

Programme

Journée annuelle de l'Obésité – Vendredi 26 Novembre 2021

*Amphithéâtre de pédiatrie HE1
Hôpital La Timone - AP-HM*

RGO et Sleeve Gastrectomy

Inserm



Institut national
de la santé et de la recherche médicale

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Disclosures

No conflict of interest

Agenda

Preamble

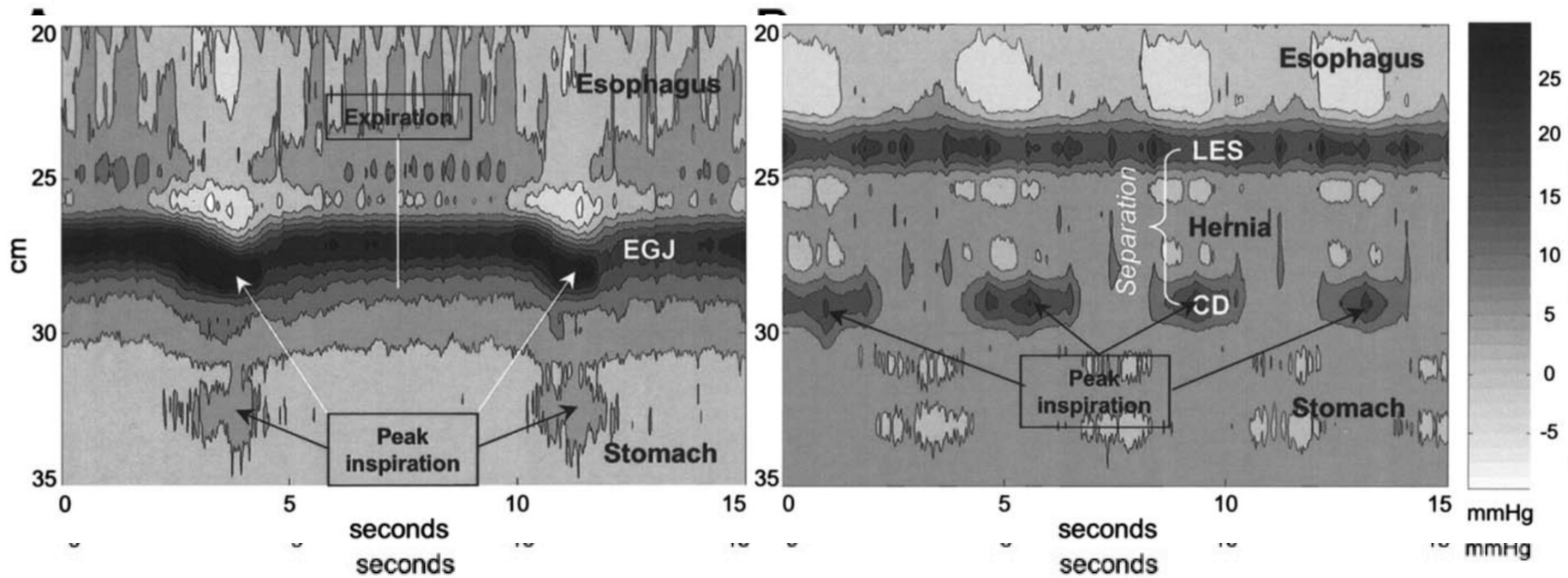
GERD and SG: mechanisms and symptoms

Definition of GERD

- Symptoms (heartburn, regurgitations ...)
- Questionnaires ←
- Endoscopy
 - Oesophagitis
 - Complications
 - Ulcerations (erosive oesophagitis)
 - Barretts esophagus (cancer)
- 24-h pH and impedance monitoring ←
- High resolution manometry ←

Mechanisms of GERD

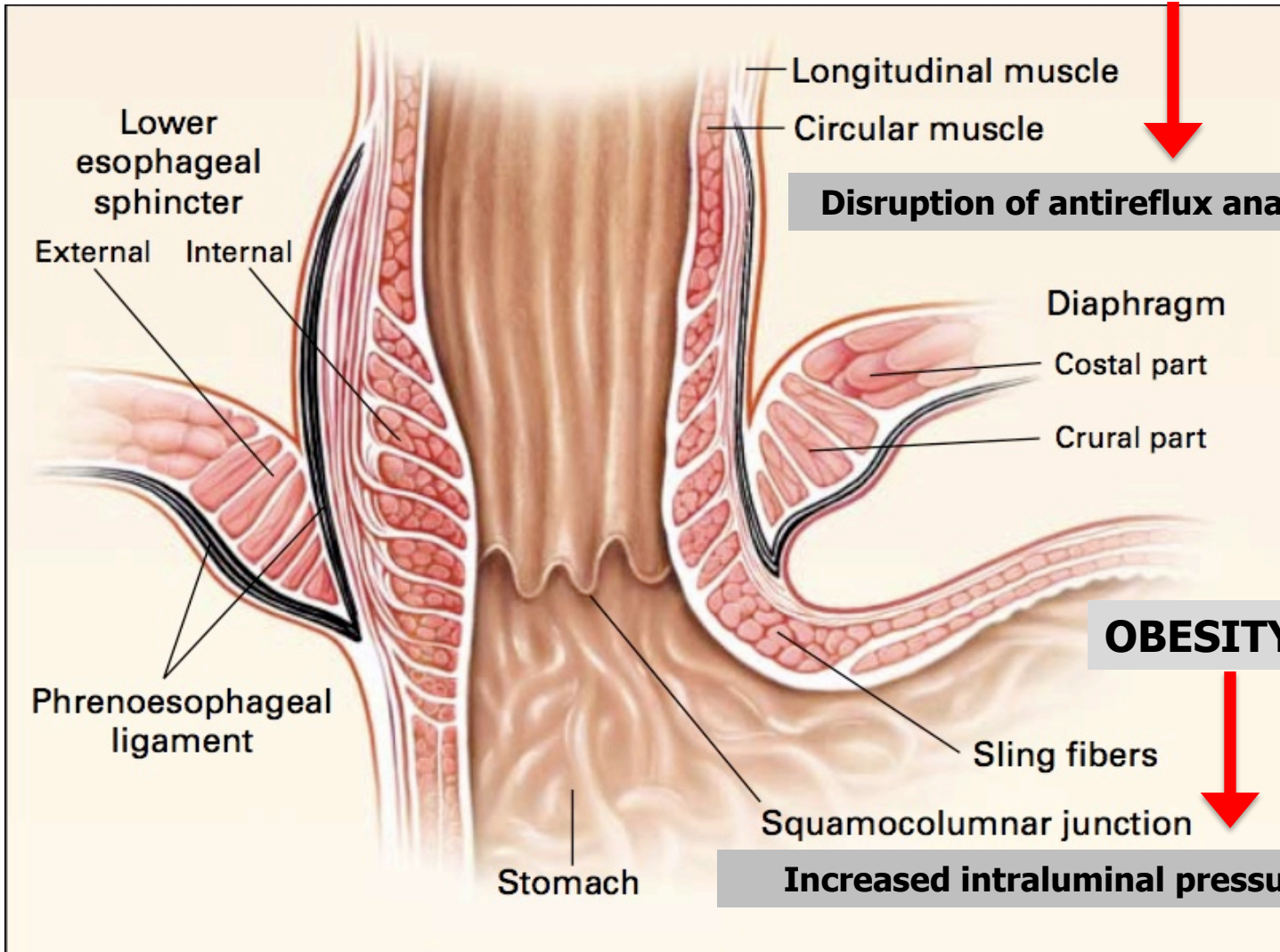
Obesity and gastroesophageal junction: an increased risk of hiatal hernia



Correlation between BMI or waist circumference and distance from LES to diaphragm

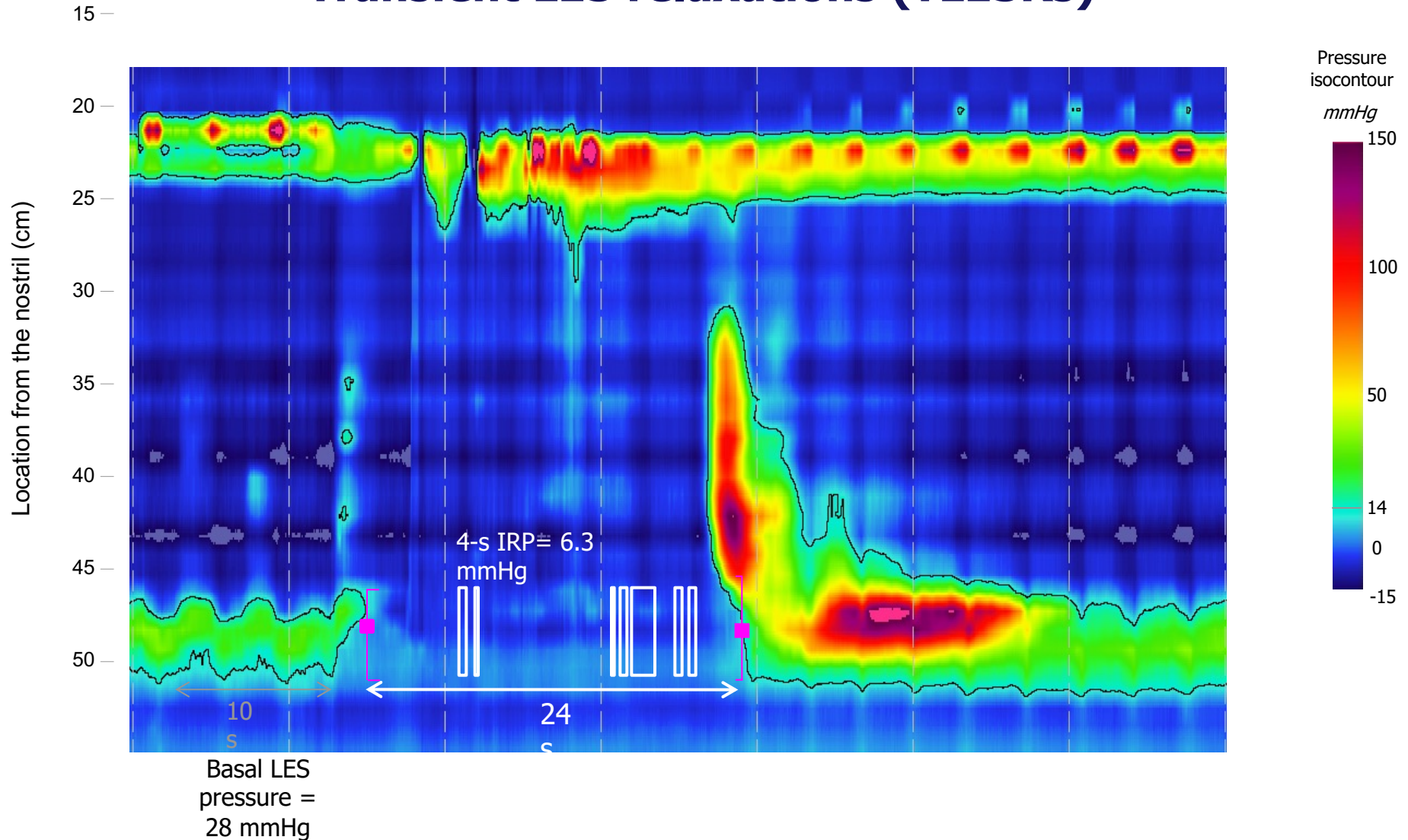
Effects of surgery on the EGJ

LSG SURGERY

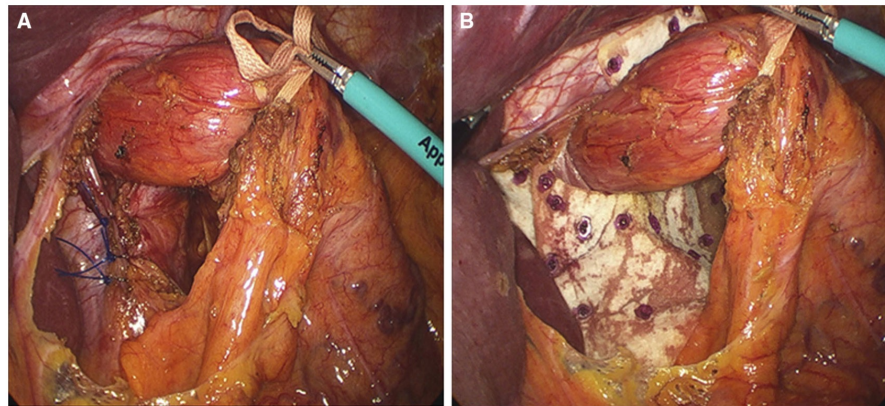


Mechanisms of GERD

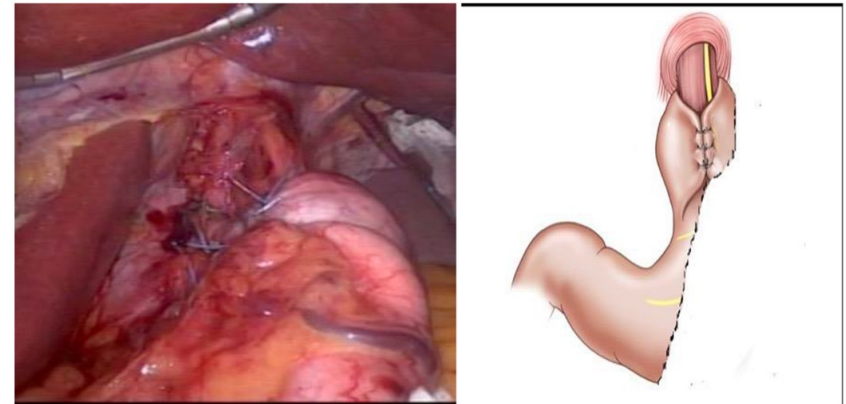
Transient LES relaxations (TLESRs)



SG and GERD



Fixing the hiatal hernia



Adding an antireflux valve



Fig. 1 Ligamentum teres encircling the gastroesophageal junction at the angle of His, forming a *necktie*

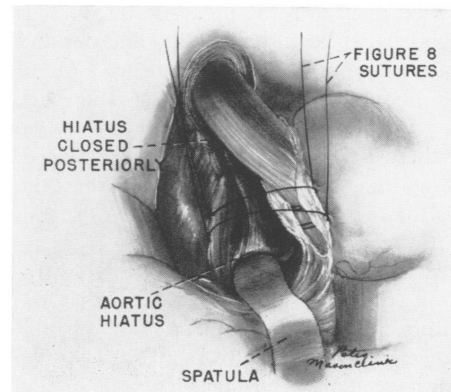
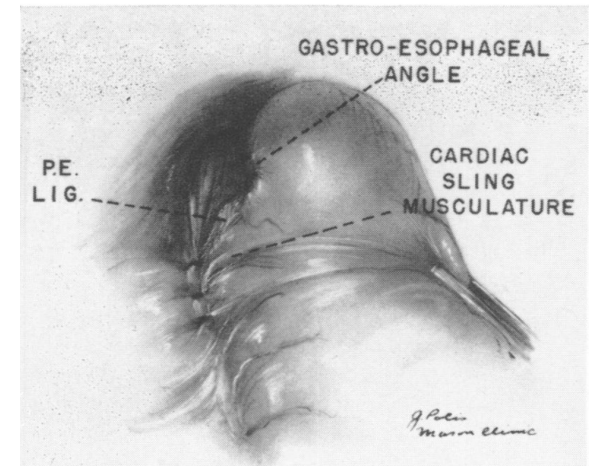


FIG. 4. Figure of 8 sutures including anterior and posterior cut edges of phrenoesophageal ligament placed deep into preaortic fascia with spatula protecting the aorta.

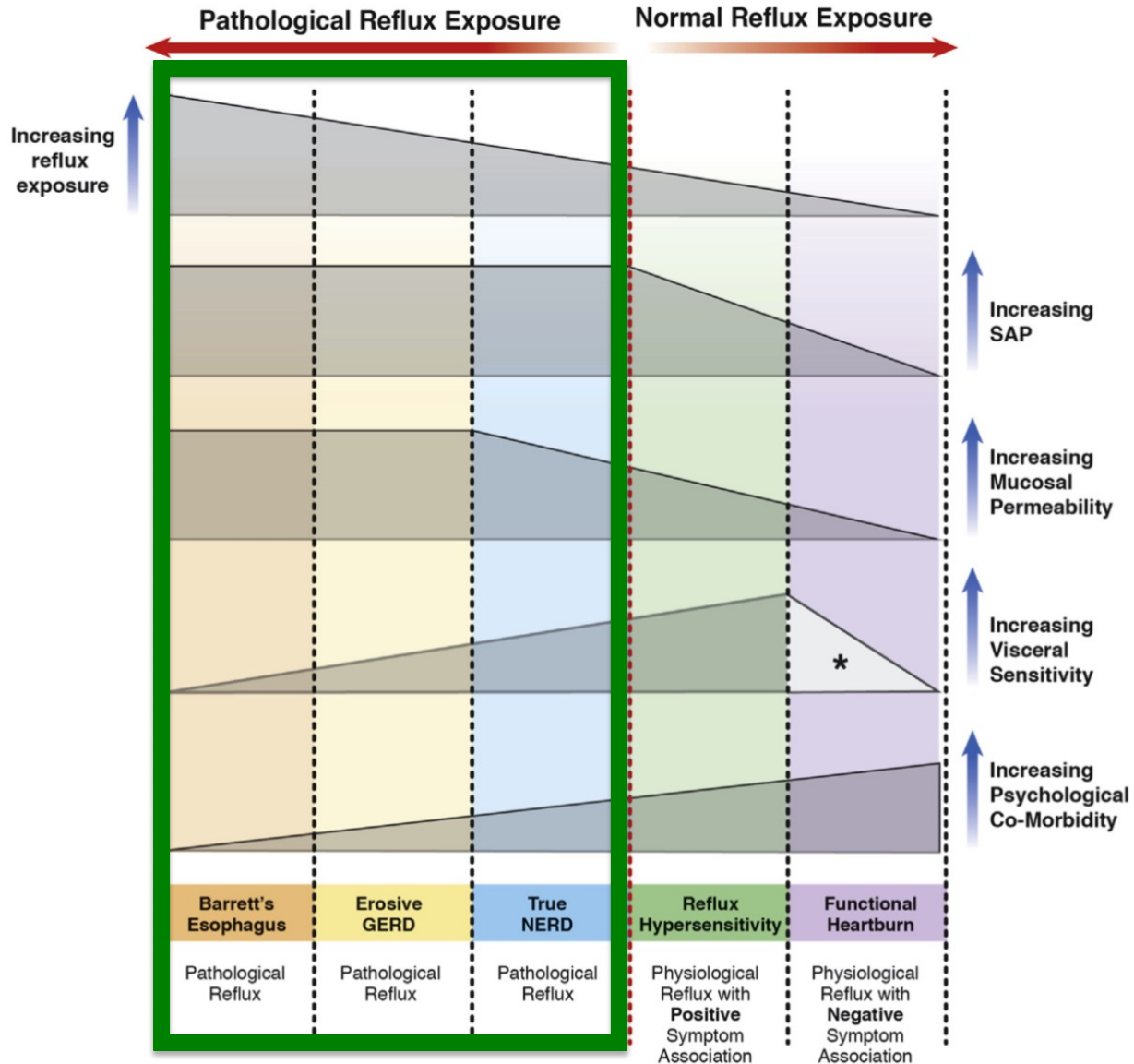


Ligamentum teres Gastropexy

Hill's Gastropexy

GERD

GERD is a complex disease



LSG and GERD

SG is not an antireflux procedure

Figure 1. Comparison of the Change in Reported Gastroesophageal Reflux Disease (GERD) Symptoms in the Laparoscopic Sleeve Gastrectomy (LSG) and Gastric Bypass (GB) Cohorts With Preoperatively Identified GERD

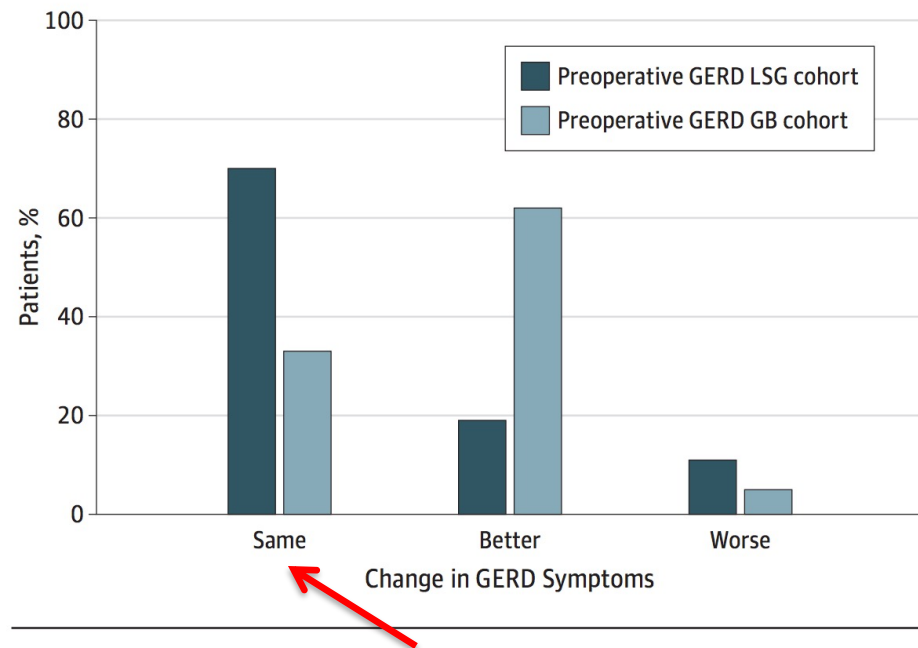
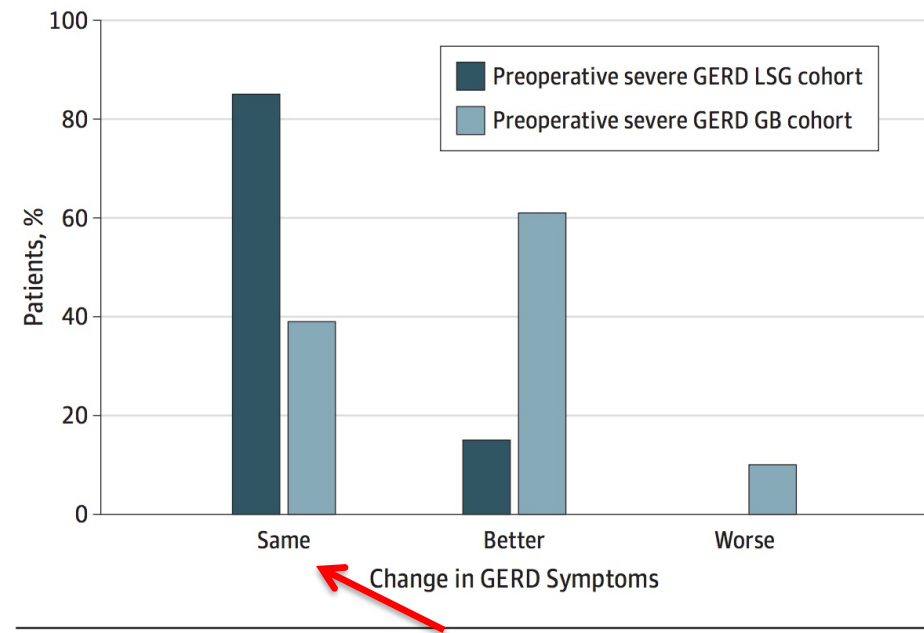


Figure 2. Comparison of the Change in Reported Gastroesophageal Reflux Disease (GERD) Symptoms in the Laparoscopic Sleeve Gastrectomy (LSG) and Gastric Bypass (GB) Cohorts With Preoperatively Identified Severe GERD (GERD Score ≥ 3)



New-onset GERD occurred in 8.6% of the preoperative GERD-negative patients in the LSG cohort.

LSG and GERD

SG is not an antireflux procedure

Remission of GERD RYGP 60.5% vs SG 25%; p<0.002

Gastroesophageal Reflux

Comorbidity present at baseline	44/101 (43.6)	48/104 (46.2)	-0.03 (-0.17 to 0.12)	.71 ^d	
Remission	11 (25)	29 (60.4)	-0.36 (-0.57 to -0.15)	.0006 ^d	.002
Improved	4 (9.1)	3 (6.3)	0.10 (-0.36 to 0.56)	.71 ^e	.94
Unchanged	15 (34.1)	13 (27.1)	0.08 (-0.16 to 0.33)	.47 ^d	.94
Worsened	14 (31.8) ^a	3 (6.3)	0.36 (0.13 to 0.59)	.002 ^e	.006

Conversion of LSG to LRYGP for GERD

Mean follow-up of 8.48 years (range 6.1–10.3)

Table 2 Preoperative gastro-intestinal comorbidities and PPI use

Gastroesophageal hernia ^a		35/97 (36.1%)
Oesophagitis ^b	Absent	44/100 (44%)
	Grade A	44/100 (44%)
	Grade B	6/100 (6%)
	Grade C	0/100 (0%)
	Grade D/Ulcus	3/100 (3%)
	Unknown	3/100 (3%)
Reflux disease ^c		17/84 (20.2%)
PPI use		15/84 (17.6%)

^a Endoscopic diagnosis

^b Los Angeles Classification

^c Symptom reporting

Table 4 Evolution of reflux disease and PPI use

	Preoperative	Postoperative	<i>p</i> value
Reflux disease	17 (17%)	44 (52%)	<0.0001
PPI use	15 (15%)	40 (47%)	<0.0001

Table 5 Indications for secondary RYGB

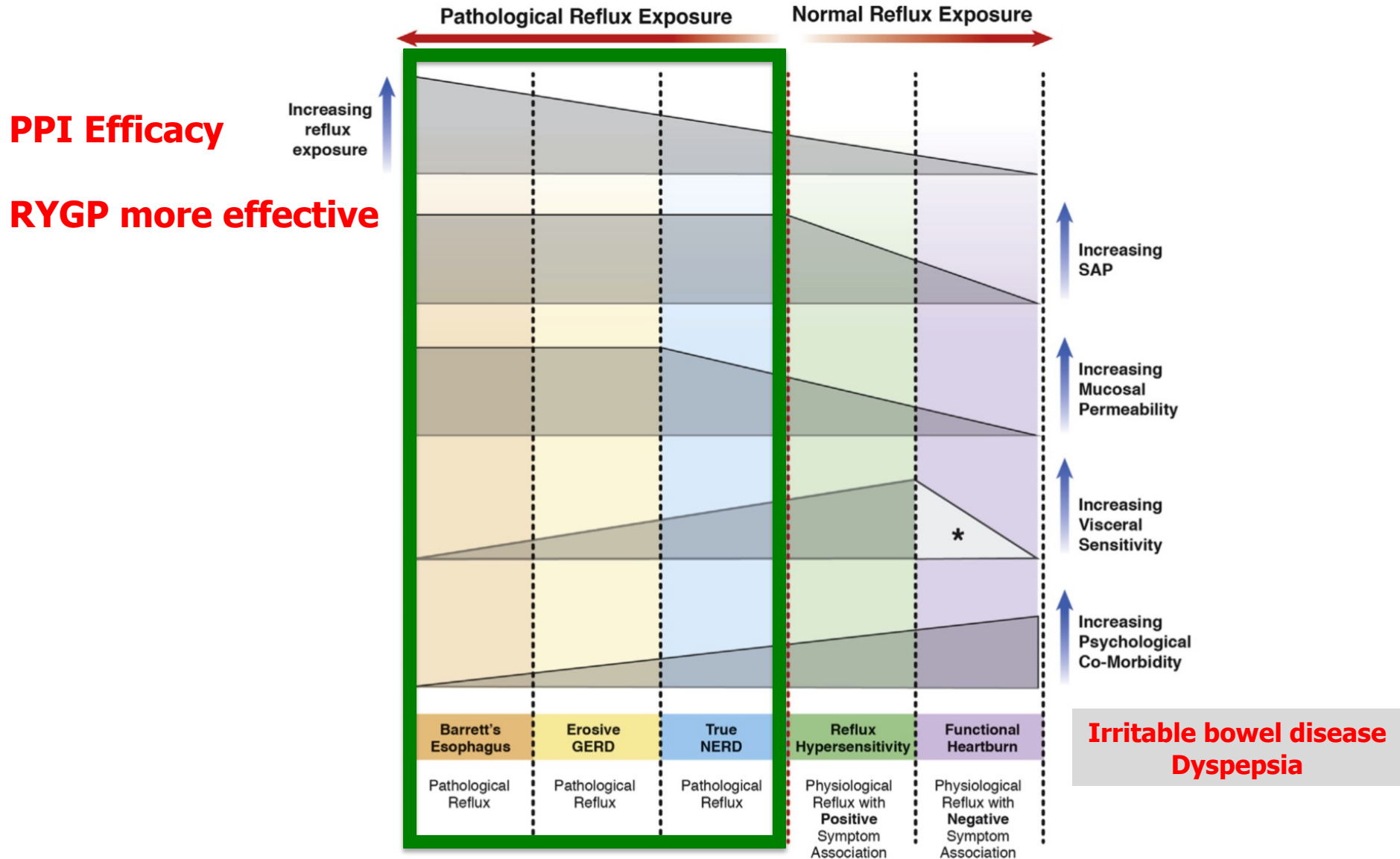
Indication	Number of patients (%)
Total	26 (100%)
Insufficient weight loss	19 (73.1%)
Insufficient weight loss + reflux disease	5 (19.2%)
Reflux disease without insufficient weight loss	2 (7.7%)

7 Pts (7% total and 26% of conversions) converted to LRYGB for GERD

LRYGB effective in 4 out of 7 Pts (57,1%) to relieve completely patients from GERD

GERD

GERD is a complex disease

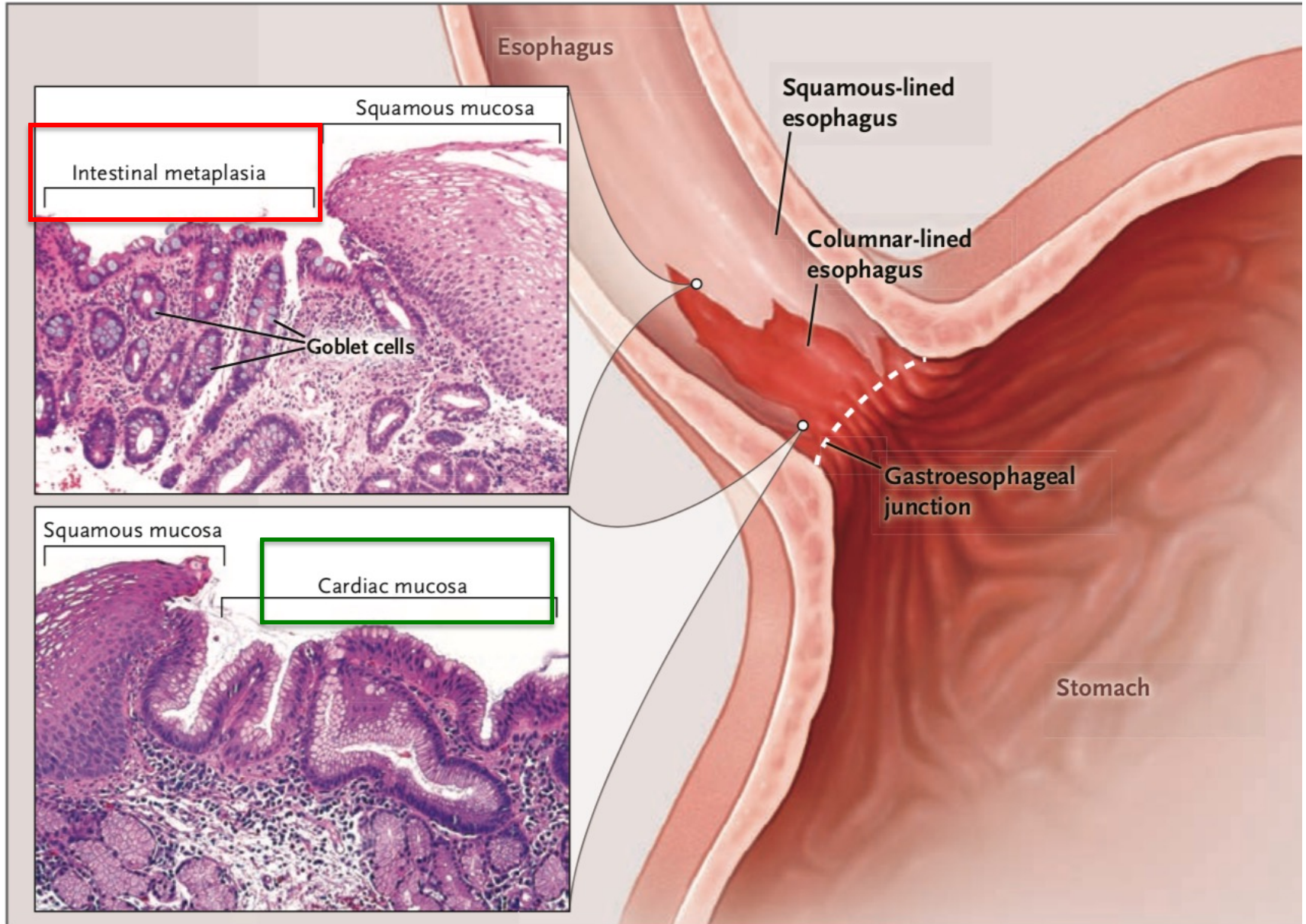


Agenda

Preamble

GERD and SG: mechanisms and symptoms
Barrett's esophagus

Barrett's esophagus: definition



Barrett's esophagus

Prague classification

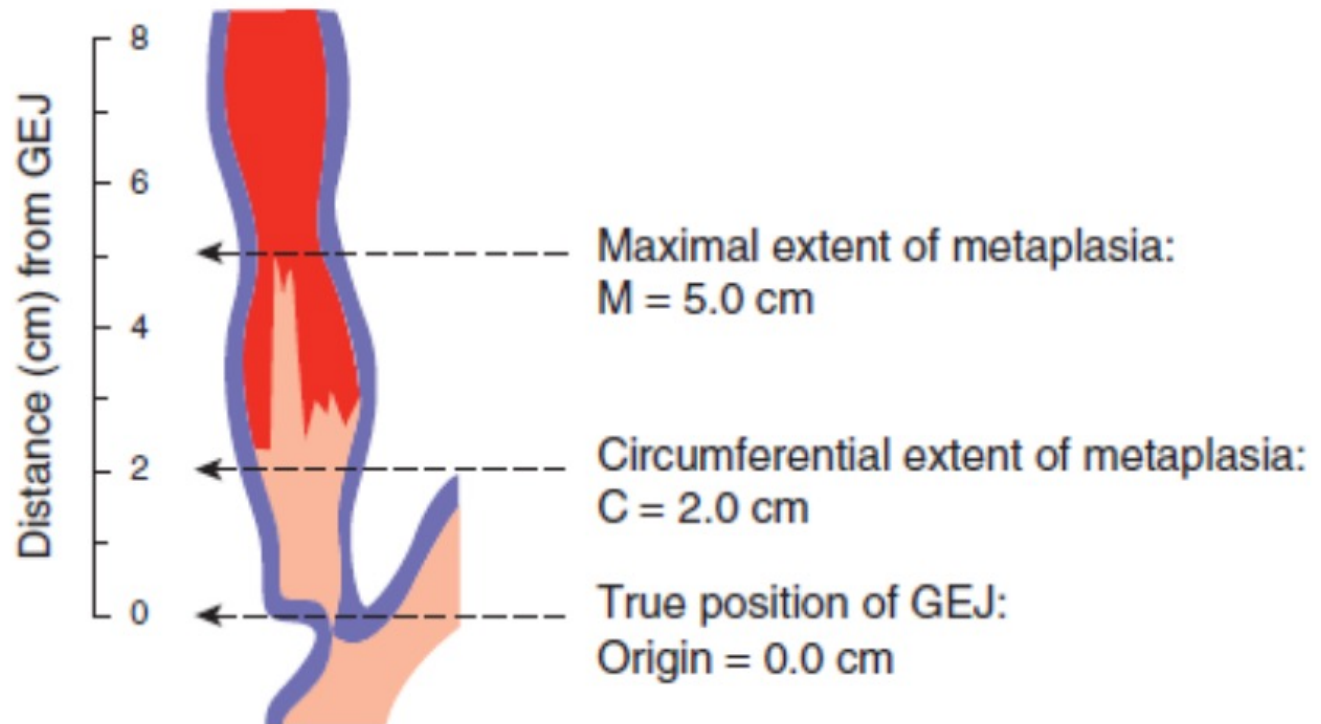


Figure 1. Illustration of Prague Classification for Barrett's esophagus (BE) where C indicates circumferential extent of metaplasia and M indicates maximal extent of metaplasia. Schema shows a C2M5 segment with identification of the gastroesophageal junction (GEJ) below the squamo-columnar junction. Reprinted with permission (24).

Barrett's esophagus

Table 1. Proposed Risk Factors and Protective Factors for Barrett's Esophagus and Esophageal Adenocarcinoma.*

Factor	Risk Factor for Barrett's Esophagus	Risk Factor for Esophageal Adenocarcinoma
Older age	Yes	Yes
White race	Yes	Yes
Male sex	Yes	Yes
Chronic heartburn	Yes	Yes
Age <30 yr at onset of GERD symptoms	Yes	—
Hiatal hernia	Yes	Yes
Erosive esophagitis	Yes	Yes
Obesity with intraabdominal fat distribution	Yes	Yes
Metabolic syndrome	Yes	Yes
Tobacco use	Yes	Yes
Family history of GERD, Barrett's esophagus, or esophageal adenocarcinoma	Yes	Yes
Obstructive sleep apnea	Yes	—
Low birth weight for gestational age	Yes	No
Preterm birth	No	Yes
Consumption of red meat and processed meat	Yes	Yes
Human papillomavirus infection	No	Yes
	Protective Factor for Barrett's Esophagus	Protective Factor for Esophageal Adenocarcinoma
Use of nonsteroidal antiinflammatory drugs	Yes	Yes
Use of statins	Yes	Yes
<i>Helicobacter pylori</i> infection	Yes	Yes
Diet high in fruits and vegetables	Yes	Yes
Exposure to ambient ultraviolet radiation	—	Yes
Breast-feeding for parous women	—	Yes
Tall height	Yes	Yes

Agenda

Preamble

GERD and SG: mechanisms and symptoms
Barrett's esophagus

The REFSLEEVE Study

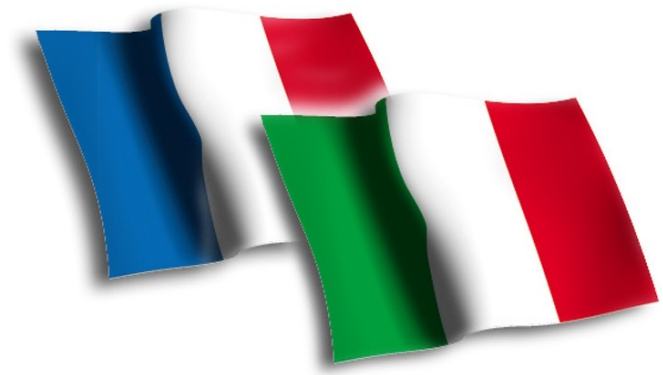


Systematic Endoscopy 5 Years After Sleeve Gastrectomy Results in a High Rate of Barrett's Esophagus: Results of a Multicenter Study

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Published online: 21 January 2019

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SG and BE

110 patients	Pre-operative	Follow-up	p
GERD symptoms	33.6% (37 Pts)	68.1 % (75 Pts)	<.0001
VAS Score	1.8	3	.018
Daily PPI intake	19.1% (21 Pts)	57.2% (63 Pts)	<.0001
Class A esophagitis	12.7% (14 Pts)	46.3% (51 Pts)	<.0001
Class B esophagitis	8.1% (9 Pts)	32.7% (36 Pts)	<.0001
Class C esophagitis	3.6% (4 Pts)	11.8% (13 Pts)	.04
Class D esophagitis	0	9.1% (10 Pts)	.0016
Barrett's Esophagus	0	17.2% (19 Pts)	<.0001

(GERD: Gastro-esophageal reflux disease; VAS: Visual Analog Scale; PPI: Proton pump inhibitors)

SG and BE

Table 1 Endoscopic and histologic upper-GI findings at 10 years after SG

Gastroscopy macroscopic	Non-converted (n = 20)	Symptomatic reflux (n = 10)	Non-symptomatic reflux (n = 10)	p value
Fundus residual (%)	20	10	30	0.29
Hiatal hernia (%)	45	70	20	0.02
Bile in the stomach (%)	25	20	30	0.63
Enlarged sleeve (%) ^a	60	70	50	0.39
Gastritis and ulcers (%)	45	50	40	0.67
Esophagitis (%)	30	50	10	0.05
CLE (GE junction) (%)	50	70	30	0.08
Mean size (mm) ^b	3.5 (R 2–5)	4.0 (R 3–5)	2.3 (R 2–3)	0.01
Chronic gastritis (%)	80	90	70	0.29
Active gastritis (%)	45	40	50	0.67
Dysplasia (%)	0	0	0	N/A
Barrett's esophagus (%)	15	10	20	0.56
Acanthosis/parakeratosis (%)	20	30	10	0.29
Hyperregenerative esophagopathy (%)	60	70	50	0.39
<i>Helicobacter pylori</i> (%)	15	10	20	0.56

SG sleeve gastrectomy, CLE columnar lined esophagus, GE gastroesophageal

^a Enlarged sleeve was defined as inversion with a gastroscope equaling a 5-cm diameter

^b n = 10

SG and BE

Table 1 Patients' characteristics before the SG and at the time of follow-up

Patients' characteristics	Before SG	Follow-up	<i>p</i>
Patients (<i>N</i>)	90	90	–
Sex ratio male/female (%)	24/66 (73)	–	–
Age, SD	41 ± 11	48 ± 11	–
Time of follow-up (months), SD	–	78 ± 15	–
Body weight (kg), SD	127 ± 24	94 ± 22	< 0.0001
BMI (kg/m ²), SD	46 ± 8	34 ± 8	< 0.0001
TBWL %, SD	–	25 ± 12	–
EBWL %, SD	–	58 ± 27	–
Barrett's <i>N</i> (%)	0	17 (18.8)	–
GERD <i>N</i> (%)	20 (22)	68 (76)	< 0.0001
Patients on PPI <i>N</i> (%)	20 (22)	46 (52)	< 0.0001
Esophagitis <i>N</i> (%)	9 (10)	37 (41)	< 0.0001

P value was calculated for quantitative or qualitative variables with Student's and χ^2 test, respectively (*p* < 0.05)

SG sleeve gastrectomy, *N* number of patients, *SD* standard deviation, *BMI* body mass index, *TBWL* total body weight loss, *EBWL* excess body weight loss (calculated with a 25 kg/m² as ideal BMI), *GERD* gastroesophageal reflux, *PPI* proton pump inhibitor

SG and BE

Table 5 Logistic regression analyses to identify factors associated to Barrett's esophagus 5 years after SG. OR odds ratio, CI 95% confidence limits 95%

Patients' characteristics	Adjusted OR	CI 95%	<i>p</i>
Weight loss failure*	6.7	1.7–25.7	< 0.01
Age 30 to 39 (ref. 18–29)	1.2	0.2–8.7	0.83
Age 40 to 49 (ref. 18–29)	1.6	0.2–11.8	0.76
Age > 50 (ref. 18–29)	1.8	0.2–13.1	0.61
Women (ref. men)	1.1	0.3–4.8	0.88
GERD symptoms at baseline	0.5	0.1–2.6	0.39
Esophagitis	1.7	0.5–6.2	0.39
PPI intake	0.4	0.1–1.7	0.23

SG sleeve gastrectomy, *N* number of patients, GERD gastroesophageal reflux, PPI proton pump inhibitor, ref reference

*Weight loss failure defined by excess body weight loss < 50%

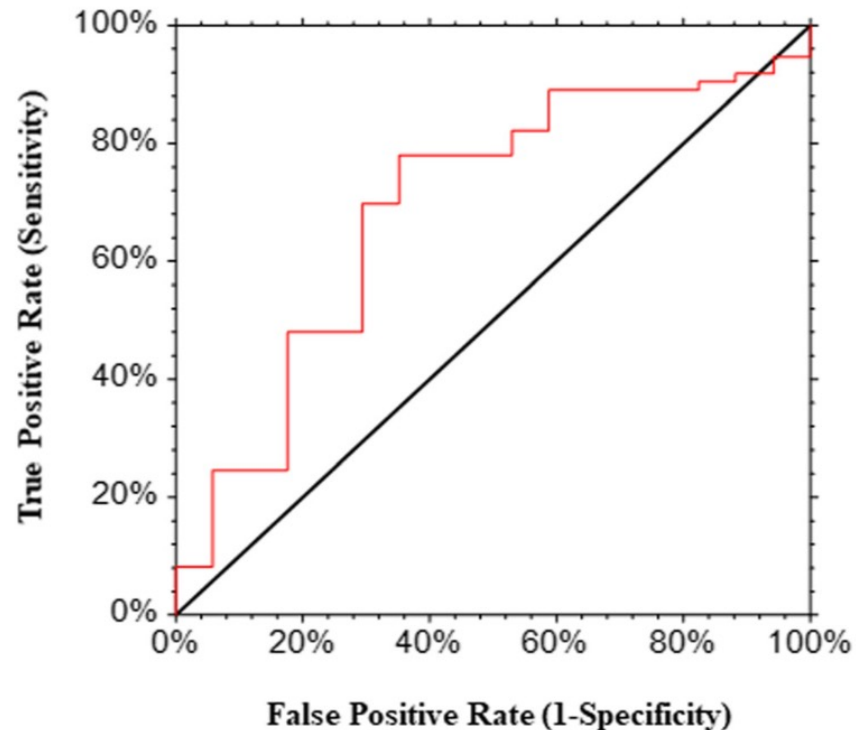


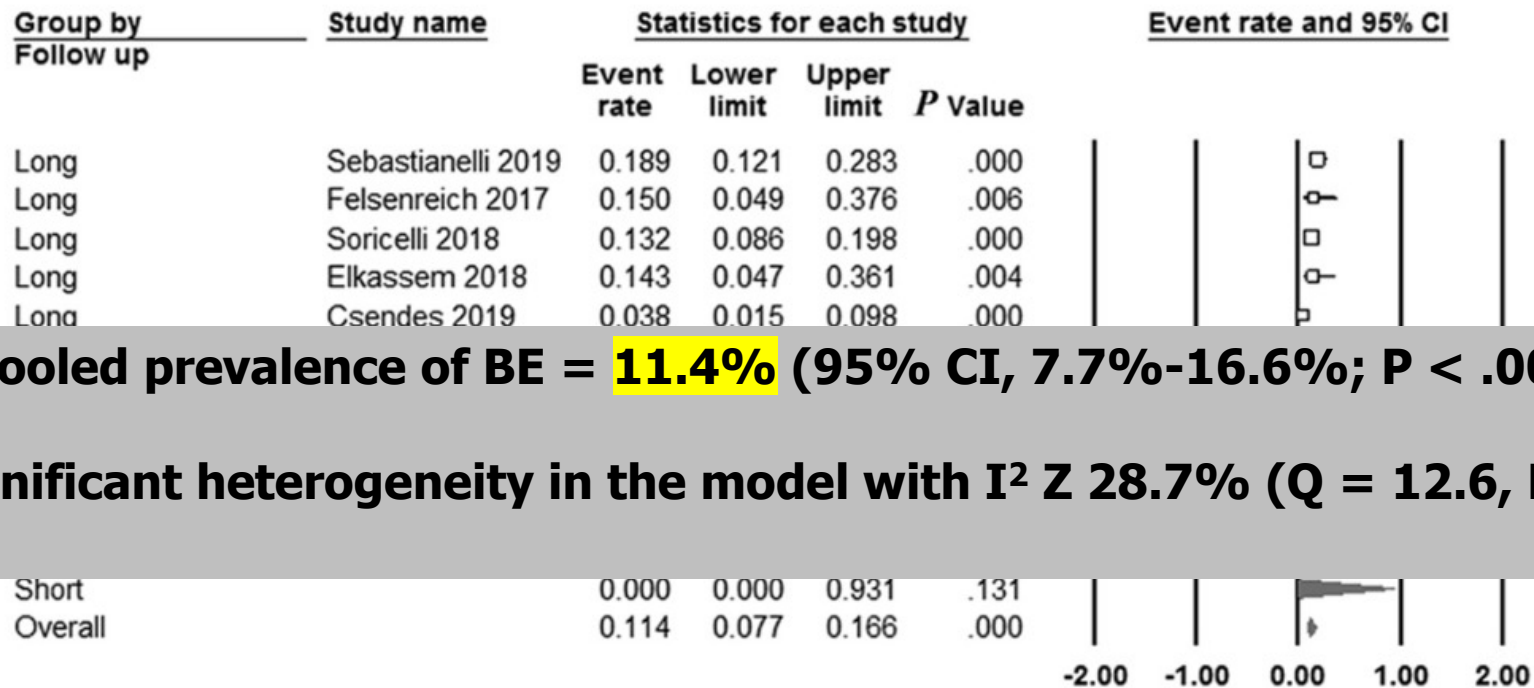
Fig. 2 Receiver operating characteristic (ROC) curves for the diagnosis of Barrett's esophagus. The excess weight loss (EWL) cutoff with the highest sensitivity and specificity for the detection of Barrett's esophagus (BE) was 48.1%. At this threshold, sensitivity, specificity, likelihood ratio positive, likelihood ratio negative, and index of Youden were 0.78, 0.65, 2.21, 0.34, and 0.43, respectively

SG and BE

Study	Time to EGD or follow-up time	No. of patients	No. with BE	BE with GERD	BE without GERD	Type of BE	Preop EE	Postop EE	Definition of GERD
Sebastianelli et al, 2019 ¹⁵	78 ± 15 months	90	17	16 of 68	1 of 22	NDBE	9	37	Montreal Consensus
Felsenreich et al, 2017 ¹⁷	10 years	20	3	1 of 10	2 of 10	NDBE	NA	6	Reflux Symptoms Index
Soricelli et al, 2018 ¹⁹	66 (41-89) months	144	19	15 of 101	4 of 43	NDBE	NA	86	Visual Analog Scale
Elkassam, 2018 ²²	At least 3 year	21	3	NA	NA	NA	10	16	NC
Tai and Huang, 2013 ²⁷	12 (12-21) months	66	0	–	–	–	11	44	Reflux Disease Questionnaire
Sharma et al, 2014 ²⁰	6 months	32	0	–	–	–	6	8	Scintigraphy, Severity Symptoms, and Carlson Dent
Viscido et al, 2018 ²¹	18 months	109	0	–	–	–	22	37	Montreal Consensus
Csendes et al, 2019 ²³	95 ± 15 months	104	4	–	–	–	14	33	Burning symptoms
Dimbezel et al, 2020 ²⁴	62.4 months	40	4	–	–	–	1	18	No clearly defined preop
Lallemand et al, 2019 ²⁵	5 years	54	4	–	–	–	–	–	Unclear

SG and BE

Prevalence of BE in studies with follow-up esophagogastroduodenoscopy



Pooled prevalence of BE = 11.4% (95% CI, 7.7%-16.6%; P < .001)

No significant heterogeneity in the model with I² = 28.7% (Q = 12.6, P = .18)

A

Meta Analysis

Agenda

Preamble

GERD and SG: mechanisms and symptoms
Barrett's esophagus

The REFSLEEVE Study

Barrett's and HGD (after SG)

ADK and HGD in Barrett's esophagus

Table 3. Incidence of High-Grade Dysplasia or Esophageal Adenocarcinoma in Patients with Barrett's Esophagus.*

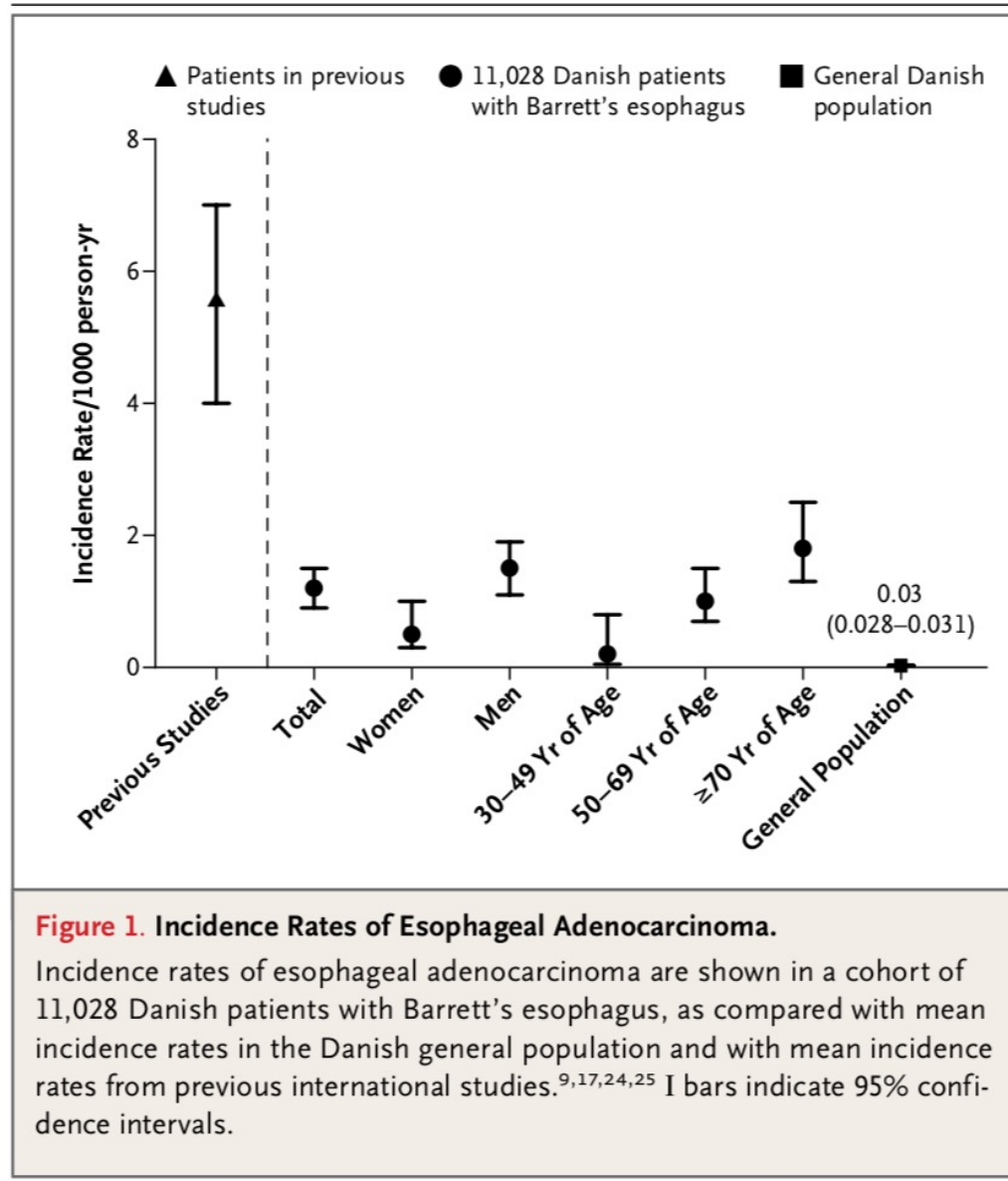
0.26%/yr ADK + HGD

Variable	No. of Cases of High-Grade Dysplasia or Adenocarcinoma in Study Cohort	Person-Yr of Risk	No. of Expected Cases	Incidence Rate/1000 Person-Yr (95% CI)		Standardized Incidence Ratio (95% CI)†
				Study Cohort	General Population	
Total cases	148	56,151	7.0	2.6 (2.2–3.1)	0.035 (0.034–0.036)	21.1 (17.8–24.7)
Sex						
Female	29	18,891	0.9	1.5 (1.1–2.2)	0.015 (0.014–0.016)	33.9 (22.7–48.7)
Male	119	37,260	6.2	3.2 (2.7–3.8)	0.056 (0.054–0.058)	19.3 (16.0–23.1)
Age						
30–49 yr	7	9,696	0.1	0.7 (0.3–1.5)	0.0031 (0.0027–0.0036)	71.6 (28.7–147.6)
50–69 yr	76	26,561	2.6	2.9 (2.3–3.6)	0.065 (0.062–0.069)	28.7 (22.6–36.0)
≥70 yr	65	19,894	4.3	3.3 (2.6–4.2)	0.16 (0.15–0.17)	15.2 (11.7–19.3)
Low-grade dysplasia						
Present on index endoscopy	32	2,525	0.4	12.7 (9.0–17.9)	NA	75.9 (51.9–107.2)
Absent on index endoscopy	116	53,625	6.6	2.2 (1.8–2.6)	NA	17.6 (14.5–21.1)
Occurring at any time during follow-up	55	3,760	0.6	14.6 (11.2–19.1)	NA	89.0 (67.0–115.8)

* Events during the first year after the endoscopy were excluded from the calculations. Included are all the cases diagnosed during the period after the first year through year 17 of follow-up (i.e., from 1993 through 2009). NA denotes not available.

† The standardized incidence ratio was calculated as the observed number of events in the cohort with Barrett's esophagus divided by the expected number of events in the general population.

ADK and HGD in Barrett's esophagus



ADK and HGD in Barrett's esophagus

Low grade dysplasia at diagnosis as a negative prognostic factor

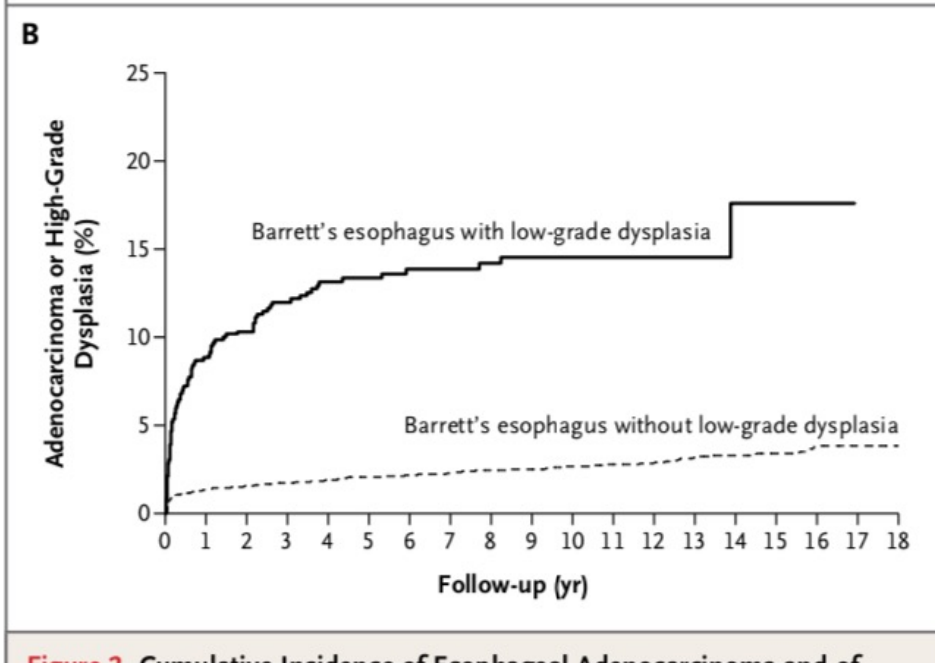
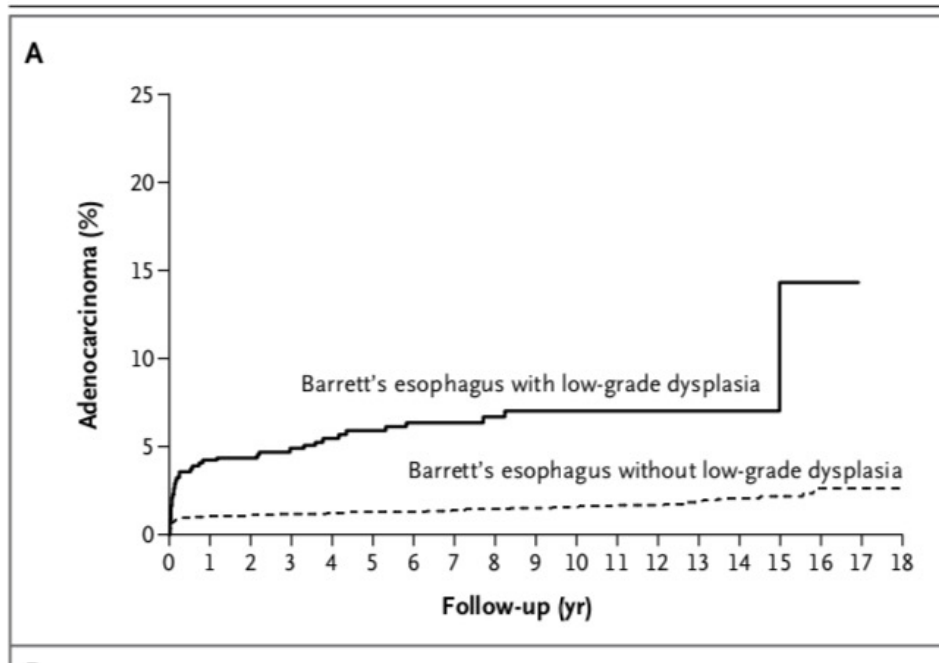


Figure 2. Cumulative Incidence of Esophageal Adenocarcinoma and of Esophageal Adenocarcinoma or High-Grade Dysplasia.

Shown is the cumulative incidence of esophageal adenocarcinoma (Panel A) and of esophageal adenocarcinoma or high-grade dysplasia (Panel B) among patients with Barrett's esophagus, according to the presence or absence of low-grade dysplasia on baseline endoscopy. Kaplan–Meier plots include data from the first year after the index endoscopy.

ADK in patients with SG

Table 4 Histology of each recorded lesion and the original bariatric procedure performed

Features	VBG	Open VBG	LSG	LAGB	Open AGB	LRYGBP	Open RYGBP	MGB/OAGB	BPD
Tumor histology									
Adenocarcinoma of stomach	2		3	1		3		1	
Adenocarcinoma of esophagus	1	2	1	12	3	6	2		1
GIST			1			1			
Tumor location									
Esophagus		2		1	3		2		
Mid-esophagus						1			
Lower third esophagus				10		5			1
Siewert II	1		2	1					
Gastric pouch						1			
Body and antrum of stomach			1						
Antrum of stomach	2		1	1					
Excluded stomach						3		1	
Total	3	2	5	13	3	10	2	1	1

VBG vertical banded gastroplasty, LSG laparoscopic sleeve gastrectomy, LAGB laparoscopic adjustable gastric banding, AGB adjustable gastric banding, LRYGBP laparoscopic Roux-en-Y gastric bypass, MGB/OAGB mini-/one-anastomosis gastric bypass, BPD bilio-pancreatic diversion

The magnitude of the problem

TABLE 2. Postoperative Procedures, Diagnoses, Prescriptions, Re-Hospitalizations, and GERD

Summary of Cohort
91 to 1825 Days, Post-Op
n = 16,724

<i>N</i>	RYGB		VSG		<i>Ps</i>
	8362	50.0%	8362	50.0%	
<i>Procedures</i>					
Esophagogastroduodenoscopy	2442	29.2%	1798	21.5%	<0.001
Esophagoscopy	31	0.4%	31	0.4%	~1.0
pH monitoring study	32	0.4%	59	0.7%	0.006
Manometry	73	0.9%	102	1.2%	0.03
<i>Diagnoses</i>					
Peptic or esophageal ulcer	1990	23.8%	1601	19.1%	<0.001
Gastrojejunal ulcer	525	6.3%	37	0.4%	<0.001
Esophageal cancer	33	0.4%	40	0.5%	0.48
<i>New acid-treating prescription(s)</i>	677	8.1%	511	6.1%	< 0.001
<i>Re-hospitalization</i>	3254	38.9%	2415	28.9%	<0.001
<i>Re-hospitalization; count</i>					
Mean	0.8		0.6		<0.001
SD	1.9		1.5		
Median	0		0		
<i>Re-hospitalization; average length of stay</i>					
Mean	1.5		1.3		<0.001
SD	3.6		6.9		
Median	0		0		
<i>GERD</i>					
<i>GERD</i>	4650	55.6%	5038	60.2%	<0.001
<i>New acid-treating prescription(s)</i>	519	6.2%	397	4.7%	<0.001
Barrett esophagus	93	1.1%	60	0.7%	0.007
Reflux esophagitis	542	6.5%	525	6.3%	0.59
Esophageal reflux	4015	48.0%	4453	53.3%	<0.001
<i>De novo GERD</i>					
<i>Patients with no preoperative GERD</i>	1906	22.8%	1665	19.9%	<0.001
<i>New acid-treating prescription(s)</i>	113	5.9%*	76	4.6%*	0.07
Barrett esophagus	<11	<0.6%*	<11	<0.7%*	~1.0
Reflux esophagitis	67	3.5%*	57	3.4%*	0.88
Esophageal reflux	672	35.3%*	655	39.3%*	0.01

SD indicates standard deviation.

*Condition is a subset of the first row in the section only.

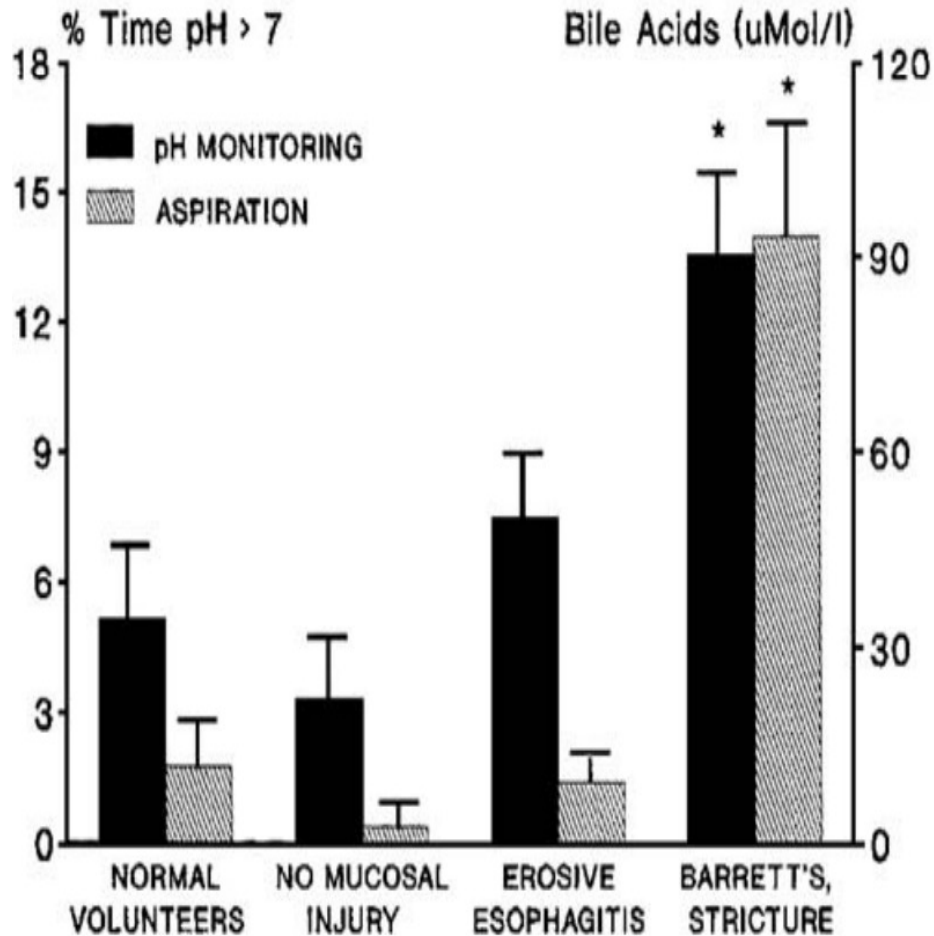
The magnitude of the problem

(year)	SG (N of Pts = 257890)		RYGB (N of Pts = 122761)	
	N of EC	C Inc (%)	N of EC	C Inc (%)
2011	9	0.003	5	0.004
2012	5	0.001	4	0.001
2013	11	0.001	3	0.001
2014	9	0.001	4	0.001
2015	10	0.001	4	0.001
2016	10	0.001	4	0.001
2017	10	0.001	4	0.001
2018	10	0.001	4	0.001
2019	1	0.002	0	0.002
2020	3	0.002	1	0.002

**Esophageal cancer incidence in France
(source PMSI 2011-20)
0.02% SG and RYGP**

SG (Sleeve gastrectomy); RYGB (Roux-en-Y gastric bypass); EC (Esophageal Cancer); N (Number); Pts (Patients undergoing bariatric surgery). C Inc (Cumulative incidence).

Bile reflux effect on esophageal mucosa



Using prolonged *Ambulatory aspiration in the distal esophagus*, it can be shown that patients who have **GERD** and **Barrett's esophagus** have greater and more concentrated bile acid exposure to the esophageal mucosa than normal subjects

Bile reflux effect on esophageal mucosa

BARRETT'S ESOPHAGUS

1052-3359/02 \$15.00 + .00

ROLE OF ACID AND BILE IN THE GENESIS OF BARRETT'S ESOPHAGUS

Werner K.H. Kauer, MD, and Hubert J. Stein, MD

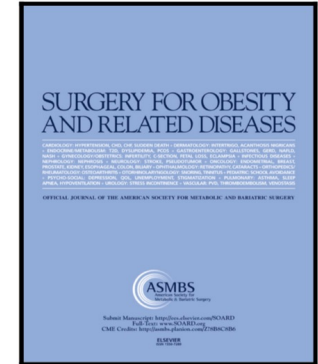
There is a critical **pH range (3-6)** in which **bile acids** exist in their soluble, **un-ionized form**; can **penetrate cell membranes and accumulate within mucosal cells**. At a lower pH, bile acids are precipitated, and at a higher pH, bile acids exist in their non-injurious ionized form.

Thus, **incomplete gastric acid suppression**, as is the case with most medical treatment regimens for gastroesophageal reflux, **may in fact predispose to the development of Barrett's esophagus**.

Non acid GERD and omega loop bypass

Acid and non-acid gastro-esophageal reflux following single anastomosis gastric bypass. An objective assessment using 24H multichannel intraluminal impedance- phmetry

Doulami Georgia, Triantafyllou Stamatina, Albanopoulos Konstantinos, Natoudi Maria, Zografos Georgios, Theodorou Dimitrios



Doing a omega bypass after a SG is a non-sense

CONCLUSION: The use of symptom questionnaires in order to assess postoperative GERD following SaGB may not accurately depict the real image. 24h MIIpH in 12 months following SaGB revealed an increase of total number of non-acid reflux episodes and a decrease of total number of acid reflux episodes, with longer duration of each acid reflux episode. Close postoperative follow up with reflux testing and possibly endoscopy could eliminate the risk of complicated GERD.

Agenda

Preamble

GERD

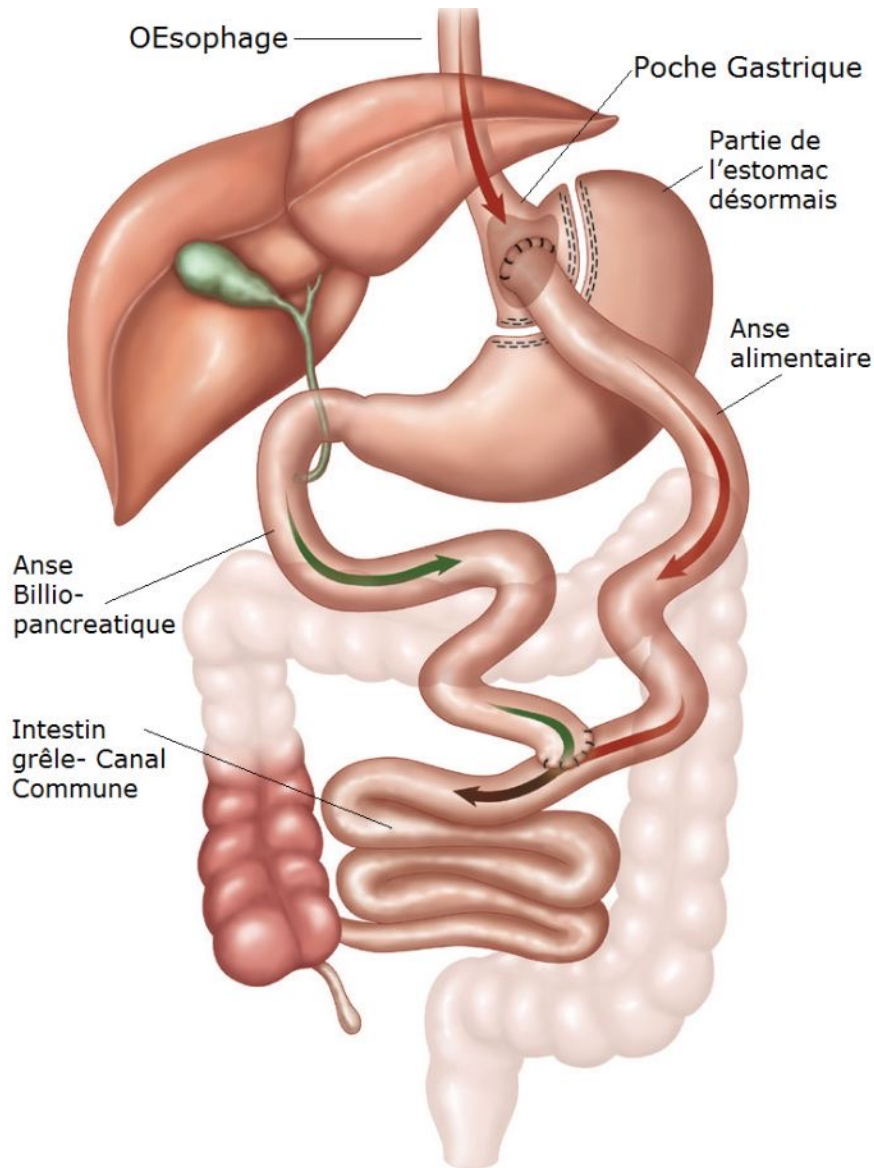
Barrett's esophagus

The REFSLEEVE Study

Barrett's and HGD + ADK (after SG)

What to do in case of Barrett's after SG?

EBO complicating SG



No dysplasia:

-PPI Surveillance (2, 3, **5 yrs**)
2 yrs >6cm; 3 yrs 3-6cm; 5yrs <3cm

-RYGP (symptoms, WL Failure)

If low grade dysplasia?

-PPI X 2

-Surveillance (6 months X2 then yearly)

-Mucosectomy, Rx F?

-RYGP (symptoms, WL failure)?

If high grade dysplasia?

-Mucosectomy and/or Rx F

-Surveillance, PPI?

-RYGP?

Barrett's Esophagus and the RYGP

Table 1. Endoscopic and histologic findings at the distal esophagus before and after gastric bypass for morbid obesity in patients with Barrett's esophagus or intestinal metaplasia of the cardia

Sex	Age	BMI before surgery	BMI after surgery (24 mo)	Length BE (mm)	Endoscopy		Histological findings			H pylori at columnar mucosa		Time for regression (mo)	
					Before surgery	After surgery	Before surgery	I Control (mo)*	II Control (mo)*	III Control (mo)*	Before surgery		After surgery
Barrett's esophagus													
Woman	46	37	29	20	Esophagitis	Normal	IM	Carditis (14)	Carditis (28)		(-)	(-)	14
Man	33	61	42	20	Esophagitis	Normal	IM	IM (26)			(+)	(-)	No
Woman	52	35	22	20	Normal	Normal	IM + LGD	IM + LGD (24)	IM (36)	Carditis (48)	(-)	(-)	48
<p>No report in the literature on the efficacy of the RYGB on post SG Barrett's esophagus</p>													
Woman	56	36	31	40	Peptic ulcer	Normal	IM	Funditis (24) + Carditis	Funditis (36) + Carditis		(-)	(+)	24
Woman	44	40	29	60	Esophagitis	Normal	IM	IM (18)	IM (28)		(-)	(-)	No
Man	39	45	32	80	Esophagitis	Normal	IM	IM (33)	IM (72)		(-)	(-)	No
Woman	62	44	29	120	2 Peptic ulcer	Normal	IM	IM (12)	IM (24)		(-)	(-)	No
		Mean 43.2	29.4										
Intestinal metaplasia of the cardia													
Woman	43	36	22	—	Normal	Normal	IM	Carditis (14)	Carditis (28)		(-)	(-)	14
Woman	56	39	25	—	Normal	Normal	IM	IM (12)	IM (24)		(-)	(+)	No
Woman	47	38	23	—	Normal	Normal	IM	Carditis (14)	Carditis (34)		(+)	(-)	14
		Mean 37.7	23.3										

BMI = body mass index (Kg/M2); BE = Barrett's esophagus; IM = intestinal metaplasia; LGD = low-grade dysplasia.

*Endoscopy performed after surgery (mo).

Conversion of LSG to LRYGP for GERD

Table 1 Review of studies showing resolution of GERD after conversion surgery

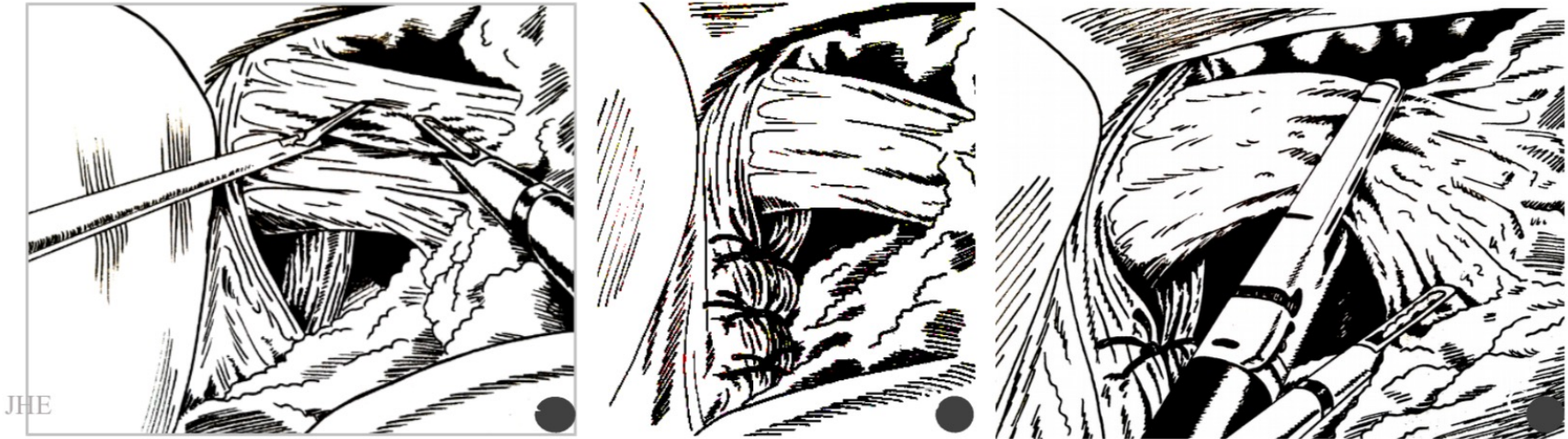
Study	N	Time (primary to conversion surgery)	Complete resolution of GERD symptoms	Partial resolution of GERD symptoms (needing PPI)
Abdemur et al.	9	NA	7	2
Gautier et al.	6	28.1 months (mean)	6	0
Langer et al.	3	39.3 months (mean)	3	0
Van Rutte et al.	5	NA	3	2
Hendricks	4	30 months (mean)	3	1
Parmar et al.	10	16 months (mean)	8	2
Iannelli et al.	11	18.6 months (mean)	11	0
Amiki et al.	9	2 months- 8 years 9 months	6	3
Yorke et al.	12	41.8 months (mean)	9	0

the liver. The Endo-GIA stapler (Medtronic, Minneapolis, MN) with a 60-mm white reload is used to divide the lesser omentum distal to first 2 branches of the left gastric artery. A small gastric pouch was created using Endo-GIA 60-mm purple or black cartridges to transect the existing gastric sleeve approximately 6–8 cm below the gastro-esophageal junction.



Length and shape of the pouch

Conversion of SG to LRYGBP (Bell rod pouch)



Technique chirurgicale de Roux-en-Y gastric bypass secondaire

- A) Libération de l'œsophage abdominal
- B) Cure de hernie hiatale postérieure
- C) Création de la poche gastrique par agrafage en amont de la cicatrice fibreuse

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Barrett's esophagus

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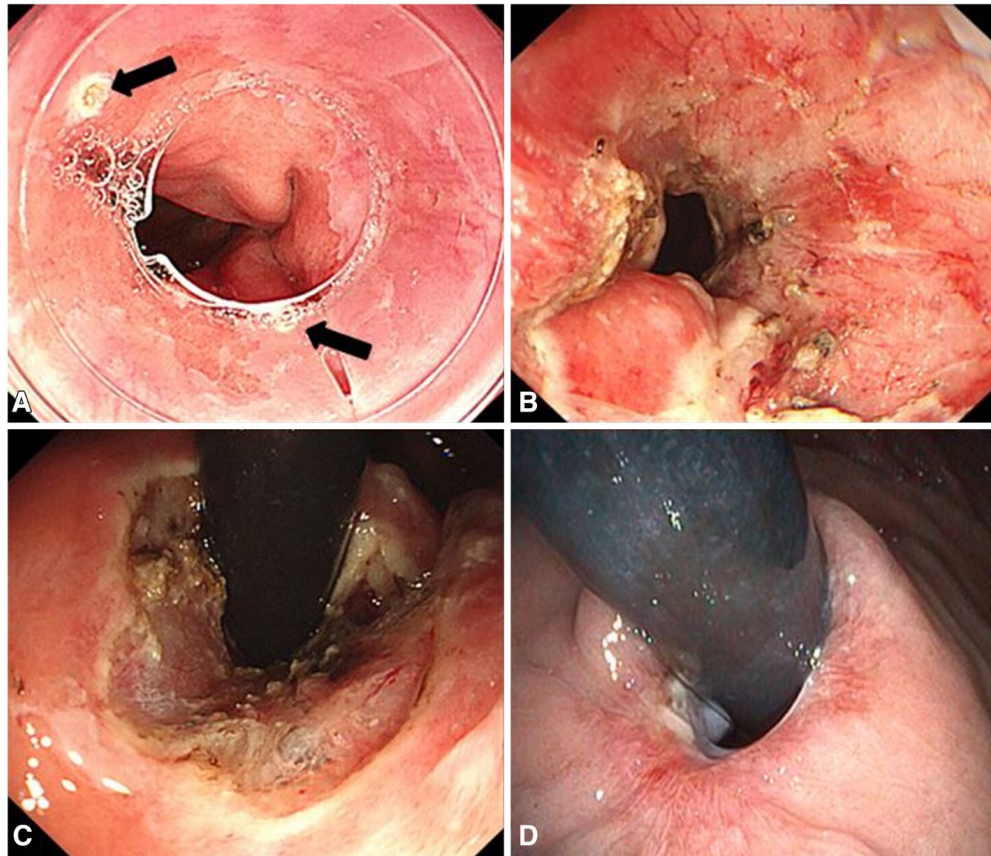
What to do in case of Barrett's after SG?

Futures directions

Futur directions

Anti-reflux mucosectomy

Mucosectomy of $\frac{3}{4}$ of the circumference at the GEJ in order to reduce the diameter due to scarring retraction

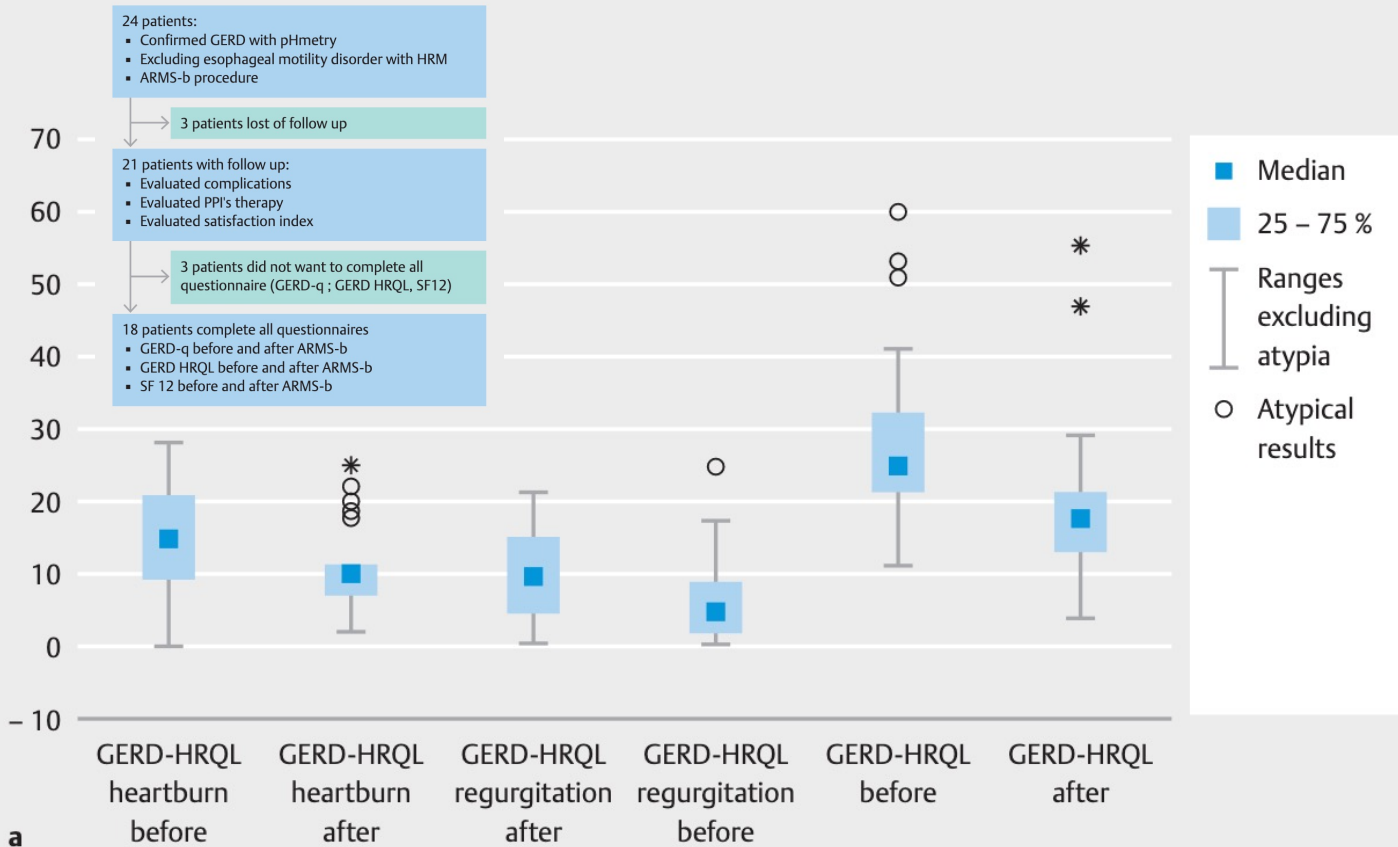


Futur directions

Anti-reflux mucosectomy

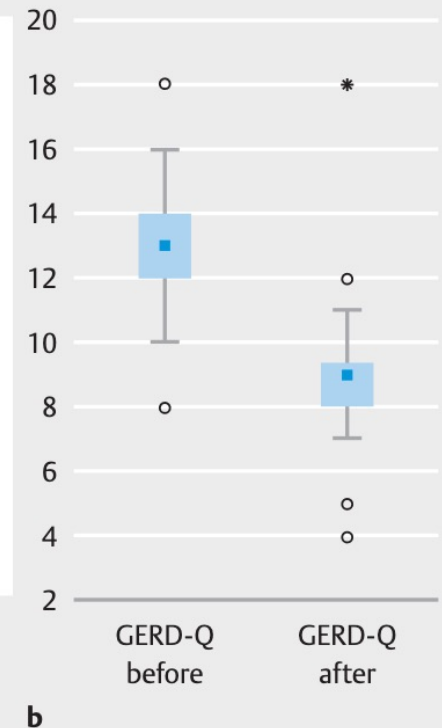
Mustache box diagram of GERD-HRQL

Median; Box: results between 25 – 75 %; mustache: ranges of results excluding atypia



Mustache box diagram of GERD-Q score

Median; Box: results between 25 – 75 %; mustache: ranges of results excluding atypia



Futur directions

Magnetic sphincter augmentation

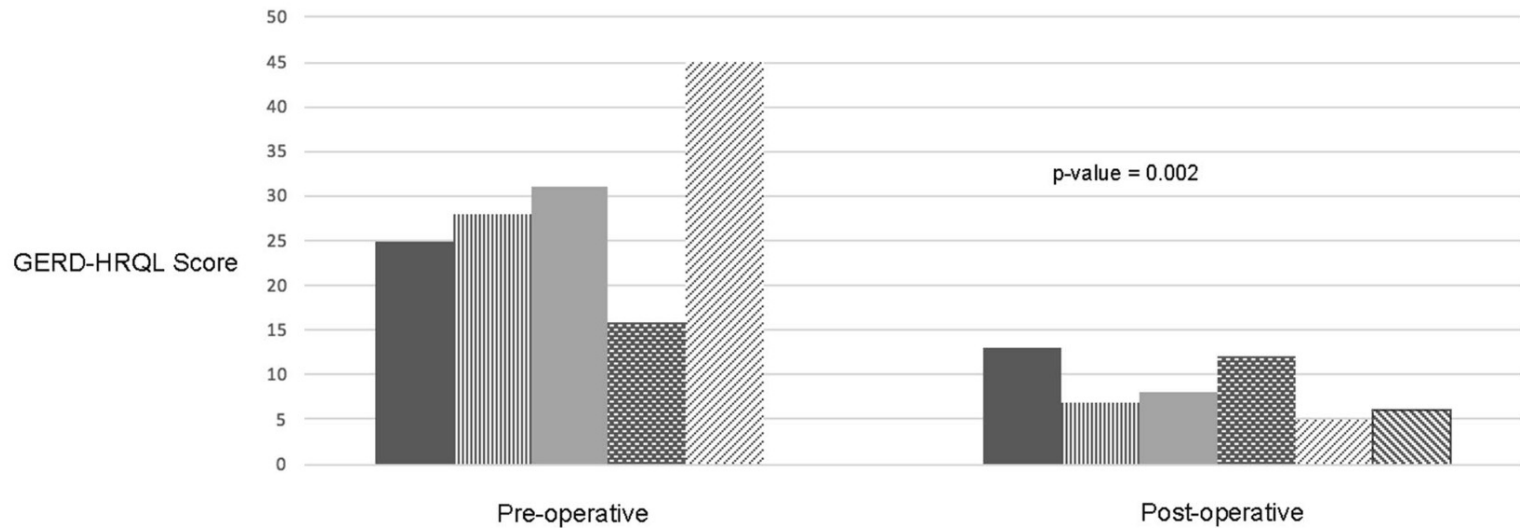


Fig. 1 Denotes the trend in reduction of GERD-HRQL scores from the pre-operative phase, to post-operative follow-up, each bar representing one individual patient

Conclusions

GERD is a common condition in the morbidly obese and should be seen as a complex and heterogeneous disease.

SG is associated with a high prevalence of GERD.

SG may result in a high rate of Barrett's esophagus at 5 years (intestinal metaplasia – short segment) and systematic endoscopy at 5 years seems appropriate.

The number of reported cases of ADK and HGD in SG patients is in contrast with expected number of cases based on the evolution of BE in the general population (0.26% HGD & ADK).

RY conversional surgery for PPI resistant GERD symptoms and or Barrett's esophagus should be done only in selected cases and with an appropriate surgical technique.

Thank you for your attention

We're designing a retrospective study to collect data on the effect of RYGB conversion of post SG Barrett's esophagus.

**Please, contact me if you wish to participate in.
this study**

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