years	0.8664
Mean time to revision	40.5 months	47.5 months	0.4085
Mean initial BMI	48.3 kg/m^2	50.5 kg/m^2	0.4525
Mean pre-revision BMI	38.7 kg/m^2	37.3 kg/m^2	0.4659
Mean final BMI	34.2 kg/m^2	33.0 kg/m^2	0.5911
Female	28	14	0.7279
Male	3	1	0.7279

Table 1. Patient Characteristics

Results

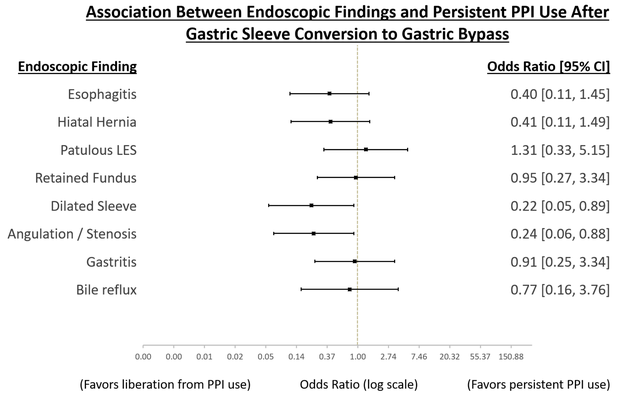


Figure 1. Forest Plot for endoscopic predictors of PPI use after conversion

Endoscopic Finding	Patients remaining on anti-reflux medication (n= 31)	Patients with GERD resolution off anti-reflux medication (n=15)	Odds Ratio	95% Confidence Interval	P
Esophagitis	8 (25.8%)	7 (46.7%)	0.3975	[0.1089, 1.4509]	0.1625
Hiatal Hernia	14 (45.2%)	10 (66.7%)	0.4118	[0.1138, 1.4893]	0.1761
Patulous LES	10 (32.3%)	4 (26.7%)	1.3095	[0.3328, 5.1531]	0.6996
Retained Fundus	12 (38.7%)	6 (40.0%)	0.9474	[0.2685, 3.3423]	0.933
Dilated Sleeve	5 (16.1%)	7 (46.7%)	0.2198	[0.0545, 0.8865]	0.0332
Angulation / Stenosis	10 (32.3%)	10 (66.7%)	0.2381	[0.0642, 0.8836]	0.032
Gastritis	20 (64.5%)	10 (66.7%)	0.9091	[0.2474, 3.3406]	0.8859
Bile reflux	5 (16.1%)	3 (20.0%)	0.7692	[0.1574, 3.7586]	0.7458

Table 2. Endoscopic Predictors of GERD after Conversion

Endoscopic Findings



Image 1. Esophagitis **Image 2.** Hiatal hernia **Image 3.** Patulous LES **Image 4.** Retained fundus

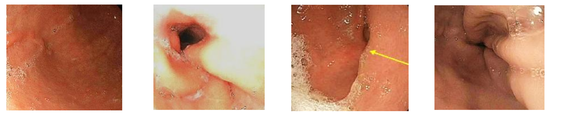


Image 5. Dilated sleeve **Image 6.** Twisting **Image 7.** Angulation **Image 8.** Stenosis

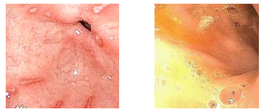


Image 9. Gastritis **Image 10.** Bile reflux

Discussion

In patients suffering from GERD following sleeve gastrectomy, conversion to RYGB can lead to the resolution of reflux symptoms. However, this procedure is not universally effective at achieving that goal. Patients with morphological sleeve irregularities such as dilation or stenosis appear to be significantly more likely to be liberated from PPI use than patients without these findings. While not statistically significant in this study, a patulous LES may be an independent risk factor for persistent GERD following conversion.

Based on this information, in patients without morphological irregularities of their sleeve and those with a patulous LES, treatment other than conversion to RYGB should be considered.

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