Upper GI Surgery

A narrative review of the diagnosis and treatment of post-LSG reflux.

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  - Device Technologies/Da Vinci

Aim

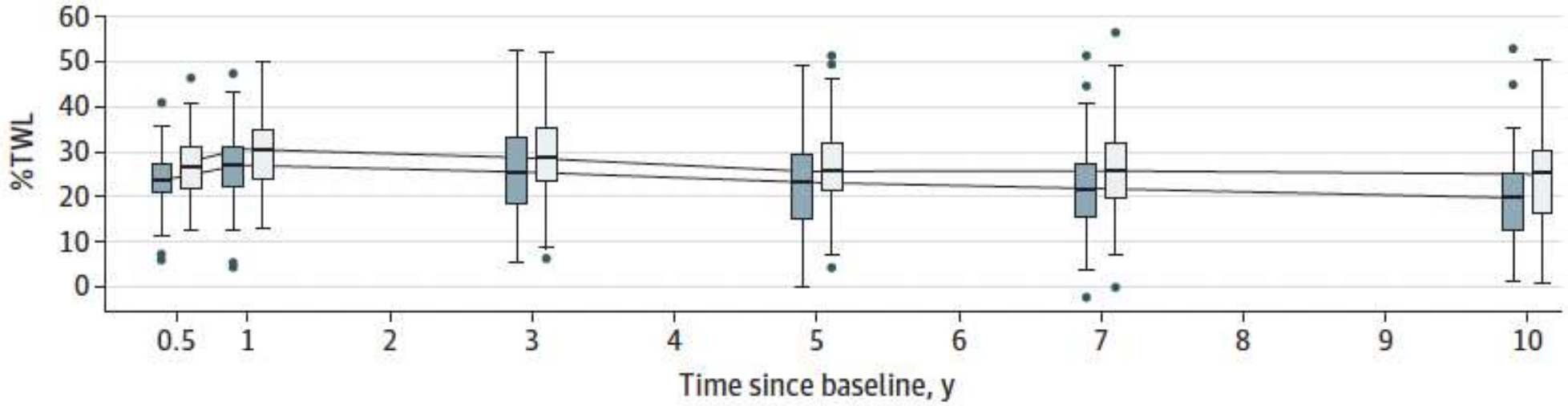
- To provide clinicians with a systematic approach to investigating and managing post-sleeve reflux.
- To examine gaps in the literature for future study.

JAMA Surgery | Original Investigation

Effect of Laparoscopic Sleeve Gastrectomy vs Roux-en-Y Gastric Bypass on Weight Loss, Comorbidities, and Reflux at 10 Years in Adult Patients With Obesity

The SLEEVEPASS Randomized Clinical Trial

%TWL after LSG and LRYGB from baseline to 10 y



at risk

Improvement in gastroesophageal reflux disease symptoms after various bariatric procedures: Review of the Bariatric Outcomes Longitudinal Database

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Of a total of 116,136 patients, 36,938 patients had evidence of GERD preoperatively. After excluding patients undergoing concomitant hiatal hernia repair or fundoplication, there were 22,870 patients with 6-month follow-up. Mean age was 47.6±11.1 years, with an 82% female population. Mean BMI was 46.3±8.0 kg/m^2. Mean preoperative GERD score for patients with Roux-en-Y gastric bypass (RYGB) was 2.80±.56, and mean postoperative score was 1.33±1.41 (P<.0001). Similarly, adjustable gastric banding (AGB, 2.77±.57 to 1.63±1.37, P<.0001) and sleeve gastrectomy (SG, 2.82±.57 to 1.85±1.40, P<.0001) had significant improvement in GERD score. GERD score improvement was best in RYGB patients (56.5%; 7955 of 14,078) followed by AGB (46%; 3773 of 8207) and SG patients (41%; 240 of 585).

All bariatric procedures improve subjective reflux scores for first 6 months.

Gastroesophageal Reflux Disease Outcomes After Vertical Sleeve Gastrectomy and Gastric Bypass

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"reflux" 3-48 months post-op, by any type of definition highly prevalent with statistically measurable but possibly clinically insignificant difference of about 5% favouring RYGB, but higher rate of admission/investigation also in RYGB

Results:

A total of 8362 patients undergoing VSG were matched 1:1 to patients undergoing RYGB, on the basis of post-operative follow-up interval. Age, sex, and follow-up time were similar between the 2 groups ($P > 0.05$). Among all patients, postoperative GERD was more frequently observed in VSG patients relative to RYGB patients (60.2% vs 55.6%, respectively; $P < 0.001$), whereas BE was more prevalent in RYGB patients (0.7% vs 1.1%; $P = 0.007$). Postoperatively, *de novo* esophageal reflux symptomatology was more common in VSG patients (39.3% vs 35.3%; $P < 0.001$), although there was no difference in development of the histologic diagnoses reflux esophagitis and BE. Furthermore, postoperative re-admission was higher in the RYGB cohort (38.9% vs 28.9%; $P < 0.001$).

Conclusions:

Compared to RYGB, VSG may not have inferior long-term GERD outcomes, while also leading to fewer re-hospitalizations. These data challenge the prevailing opinion that patients with GERD should undergo RYGB instead of VSG.

Method

- Literature search 2000-2023
- Obesity/Sleeve/Reflux/Therapy and analogous terms.
- Focus on Investigations, Therapy’s and Outcomes.

Diagnosis. Heterogeneous

- Symptoms + response to medical therapy
  - Clinical assessment approx 70% reliable
  - Reflux symptom scores are similar to this
  - Trial of PPI similar sensitivity, but low specificity.

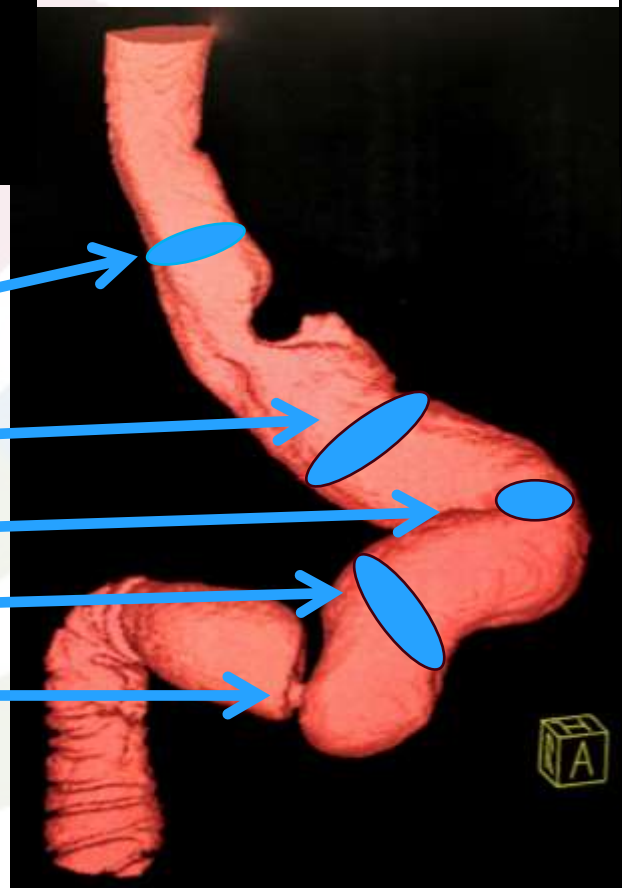
Anatomic Assessment

- Oesophageal dilation, hiatal hernia, fundic pouch, proximal or antral dilation, angularis stenosis or functional torsion.
  - Endoscopy, functional swallow, CT or functional CT.
- Barium studies.
  - 30% sensitive for stenosis, less sensitive than other modalities for the hiatus.
- Endoscopy.
  - Specificity compromised in oesophagitis and Barrett's diagnosis (poorly applied), however important for "higher grade" diagnoses.
  - Specific but insensitive for defining sleeve configuration/hiatal hernia
- Functional CT appears to trump other modalities for hiatal hernia, sleeve configuration and other anatomic variables.

Functional CT

- **Tube volumetry.**

- **Oesophageal diameter**
- **Diaphragm notch, staple line**
- **Proximal surface area**
- **Angularis: Angle and Surface Area**
- **Distal Surface area**
- **Pyloric notch**



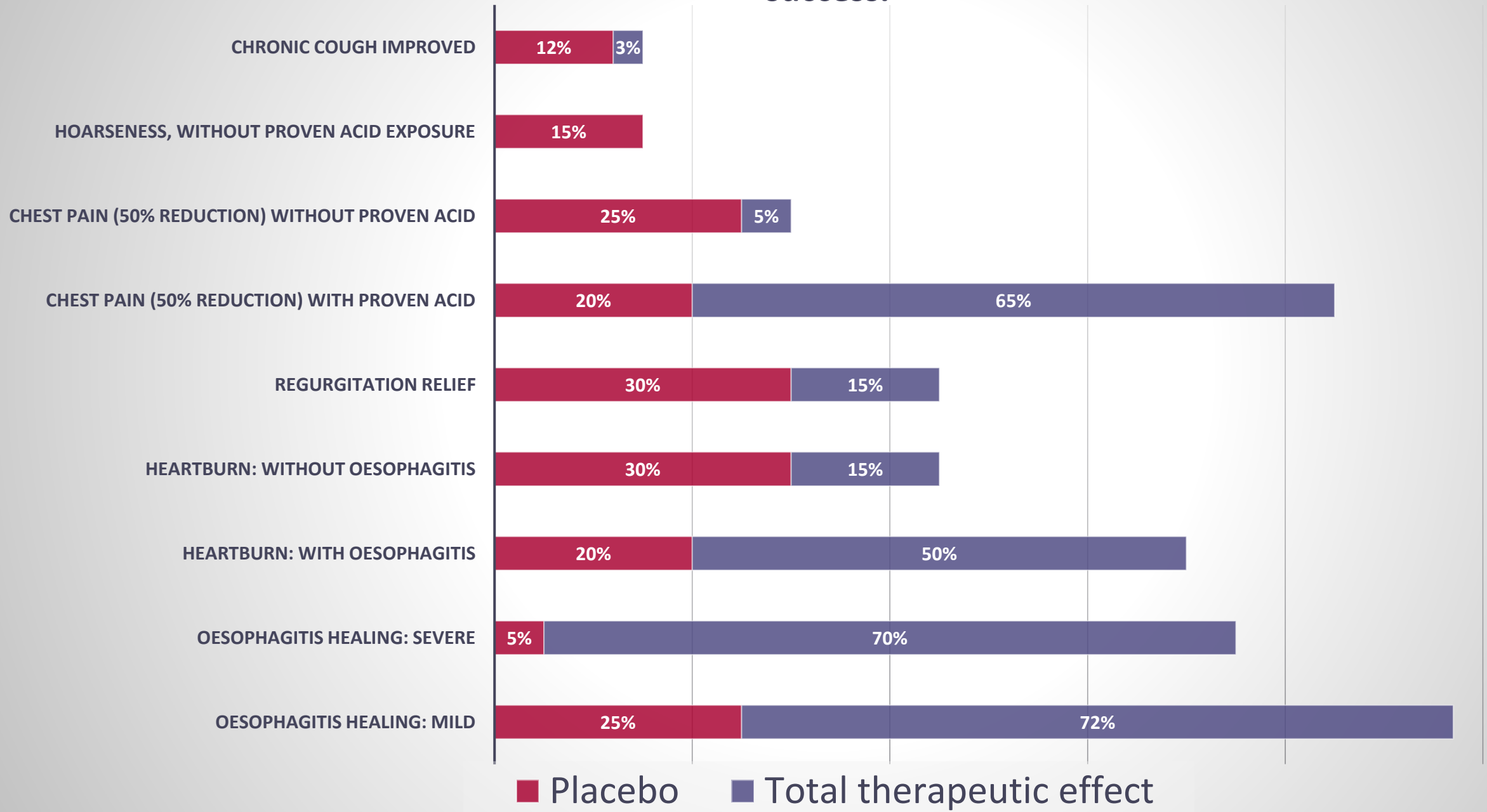
Functional assessment.

- HRM (HRIM) and 24 hour pH or (preferably) zpH studies
  - HRIM. Peristalsis and bolus clearance, EGJ pressure and relaxation, hiatus hernia, intra-gastric pressure.
- Literature determines there is a relationship between peristaltic and other abnormalities and the development of GERD, however showing causal relationships are difficult. Finding these abnormalities however can be very supportive of a GERD diagnosis and can offer clues to therapeutic options.
- pH Testing is Gold Standard. Prolonged testing and addition of zpH cand improve sensitivity, however AET >6% remains strongest single metric to focus on. Other variables and DeMeester score are useful adjuvants.

Medical therapies

- PPI’s do not lead to dose tolerance phenomena
- Placebo response highly prevalent
- Intragastric pH assessment can be used as part of dose adjustment strategy to keep pH >4
  - From a practical point of view any BD dosing is reasonably equivalent, TDS dosing no advantage
- H2 Blockers have a tolerance effect after 2 weeks.

Published trial results of strong acid suppression for reflux, placebo is a big part of the success.

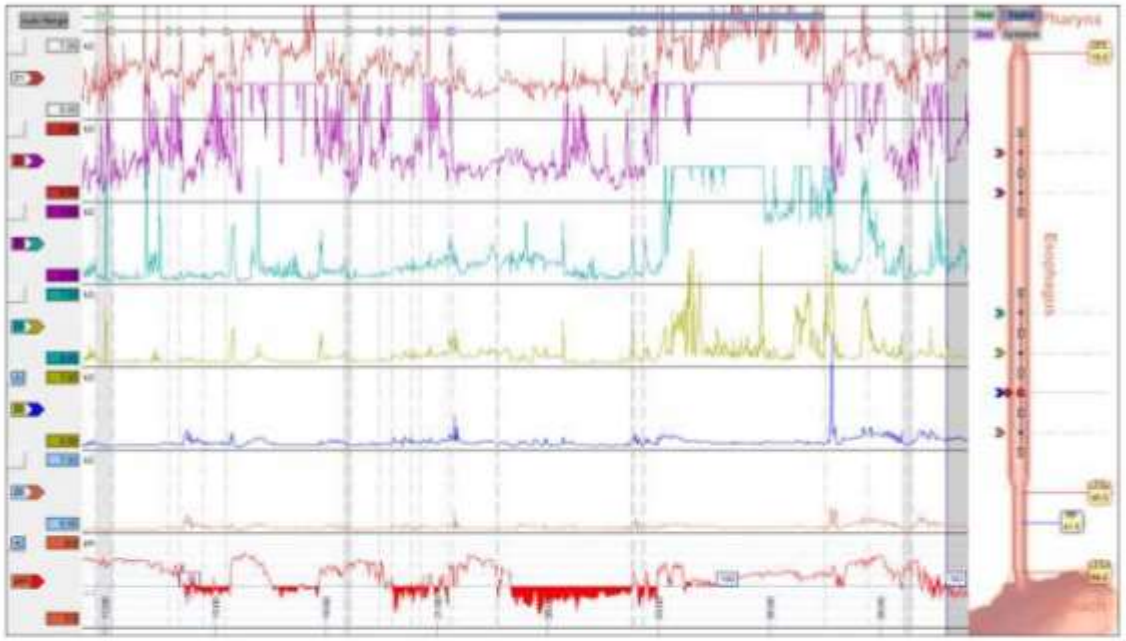


Treatment. Endoscopic therapies.

- Limited evidence, small series, highly selected, undefined criteria for success
  - Balloon dilation/stenting for angularis stenosis.
  - Stretta
  - Resection and Plication (RAP) as more robust Anti-reflux mucosectomy (ARMS)

Operative therapies

- Roux Bypass. Meta-analysis of 915 patients (7% rate of LSG conversions for reflux) indicated a 99% remission rate from reflux.
  - No details about definition of remission, provided no explanation about prospective studies showing 1/3 patients still on PPI at 6/12
  - Pre and post op pH changes following LSG to bypass are not well documented but indicate persisting oesophageal acidification.
  - Studies of primary gastric bypass reveal abn AET in 1/3 post bypass, ¼ have persisting oesophagitis and 85% have acid pouches 6/12 post op.
- Other procedures such as Hiatal Hernia repair alone, OAGB or duodenal switch also tried but again mixed results.
- Literature suggests that Roux conversion best for “unselected” patients, however morbidity higher than primary bypass and other options are also reasonable.

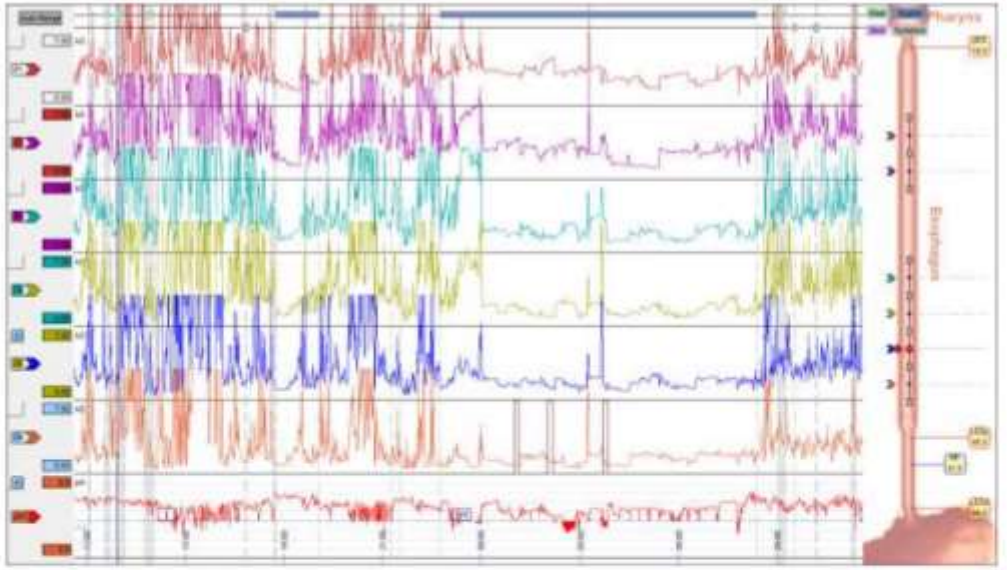


REFLUX MONITORING SUMMARY

[pH]Acid Exposure Summary	Total	Normal	Upright	Normal	Supine	No
Acid exposure time (%)	**34.9**	<4.2	**28.5**	<6.3	**44.8**	<1.
Longest reflux (min)	**100.2**	<9.2	46.1		100.2	
DeMeester Score	**123.8**	<14.7				

[Z]Reflux Episode Activity Summary	Total	Upright	Supine	Post-prandial
All reflux episodes*	16	14	2	0
Proximal episodes*	8	6	2	
Bolus Exposure Time (%)	1.6	2.7	0.0	0.0
Bolus Exposure Time (%)(Normal)	<2.3	<4.2	<1.6	

* not normalized



REFLUX MONITORING SUMMARY

[pH]Acid Exposure Summary	Total	Normal	Upright	Normal	Supine	Normal
Acid exposure time (%)	**7.7**	<4.2	4.8	<6.3	**10.9**	<1.2
Longest reflux (min)	**22.1**	<9.2	3.2		22.1	
DeMeester Score	**37.5**	<14.7				

[Z]Reflux Episode Activity Summary	Total	Upright	Supine	Post-prandial
All reflux episodes*	65	58	7	32
Proximal episodes*	19	17	2	
Bolus Exposure Time (%)	**3.3**	**5.9**	0.5	5.3
Bolus Exposure Time (%)(Normal)	<2.3	<4.2	<1.6	

* not normalized

REFLUX MONITORING SUMMARY

[pH]Acid Exposure Summary	Total	Normal	Upright	Normal	Supine	Norm
Acid exposure time (%)	**8.1**	<4.2	2.6	<6.3	**15.7**	<1.2
Longest reflux (min)	**43.9**	<9.2	6.1		43.9	
DeMeester Score	**41.1**	<14.7				

[Z]Reflux Episode Activity Summary	Total	Upright	Supine	Post-prandial
All reflux episodes*	113	108	5	102
Proximal episodes*	33	31	2	
Bolus Exposure Time (%)	**6.2**	**10.2**	0.6	18.2
Bolus Exposure Time (%)(Normal)	<2.3	<4.2	<1.6	

* not normalized

Conclusions

- The literature provides adequate information about diagnosis of post-LSG reflux. Poorly applied in clinical practice, however.
- CT provides superior anatomic information, but there is no formalised reporting system.
- Manometry and pH gold standard for diagnosis.
- Factors contributing to post-sleeve reflux are not well understood.
- LSG to Roux bypass is preferred method of treatment however studies lack objective data and adequate follow-up.
- Objective data will be needed in future studies.