Endoscopic Revision of Bariatric Surgery: An Overview of Transoral Outlet Reduction (TORe)

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Disclosures

- Olympus Corporation of the Americas-
  - Consulting Work

Learning Objectives

- Indicaciones del TORe y selección del candidato ideal
- Técnica de TORe y comparer los resultados en EEUU
- Abordaje multidisciplinario
- Protocolo en Mayo Clinic

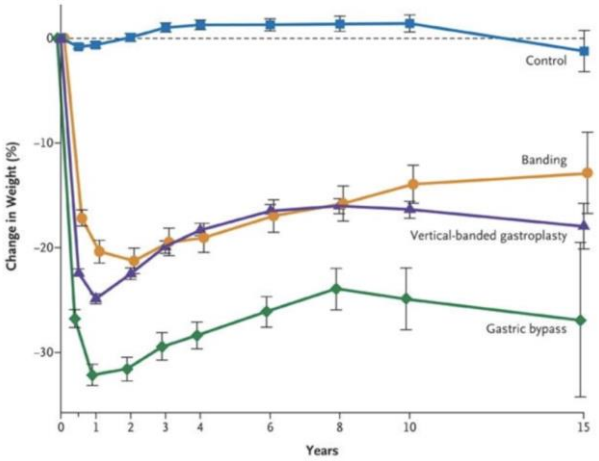
Current Status of Bariatric Surgery in the United States

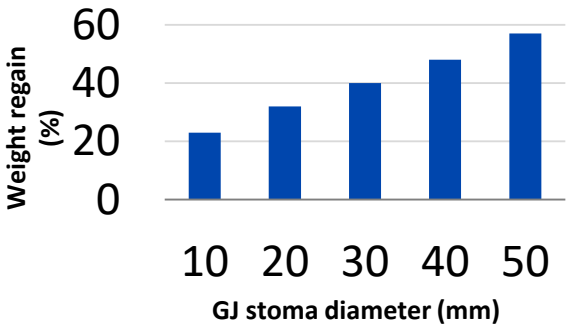
	2011	2012	2013	2014	2015	2016	2017	2018
Total	158,000	173,000	179,000	193,000	196,000	216,000	228,000	252,000
Sleeve	17.8%	33.0%	42.1%	51.7%	53.6%	58.1%	59.4%	61.4%
RYGB	36.7%	37.5%	34.2%	26.8%	23.0%	18.7%	17.8%	17.0%
Revision	6.0%	6.0%	6.0%	11.5%	13.6%	14.0%	14.1%	15.4%

https://asmbs.org/resources/estimate-of-bariatric-surgery-numbers

Weight Regain After Roux-en-Y Gastric Bypass

- Weight regain and recurrence of comorbidities are concerns following RYGB
  - Majority of patients regain 30% lost weight
  - Smaller fraction regain significant weight
  - Dumping syndrome recurrence
- Dietary and lifestyle factors
- Anatomic factors
  - Stomal size linearly correlates with risk of weight regain after Roux-en-Y gastric bypass surgery
  - Loss of restriction and early satiety → frequent hunger



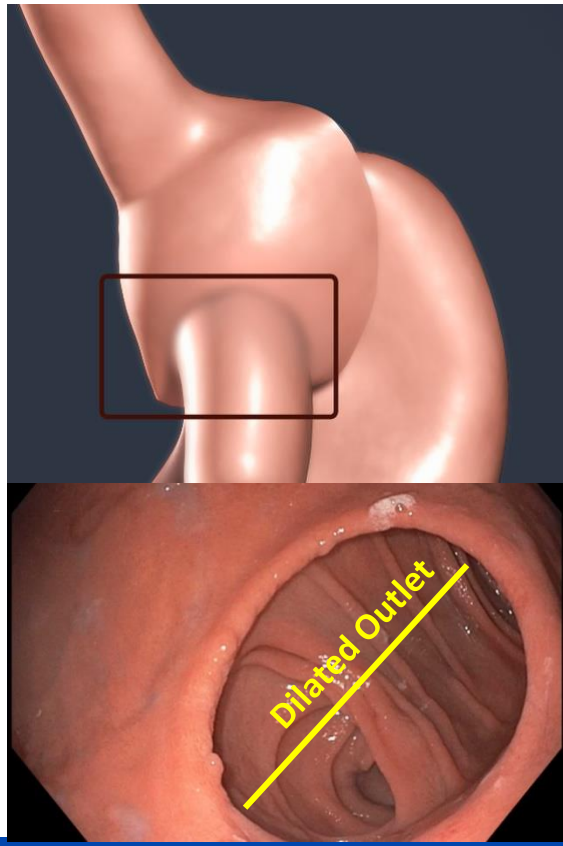


Sjostrom l, *et al. NEJM*. 2007;357:741-752
Abu Dayyeh BK et al. *Clin Gastroenterol Hepatol*. 2011;9(3):228-33

Evaluation and Management of Dilated Outlet

- Evaluation with radiologic and endoscopic studies:
  - Gastrogastric fistula
  - Dilated GJ anastomosis +/- pouch

- Management of large GJ anastomosis:
  - Surgical revision
    - Pouch resection with recreation of GJ anastomosis
    - Distalization of bypass
  - Endoscopic revision
    - Full thickness suturing with APC
    - Argon Plasma Coagulation (APC) alone



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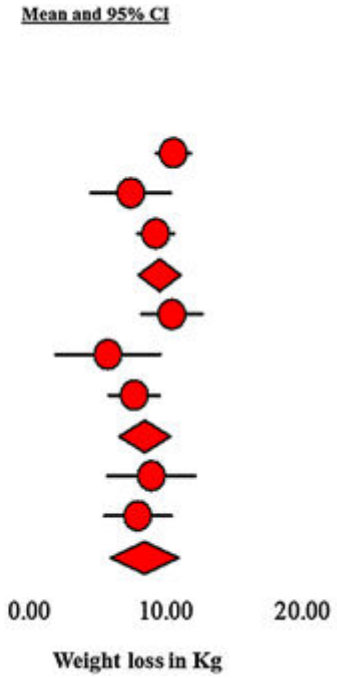
Endoscopic Transoral outlet reduction (TORe) Using Pursestring Suture Pattern

TORe Meta-Analysis

Study name	Statistics for each study		
	Mean	Lower limit	Upper limit
Kumar 2016_6M	10.6	9.2	12.0
Patel 2016_6M	7.5	4.5	10.5
Vargas 2017_6M	9.3	7.9	10.7
	9.5	7.9	11.1
Kumar 2016_12M	10.5	8.2	12.8
Patel 2016_12M	5.8	1.9	9.8
Vargas 2017_12M	7.8	5.8	9.7
	8.4	6.5	10.3
Kumar 2016_24M	9.0	5.7	12.3
Vargas 2017_24M	8.0	5.5	10.5
	8.4	5.9	10.9

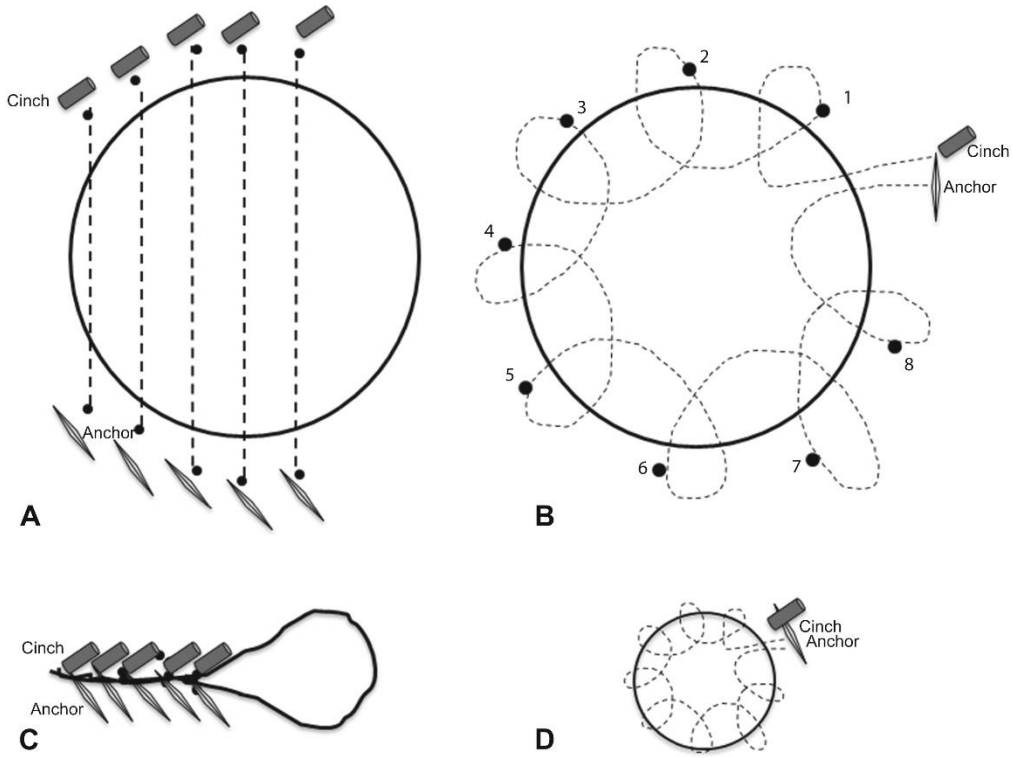


Pooled Absolute Weight loss:

6 months	9.5 kg (95% CI 7.9-11.1)
12 months	8.4 kg (95% CI 6.5-10.3)
18-24 months	8.4 kg (95% CI 5.9-10.9)

EJ Vargas *et al. Surgical Endoscopy.* 2018;32(1):252-259

Interrupted versus Pure-String Patterns



AR Schulman. *GIE*. 2018;87(5):1222-1228

Purse-String Versus Interrupted Stitch Technique

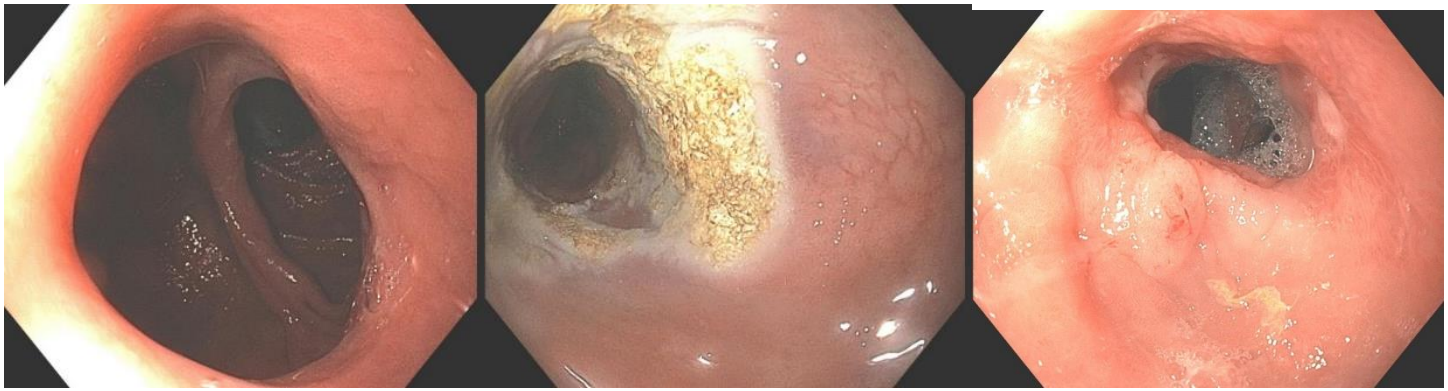
	Interrupted	Purse-String	P-value
%TWL	--	--	--
3 mo	8.0	8.6	.41
12 mo	6.4	8.6	.02 ★
Total Weight Loss (kg)	--	--	--
3 mo	11.3	9.5	.32
12 mo	7.8	9.5	.04 ★
%RWL	--	--	--
3 mo	33.3	44.7	.56
12 mo	27.8	40.2	.02 ★

- N= 241 subjects
  - Purse-string = 187; Interrupted = 54
- Primary outcome: %TWL at 3 and 12 months

Independent Predictors on multivariate analysis: % weight regain, technique

AR Schulman. *GIE*. 2018;87(5):1222-1228

APC-TORe Alone



Ft-TORe Versus APC-TORe Alone

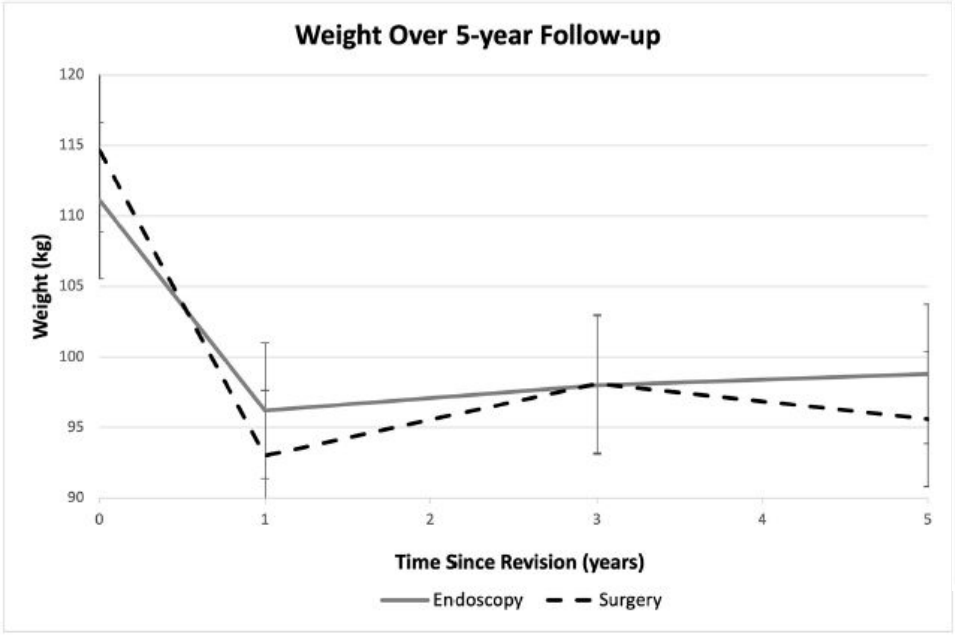
Pooled %TBWL	Ft-TORe (%) (95% CI)	APC-TORe (%) (95% CI)
3 mos	8.0 (6.3-9.7	9.0 (4.1-13.9
6 mos	9.5 (8.1-11.0)	10.2 (8.4-12.1)
12 mos	5.8 (4.3-7.1)	9.5 (5.7-13.2)

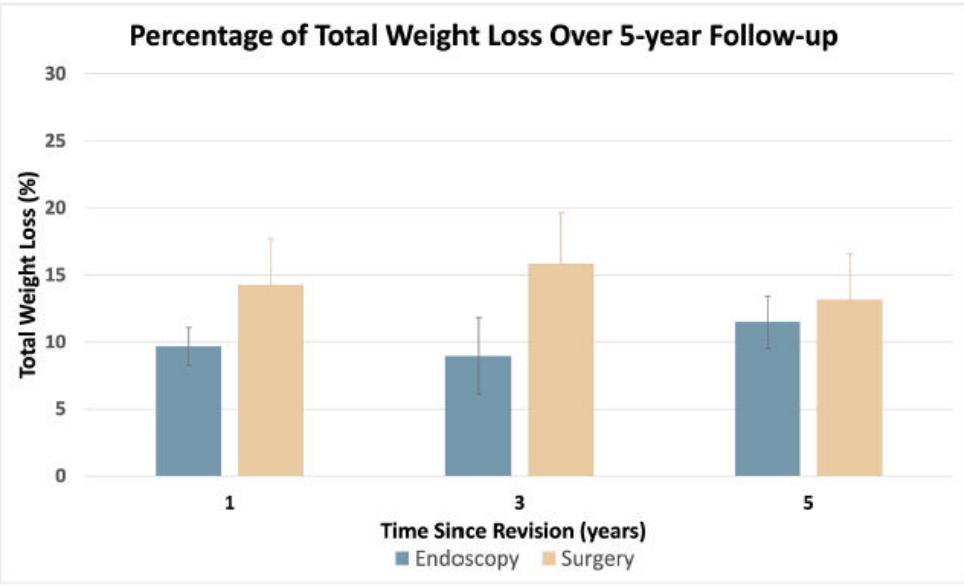
- No weight loss difference at 3 and 6 months (P >0.05)*
- Both techniques provide significant and comparable weight loss
  - Comparable safety profile
  - APC-TORe required multiple endoscopic sessions
    - Patient inconvenience, risks of endoscopy
    - Potential issues with insurance coverage

* Meta-analysis limited to only 3 two-arm studies

V Jaruvongvanich *et al*. *GIE*. 2020;92(6):1164-1175

TORe Versus Surgical Revision of GJ Anastomosis





P=0.20 P=0.09 P=0.67

RD. Dolan, P. Jirapinyo, CC Thomson. *GIE*. 2021. Online ahead of print

Adverse Event Rate Between TORe vs Surgical GJA Revision

Outcome	ENDO (n=31)	SURG (n=31)	*P* value
AE – n (%)	2 (6.5)	9 (29)	0.043
Gastrointestinal leak/perforation	0	3 (9.7)	
Ulcer	0	1 (3.2)	
GJA stenosis	1 (3.2)	2 (6.5)	
Gastrointestinal bleeding	1 (3.2)	1 (3.2)	
Small-bowel obstruction	0	1 (3.2)	
Incarcerated incisional hernia	0	1 (3.2)	
Serious adverse events – n (%)	0	6 (19.4)	0.024
Early adverse events – n (%)	1 (3.2)	7 (22.3)	0.53

Adverse event rate comparison between endoscopic and surgical GJA revision. **AE:** Adverse Event. **GJA:** Gastrojejunal anastomosis. Serious adverse events determined in reference to the American Society for Gastrointestinal Endoscopy (ASGE) lexicon for reporting endoscopic adverse events [23] and the National Surgical Quality Improvement Program (NSQIP) [25]. Early events defined as those which occurred within 30 days of revision.

RD. Dolan, P. Jirapinyo, CC Thomson. *GIE*. 2021. Online ahead of print

Patient Selection

- **BMI:** 30-40+ (case by case selection)

- **RNYGB History**
  - 2+ years post-RNYGB surgery
  - Initially achieved significant weight loss- maintenance of 25% TBWL after 2 years
  - Chronic Dumping Syndrome
  - Lost their feeling of satiety

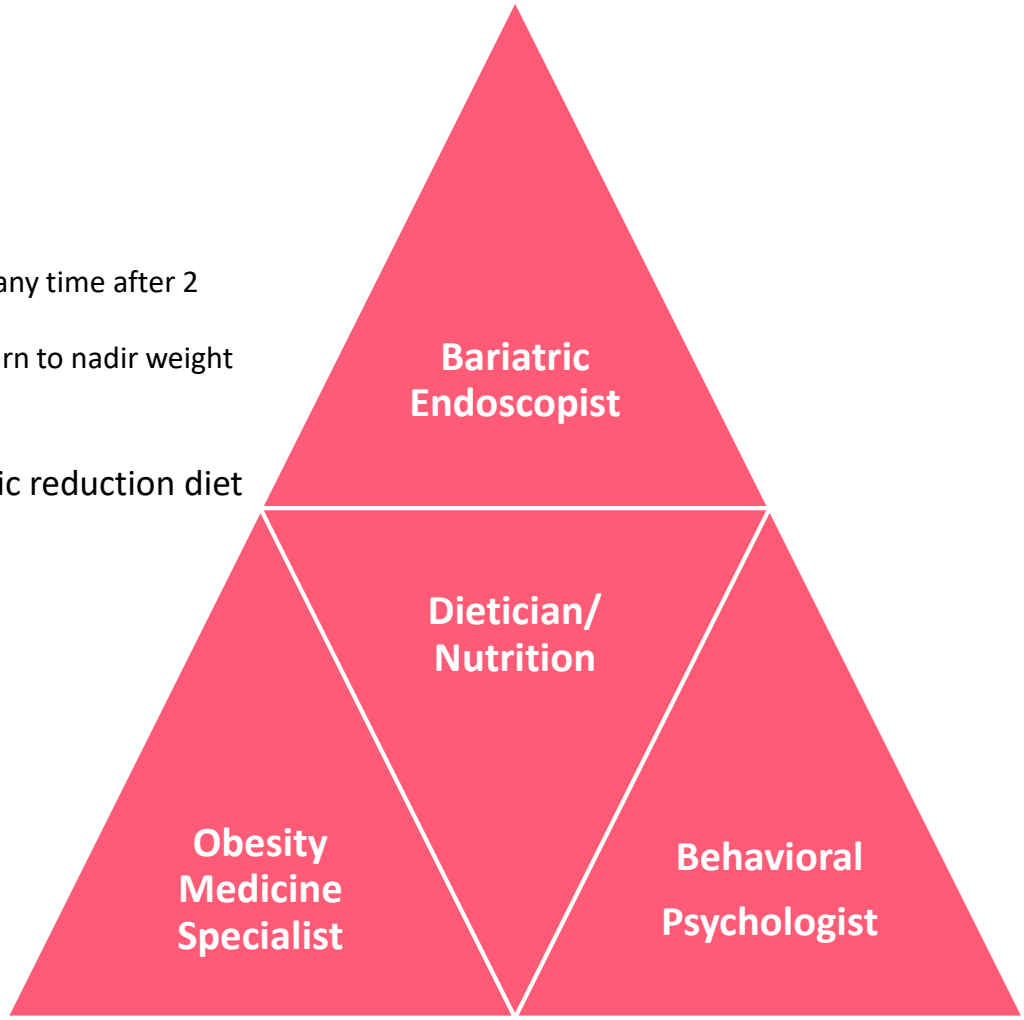
- **Anatomy**
  - Pre-op endoscopy with measurement of pouch length and outlet diameter using a measurement tool (snare, etc.)
  - Barium upper GI study to exclude gastrogastric fistula

Patient Selection: Exclusion Recommendations

- Patients with banded RNYGB
- Causal factors for weight regain other than gastric pouch enlargement including known eating disorder
- Pregnancy or plans of pregnancy in the next 12 months
- Immunosuppression
- Active substance abuse or smoker
- Coagulation disorders or chronic use of anticoagulants
- Any active medical condition that would preclude a safe endoscopic suturing repair
- Severe acid reflux disease unless concomitant hiatal hernia repair

TORe Infrastructure: Multidisciplinary Team

- Reasonable weight loss expectations
  - Maintenance of 25% TBWL a success any time after 2 years*
  - Pts will NOT and DO NOT need to return to nadir weight loss to be successful with surgery
- Nutrition classes to review post gastric reduction diet
- Behavioral psychological evaluation



*L. Sjöström. *J Intern Med* 2013;273:219-234

TORe Patient Protocol: Pre-Procedure

- **Diet:**
  - 2 days before procedure: full liquids
  - 1 day before procedure: clear liquids
  - Night before procedure: Nothing to eat or drink after midnight

- **Anti- Nausea Medication:**
  - Scopolamine 1.5 mg transdermal patch behind ear the **NIGHT BEFORE procedure**
  - Acetaminophen 1 gram (2 tablets) by mouth with small sip of water **3 hours before procedure**

TORe Patient Protocol: Anesthesia

- Dexamethasone 8 mg IV
- Ondansetron 8mg IV
- IV Fluids
- General endotracheal anesthesia, and maintenance anesthetic should be Propofol gtt only (NO VOLATILE AGENTS)

TORe Patient Protocol: Post-procedure

- **Remove** Scopolamine patch the day AFTER procedure
- **Anti-Nausea Medication:** ondansetron 4 mg
  - Every 8 hours for the first 48 hours **even if asymptomatic,** then as needed only
- **PPI:** omeprazole- Twice daily x 4 weeks
  - Open the capsules and mix the granules in applesauce. Do not swallow whole
- **Stool Softener:** Docusate **Daily** for first week- this is over the counter
- **Multi-vitamin:** Chewable FLINSTONE VITAMIN, two daily
- **Diet- clear liquids →full liquids → blenderized diet – for 4 weeks**

Challenges and Barriers to TORe

- TORe not universally covered by insurance
  - Out of pocket price
  - Cost prohibitive for many patients
- Not all patients will continue to have bariatric benefits
  - Require thorough evaluation and follow up care
- Lack of awareness of TORe
  - Providers and patients may only know of surgical revision vs nothing

Conclusions

- Substantial and meaningful literature that supports the use of TORe for reduction of the GJ anastomosis and enabling weight loss.

- Different techniques for TORe exist, with pros and cons. Ultimately, the patient's pouch and outlet anatomy, expertise of the endoscopist, and insurance status of the patient, all play a role in deciding which technique should be implemented.

- Management of weight regain after RYGB is complex and multifactorial and requires thorough evaluation to identify behavioral and lifestyle barriers, in addition to anatomic issues.

Muchas Gracias!

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Check out my YouTube Channel!
https://www.youtube.com/channel/UCV6sIOdsZIejx5VTDVBEBAQ

