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MAYO CLINIC

BARIATRIC REVISION SURGERY

A SINGLE-INSTITUTIONAL REVIEW OF TRENDS AND INDICATIONS

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DISCLOSURES

- No relevant disclosures.

BACKGROUND

- Obesity stands as a global health crisis with its prevalence doubling over the past four decades.
- Since 2011, there has been a 311% increase in the prevalence of bariatric revision and conversion procedures, currently standing as the third most commonly performed MBS behind SG and RYGB [1].

DEFINING MBS REVISION

- *Bariatric revision surgery* is defined as a follow-up procedure intended to correct or modify a previous MBS.
- These procedures may revise, convert, or reverse a patient's bariatric surgical anatomy.

THE LANDSCAPE OF BARIATRIC REVISIONS

- The landscape of MBS revision procedures continues to change as our understanding of weight-loss surgery evolves
- Currently, no standardized guidelines exist for bariatric revision surgery
- Few studies exist discussing trends and indications for bariatric revision procedures

AIMS

- Evaluate bariatric revision procedures performed at a large academic institution over 25 years.
- Describe the trends in bariatric revisions pertaining to primary MBS procedures requiring revision, revision procedures performed, approaches to revisions, and indications.

PROJECT DESIGN

- Retrospective review of patients ≥18 who underwent a bariatric revision procedure at a single large academic institution between January 2000 and December 2023.
  - Institutional Review Board Protocol number: 24-001344

- Patients were excluded if they underwent a primary endoscopic bariatric procedure.

DATA COLLECTION

- The electronic medical record was reviewed for data pertaining to primary MBS, revisions, and indications.
- Patients with primary AGB surgery were included if they underwent a revision or conversion procedure at our institution
  - Patients who underwent band removal after primary AGB followed by later conversion to a new MBS procedure were grouped together as one revision procedure

BASELINE CHARACTERISTICS

Patient Baseline Characteristics	n (%)		
	Surgical revision	Endoscopic revision	Total
Patients	336 (57.1%)	252 (42.9%)	588
Female sex	287 (85.4%)	215 (85.3%)	502 (81.6%)
White race	309 (92.0%)	232 (92.1%)	541 (88.0%)
Age at primary surgery, years (range)	39.0±12.2 (18-77)	38.6±10.2 (18-69)	38.8±11.4 (18-77)
BMI at primary surgery, kg/m^2 (range)	49.1±11.0 (26.3-98.7)	49.3±9.1 (32.9-86.0)	49.2±10.1 (26.3-98.7)
Age at revision surgery, years (range)	50.7±12.6 (21-81)	51.1±10.1 (24-79)	50.9±11.6 (21-81)
BMI at revision surgery, kg/m^2 (range)	37.6±11.1 (17.8-86.7)	41.0±8.1 (25.0-65.8)	39.2±10.0 (17.8-86.7)

- 588 patients were identified who underwent revision after primary MBS
  - Surgical revision (n=336, 57.1%)
  - Endoscopic revision (n=252, 42.9%)

REVISION TRENDS

- RYGB, AGB, and SG were the most common primary MBS procedures requiring revision, respectively.
- Overall, surgical revisions were mostly performed via laparoscopy.
- Strikingly, 76 (22.3%) of patients required more than one surgical revision.

All Revisions	n (%)
Total revisions	588 (100%)
Surgical revisions	336 (57.1%)
Endoscopic revisions	252 (42.9%)
Multiple revision surgeries	76 (22.6%)
Primary Bariatric Surgeries Requiring Revision Surgery	
RYGB	116 (34.5%)
AGB	65 (19.3%)
SG	60 (17.9%)
VBG	52 (15.5%)
Loop gastric bypass	22 (6.5%)
BPD-DS	6 (1.8%)
Vertical banded RYGB	6 (1.8%)
Jejunoileal bypass	4 (1.2%)
SADI-S	2 (0.6%)
Other/unknown	3 (0.9%)
Surgical Approach to Revision Surgery	
Laparoscopic	196 (61.8%)
Open	116 (36.6%)
Robotic	5 (1.6%)

REVISIONS SUBDIVIDED BY PRIMARY MBS

- Primary RYGB was most likely to undergo a revision procedure whereas SG, AGB, and VBG were more likely to undergo conversion to new surgical anatomy.
- Interestingly, 1 in 4 patients who underwent primary RYGB or VBG and required MBS revision went on to receive a subsequent revision surgery.

Revision	n (%)	% Open	% MIS	Requiring additional revision surgery
Primary RYGB (n=116)		43.6%	56.4%	31 (26.7%)
Revision	100 (86.2%)	62.6%	37.4%	
Reversal	9 (7.8%)			
Conversion to SG	2 (1.7%)			
Conversion to other	5 (4.3%)			
Primary SG (n=60)		1.7%	98.3%	6 (10%)
Revision	0 (0%)	10.0%	90.0%	
Reversal	0 (0%)			
Conversion to RYGB	52 (86.7%)			
Conversion to other	8 (13.3%)			
Primary AGB (n=65)		0.0%	100.0%	11 (16.9%)
Revision	0 (0%)	1.6%	98.4%	
Reversal (band removal)	1 (1.5%)			
Conversion to RYGB	46 (70.8%)			
Conversion to SG	17 (26.2%)			
Conversion to other	1 (1.5%)			
Primary VBG (n=52)		78.7%	21.3%	15 (28.9%)
Revision	2 (3.9%)	63.3%	36.7%	
Reversal	0 (0%)			
Conversion to RYGB	47 (90.4%)			
Conversion to SG	0 (0%)			
Conversion to other	2 (3.9%)			

INDICATIONS FOR REVISIONS

- Weight-related indications (insufficient weight loss or weight regain) were the most common reason for revision (31.6%)

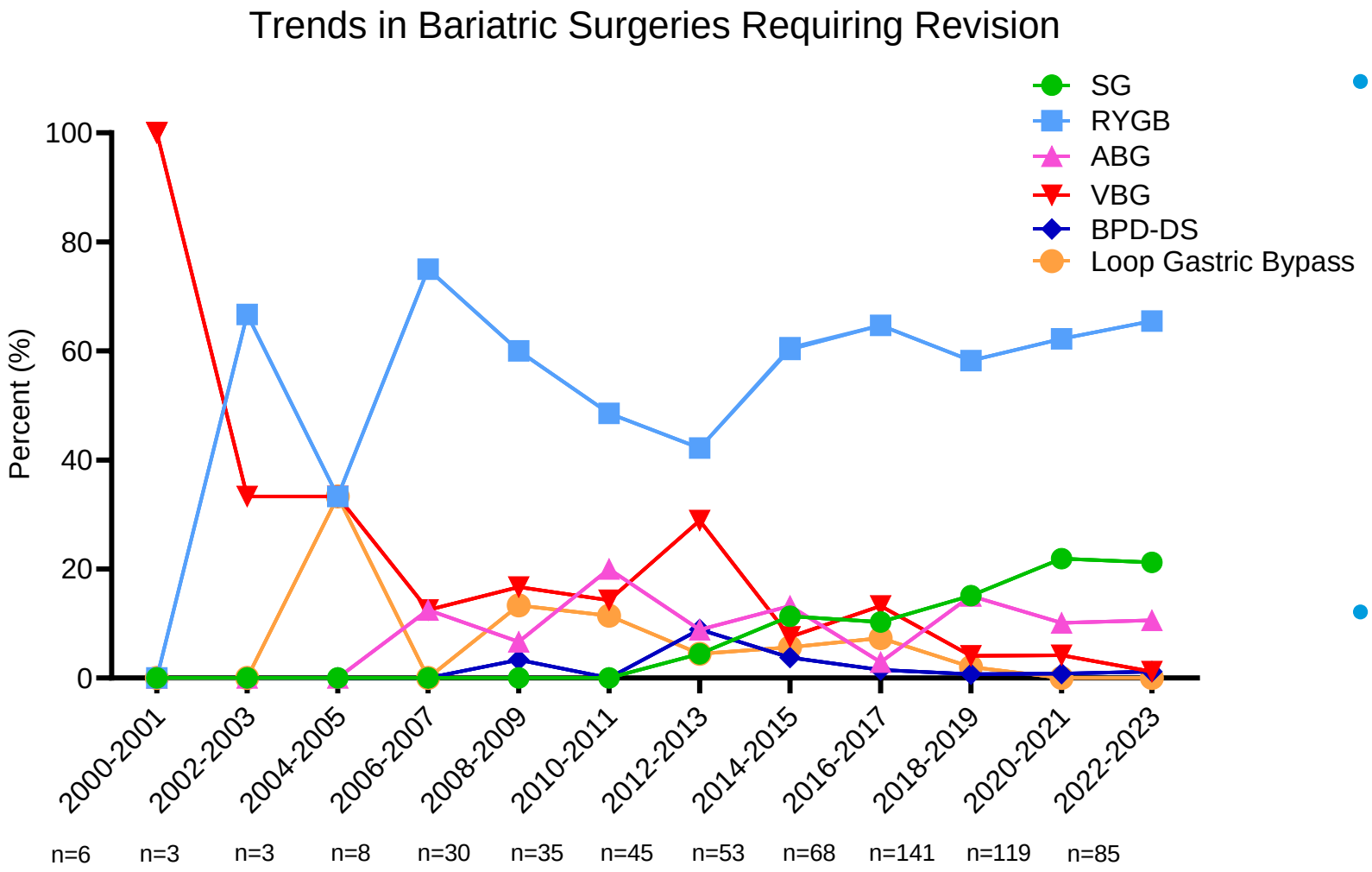
Indication	n (%)
Weight-related	105 (31.6%)
Reflux symptoms	57 (17.2%)
Dysphagia symptoms	32 (9.6%)
Anastomotic stricture	29 (8.7%)
Ulcer	24 (7.2%)
Malabsorption or nutritional deficiency	19 (5.7%)
Gastrogastric fistula	17 (5.1%)
Bile reflux	14 (4.2%)
Internal hernia or torsion	9 (2.7%)
Band-related complications (slip/erosion)	8 (2.4%)
Leak or dehiscence	5 (1.5%)
Perforation	4 (1.2%)
Gastroparesis	4 (1.2%)
Dumping syndrome	3 (0.9%)
Intussusception	2 (0.6%)

INDICATIONS SUBDIVIDED BY PRIMARY MBS

- The most common indication for revision after primary SG was reflux symptoms and this procedure had the shortest interval of time from primary MBS to revision

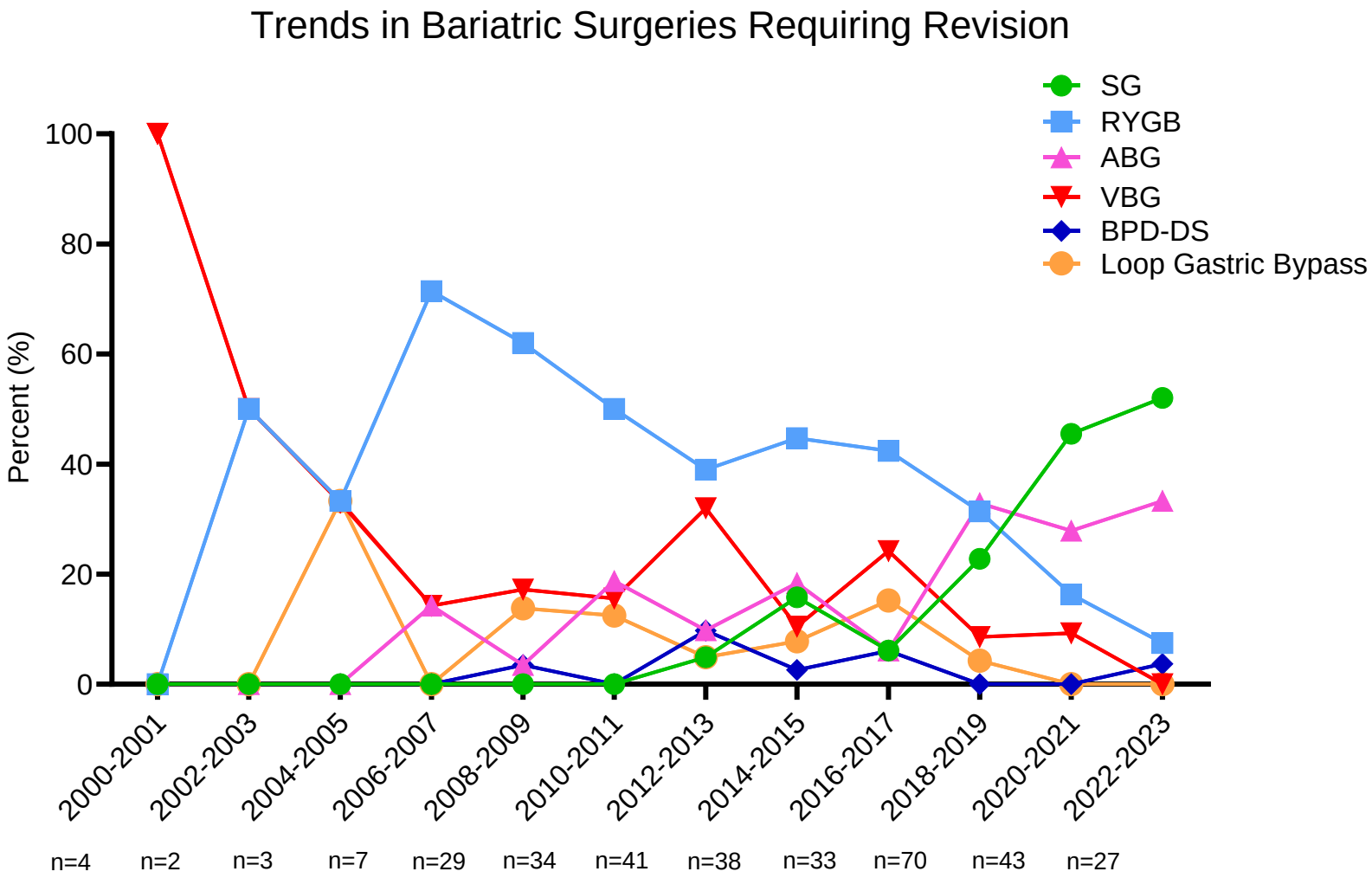
Indications for Revision Surgery	%	Time to Revision (years)
Primary RYGB (n=116)		
Ulcer	17.2	9.4±6.6
Anastomotic narrowing/stricture	16.4	
Dysphagia	11.2	
Primary SG (n=60)		
Reflux	55.0	5.0±4.3
Weight-related	33.3	
Sleeve stenosis	5.00	
Primary AGB (n=65)		
Weight-related	72.3	9.3±4.5
Reflux	9.2	
Dysphagia	9.2	
Primary VBG (n=52)		
Weight-related	41.5	20.3±9.5
Reflux	15.1	
Dysphagia	11.3	

TRENDS IN PRIMARY MBS REQUIRING REVISION



- Evaluating all primary MBS revisions (surgical and endoscopic), RYGB has consistently been the most common primary MBS procedure requiring revision
- We observed a recent rise in primary SG revisions

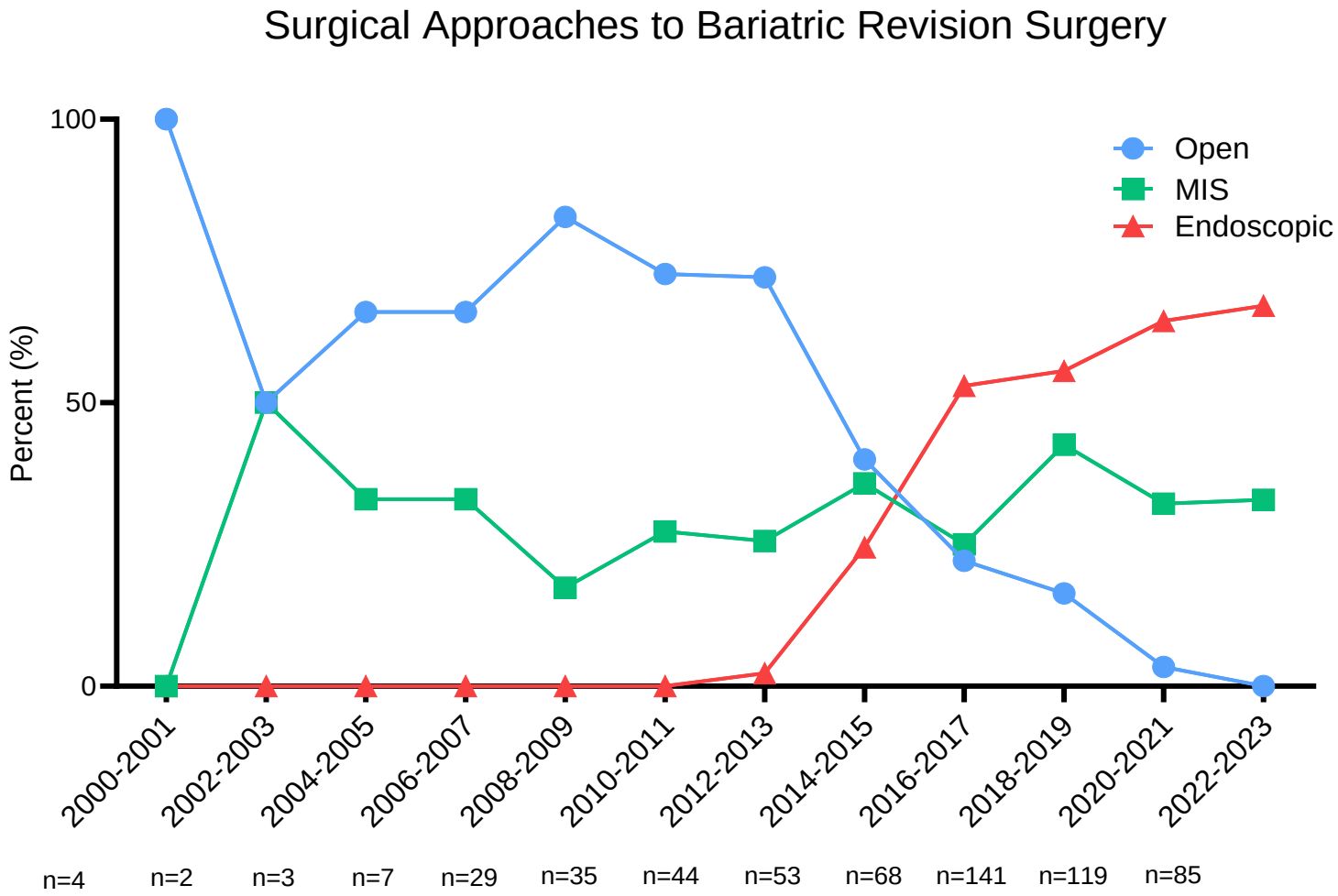
TRENDS IN PRIMARY MBS REQUIRING REVISION



- Excluding endoscopic MBS revisions, we found that SG has recently surpassed RYGB as the most common primary MBS requiring surgical revision.

TRENDS IN APPROACHES TO MBS REVISION

- MIS has largely replaced open surgery as the approach to revision surgery since approximately 2015.
- Strikingly, we observed a dramatic increase in the prevalence of endoscopic revisions performed since 2015



IMPORTANT CONSIDERATIONS

FACTORS

- Patient-dependent factors (i.e. primary MBS surgery)
- Surgeon preference
- Indications for revision

POSSIBLE SOLUTIONS

- Increasing our understanding of indications for and safety of approaches to MBS revisions

CONCLUSION

- The prevalence of bariatric revision surgery continues to grow and is now one of the most common MBS procedures performed
- MIS and endoscopic approaches are becoming increasingly popular
- Standardized guidelines for MBS revision procedures are lacking and more research is required to better understand indications for and outcomes following these complex revision procedures

LIMITATIONS

- Retrospective nature
- Difficult data abstraction due to many patient's undergoing primary MBS at outside hospitals over a wide period of time
- Lacking outcomes data related to MBS revision surgery

REFERENCES

1. Clapp B, Ponce J, DeMaria E, Ghanem O, Hutter M, Kothari S, et al. American Society for Metabolic and Bariatric Surgery 2020 estimate of metabolic and bariatric procedures performed in the United States. Surg Obes Relat Dis 2022;18(9):1134-40.

OUR TEAM

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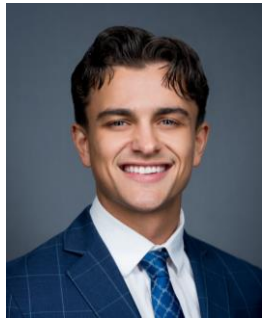

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QUESTIONS?