Which hiatal hernia has to be repaired in primary bypass surgery?

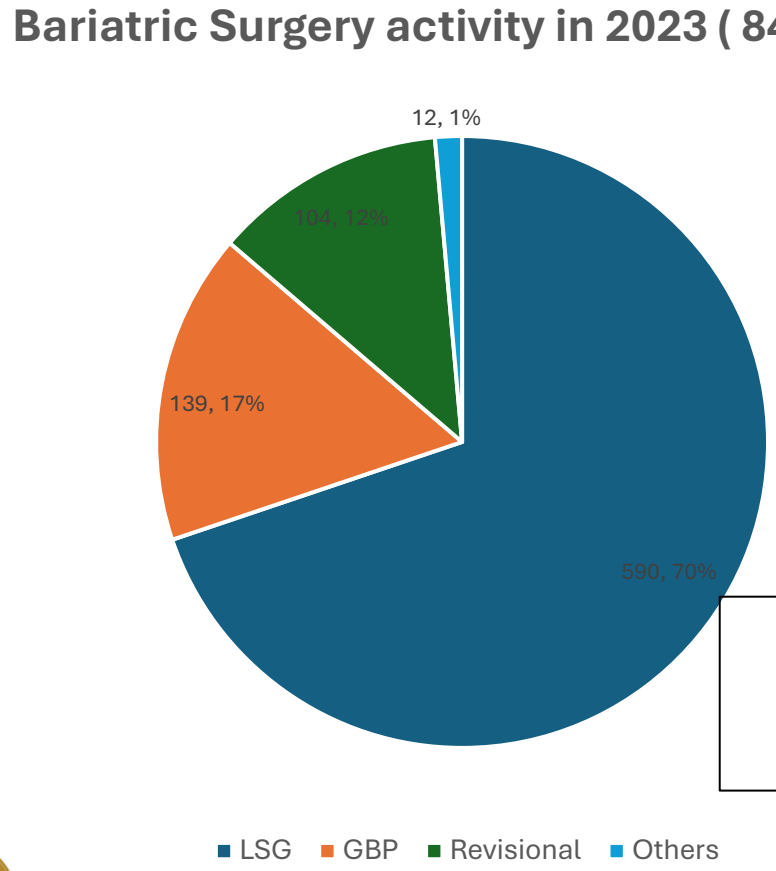
Catalin Copaescu, MD, PhD

PONDERAS ACADEMIC HOSPITAL

Bucharest, Romania

Disclosures

Executive Director of Surgical Training Institute involved in **endoscopic surgery training and educational programs** together: Karl Storz, Medtronic, Ethicon-JJ, BARD
Speaker for Novo Nordisk, Ely Lilly



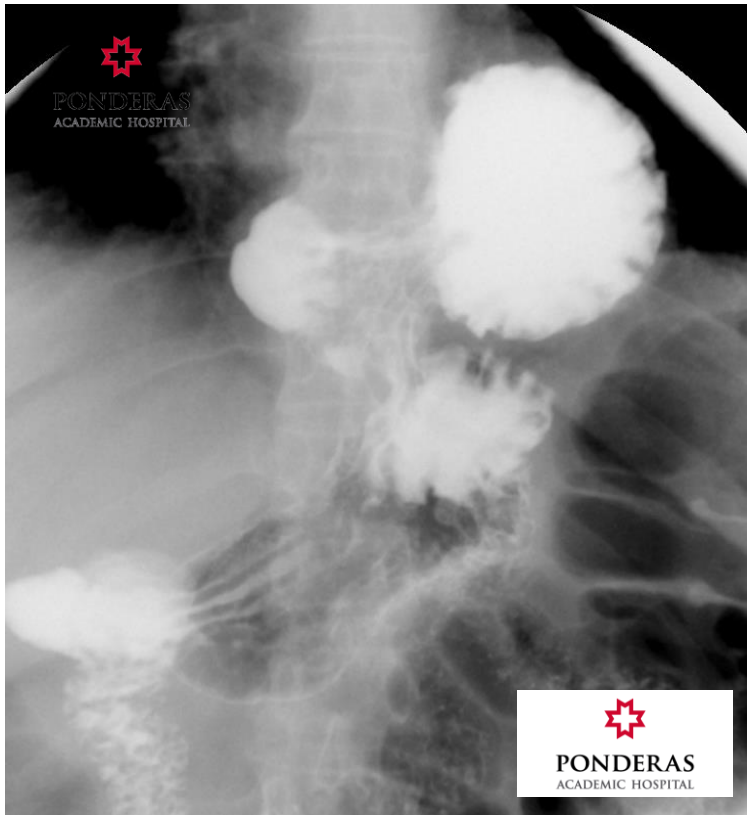
Bariatric Surgery Experience 12000+

PONDERAS ACADEMIC HOSPITAL

Hiatal Hernia in Bariatric Surgery Candidates

- 10% to 40% of patients undergoing bariatric surgery have an HH on preoperative endoscopy or radiographic study
    - Che F, et al. Surg Obes Relat Dis 2013
    - Wilson LJ, et al. Am J Gastroenterol 1999

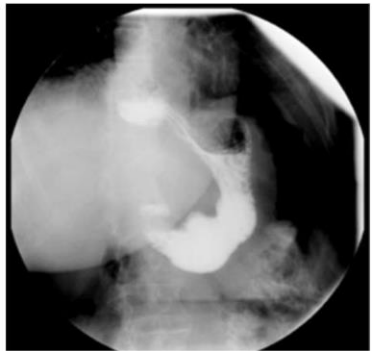
- The prevalence may be even higher.
    - As not all patients have preoperative upper endoscopy or radiographic studies before surgery
    - Some programs investigate the pts only if GERD symptoms are present



Hiatal Hernia in Bariatric Surgery Candidates

- Higher prevalence if **preoperative and intraoperative** studies are used

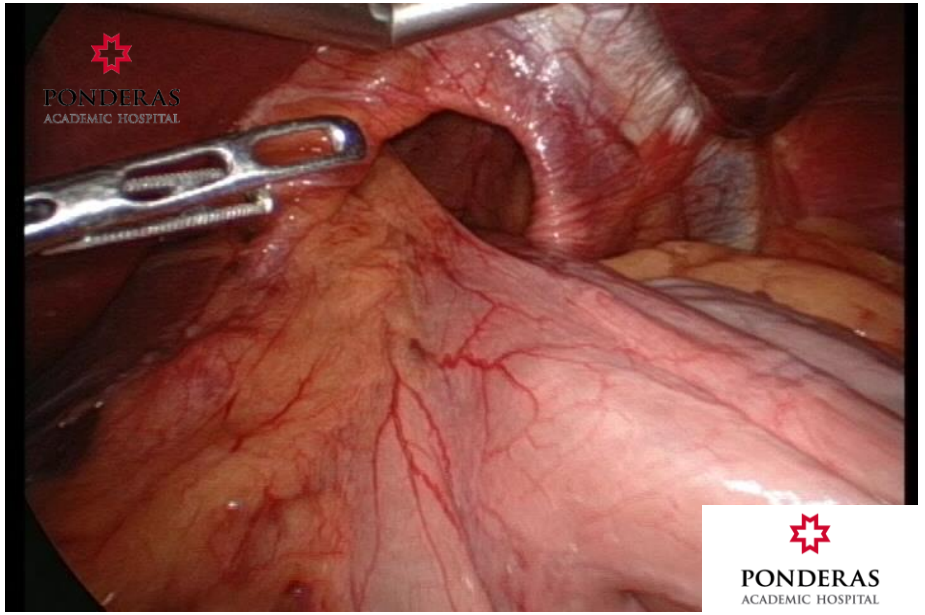
- Boules M et al. (2015)
  - 83 concomitant HHR 2010-2014 (61 RYGBP)
    - 39% of HHs were diagnosed before bariatric surgery, whereas
    - 61% were diagnosed at the time of bariatric surgery
      - Boules M et al. Surgery (United States) 2015;158(4):911–8.



- Our study (Chirurgia, 2019)
  - 48.5% - 339 HHRs in 695 pts (PONDERAS Hospital,2015-2016)
    - 57% (192pts) - HH was evident before operation and confirmed intraoperatively
    - 43% (147pts) – HH was intraoperatively discovered
      - ***using the surgical protocol for active identification of preoperative undiagnosed hiatal hernia - SPAIH***
        - Hutopila, I. and C. Copaescu (2019). "Hiatal Hernia is More Frequent than Expected in Bariatric Patients. Intraoperative Findings during Laparoscopic Sleeve Gastrectomy." Chirurgia (Bucur)

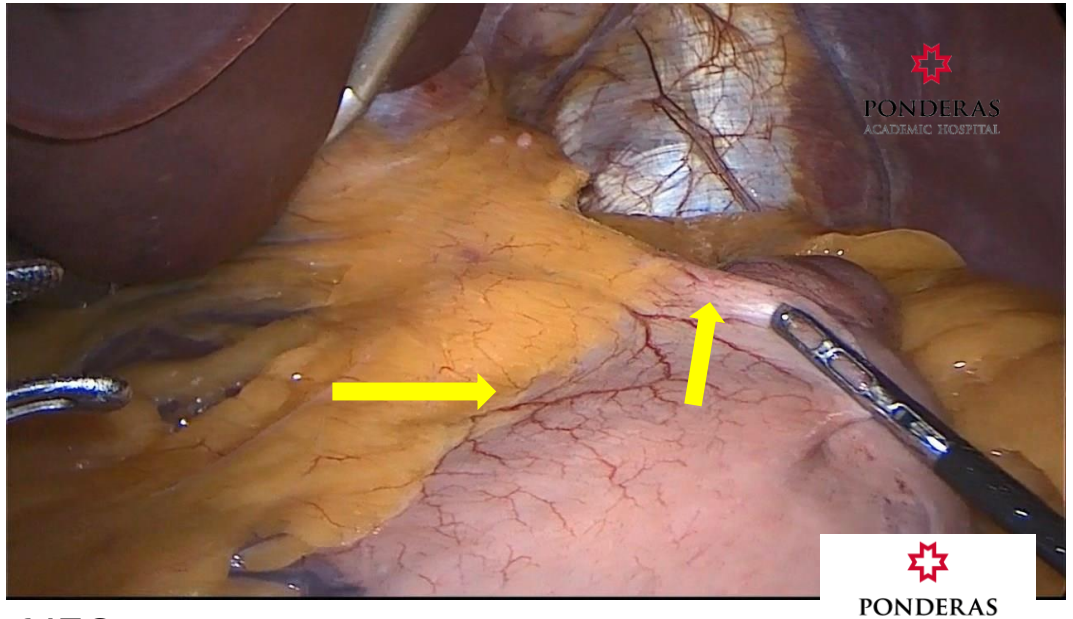
Hiatal Hernia and Bariatric Surgery

- **Intra-operative diagnostic**
  - Careful inspection
  - Careful dissection
  - A significant risk of missing!
    - If no preoperative clue of HH!)



Hiatal Hernia and Bariatric Surgery
Gastric Bypass

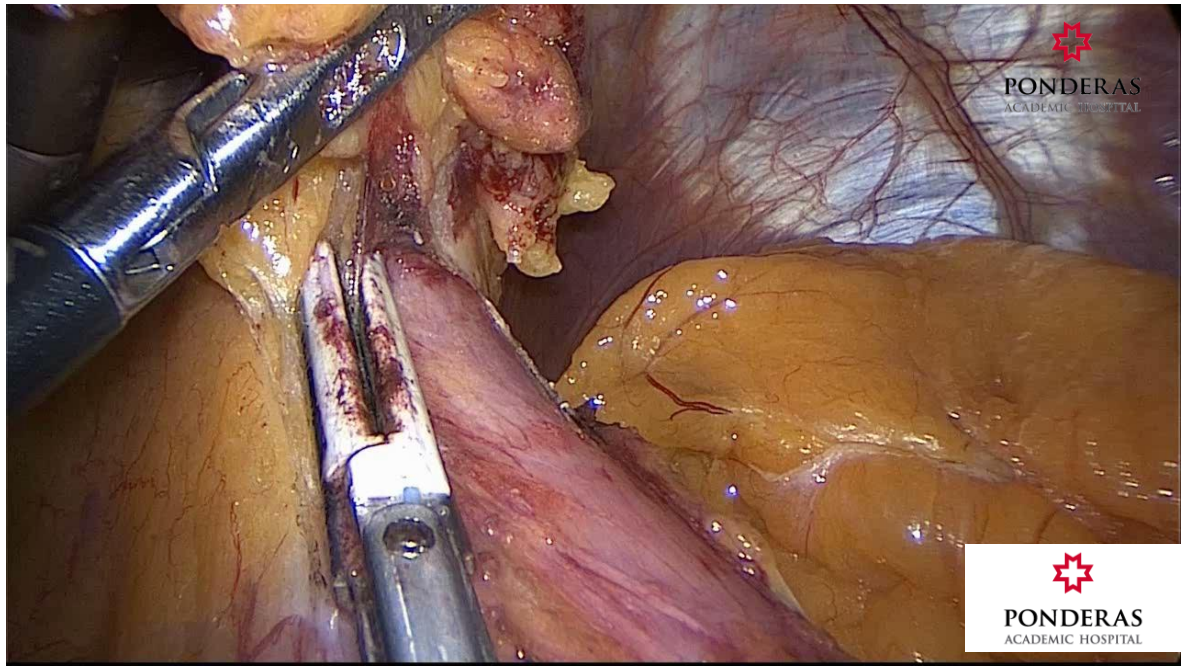
- **Intra-operative diagnostic**
  - Careful inspection
  - Careful dissection
  - A significant risk of missing!
    - If no preoperative clue of HH!)
    - In GBP
      - Limited inspection from the left site
      - Limited anterior and posterior mobilization of JEG



No preoperative investigation positive for Hiatal Hernia

Hiatal Hernia and Bariatric Surgery

- **Intra-operative diagnostic**
  - Careful inspection
  - Careful dissection
  - A significant risk of missing!
    - If no preoperative clue of HH!)
    - In GBP
      - Limited inspection from the left site
      - Limited anterior and posterior mobilization of GEJ



No preoperative investigation positive for Hiatal Hernia

Hiatal Hernia in Bariatric Surgery Candidates

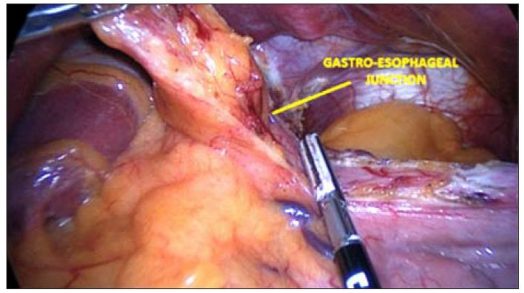


Figure 5. No identification of the abdominal esophagus after the fat pad's mobilization

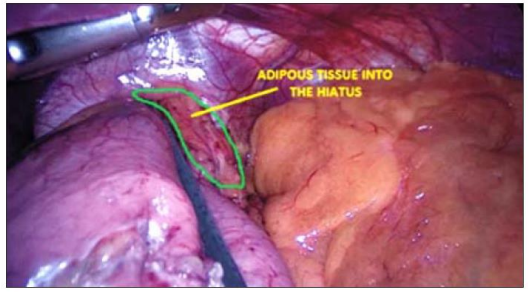


Figure 6. Pericardial adipose tissue retracted into the hiatus

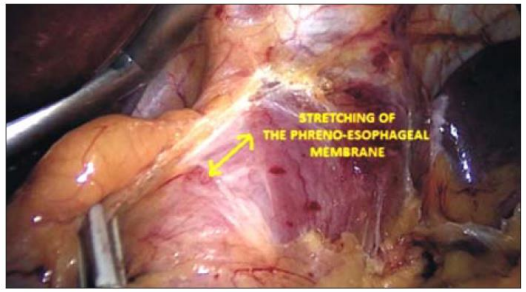


Figure 7. Stretching of the phreno-esophageal membrane

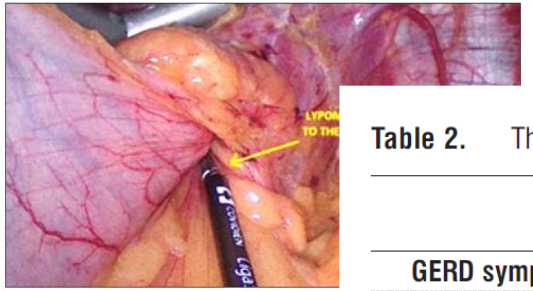


Figure 8. Para-esophageal lipoma loca gastro-esophageal junction

Original Article

Chirurgia (2019) 114: 779-789
No. 6, November - December

http://dx.doi.org/10.21614/chirurgia.114.6.779

Hiatal Hernia is More Frequent than Expected in Bariatric Patients. Intraoperative Findings during Laparoscopic Sleeve Gastrectomy

Ionut Hutopila[1,2], Catalin Copaescu[1,3]

Table 2. The result of the preoperative evaluation for patients with HH discovered intraoperatively

Preoperative Evaluation [147p (43.37%) - HH Discovered Intraoperatively]									
GERD symptoms		EGD - Esophagitis				X-ray GERD		Esophagitis+X-ray GERD	
No	Yes	No	Yes			No	Yes	No	Yes
112 (76.19%)	35 (23.81%)	101 (68.71%)	46 (31.29%)			112 (76.19%)	35 (23.81%)	127 (86.40%)	20 (13.60%)
			Grade A	Grade B	Grade C				
			29 (19.72%)	13 (8.84%)	4 (2.72%)				

Surgical Protocol for Active Identification of Preoperative undiagnosed Hiatal Hernia - SPAIH

GERD & Hiatal Hernia

Diagnostic Correlations before Metabolic Surgery

- **Diagnostic Work-up**
  - GERD Symptoms
  - Radiology (UGI Studies/CT)
  - EGD
  - 24 monitoring pH-metry,

Lack of correlations clinical symptoms and objective evidence

GERD & HH are underdiagnosed

450 pts

Hutopila I, Constantin A, Copaescu C. Gastroesophageal Reflux Before Metabolic Surgery. Chirurgia (Bucur). 2018;113(1):101-7.

100 pts

Heimgartner B, Herzig M, Borbély Y, Kröll D, Nett P, Tutuian R. Symptoms, endoscopic findings and reflux monitoring results in candidates for bariatric surgery. Digestive and Liver Disease.49(7):750-6.(2017)

Many preoperative work-ups do not consider the need of UGI Rx/EGD

SAGES guideline for clinical application of laparoscopic bariatric surgery.

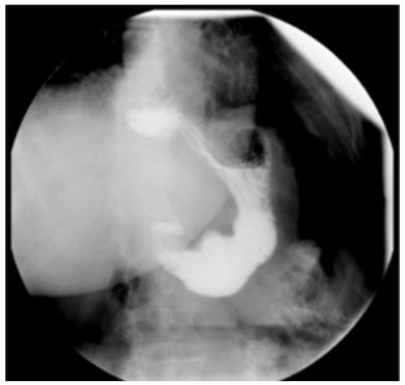
Underestimation of GERD & HH

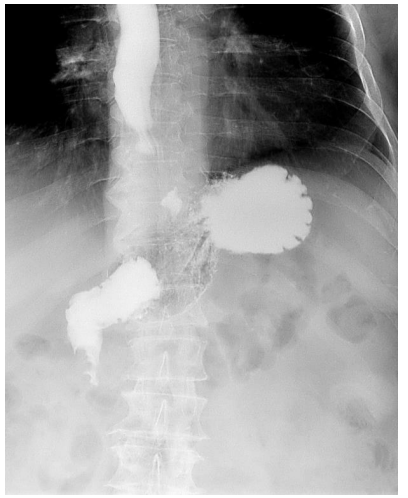
UK

ery. 2016;26(9):2257-62.

Hiatal Hernia in Bariatric Surgery Candidates

- High Prevalence of GERD & HH
    - What we do with this information?





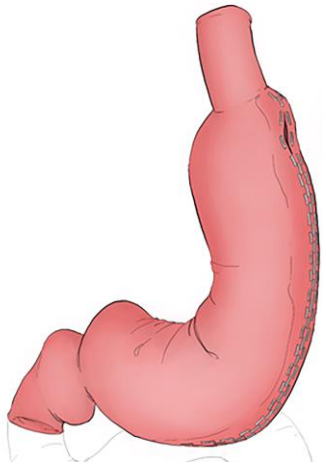
Consider concomitant HHR?

- Concurrent repair is often performed during metabolic and bariatric surgery (Docimo,S and al. ObesSurg, 2019)
- When? > 2cm? 3cm? Objective measurement?

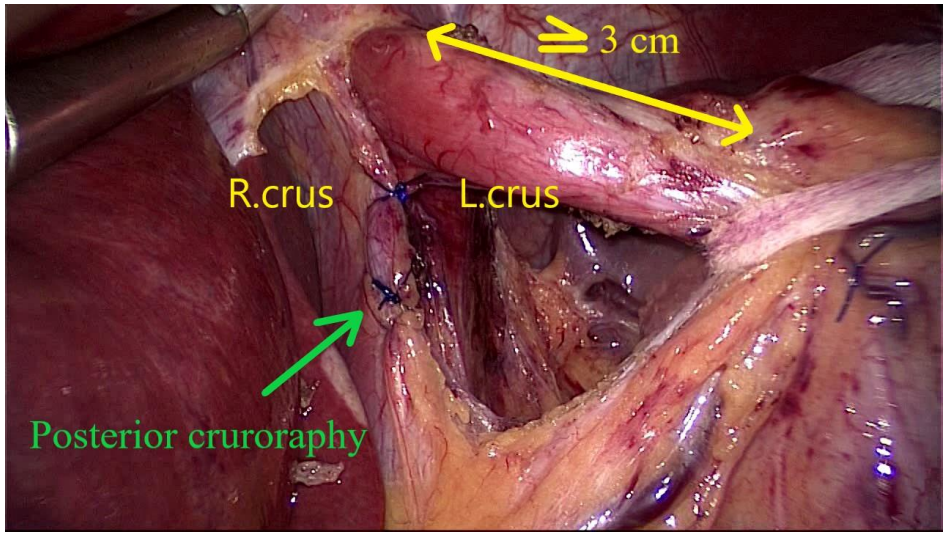
- *A general consensus on the safety and effectiveness of concurrent HH repair (HHR) and MBS remains unclear.*

Indication for HHR
Consider it concomitant HHR during BMS

- **Relative to the metabolic procedure?**
  - SG or GBP



5-45%

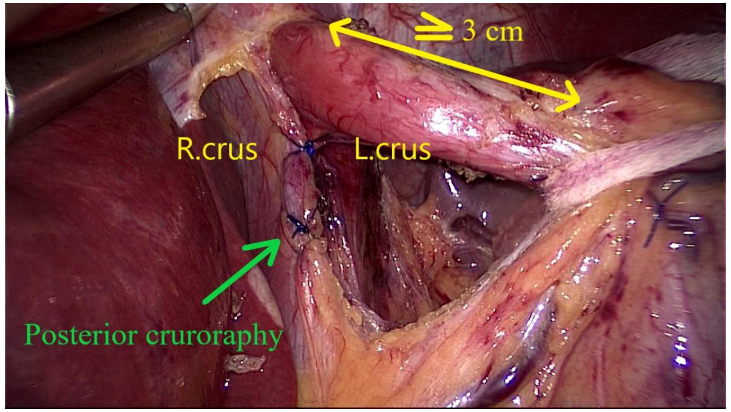


5-15%

C.Copaescu et al. Surgical Endoscopy,2022

HHR concomitant with RYGB

- **Surgical Technique of HHR**



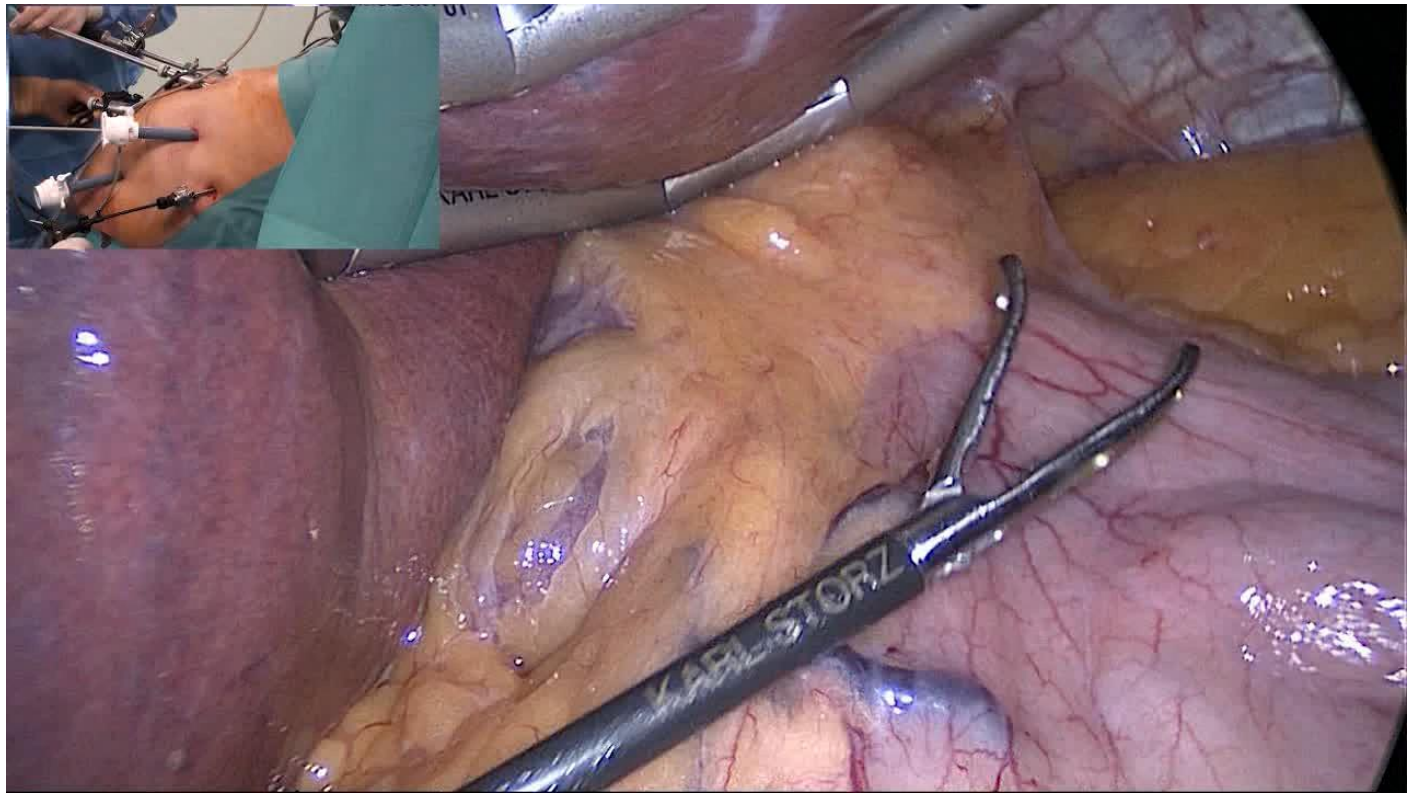
  - AIM: calibration of the hiatus, no intraoperative/postoperative complications, and prevention of recurrence
  - Before the GBP
    - avoiding any aggressive traction on the stapled gastric pouch
  - Crura dissection & mobilization of GOJ and inferior esophagus, hernia sac excision
  - Crura approximation
    - Separate/continues stitching (nonresorbable)
    - Mesh reinforcement may be considered depending on the consistence of the diaphragmatic pillars

- **The RYGBP/OAGB procedure continues with the pouch formation, GI anastomosis (Not for Orvil)**

HHR concomitant with RYGB

Surgical Technique of HHR
RYGBP using Orvil for the GJA

The crura approximation will be performed after fashioning the gastric pouch and passing the Orvil through the GOJ



HHR concomitant with RYGB

- Safety and feasibility of HHR at the time of RYGB
  - Boules M et al, 2015
    - no significant difference in operative time, duration of stay, intraoperative complications, or postoperative symptoms between patients who underwent HHR and the control group
      - Boules M, Corcelles R, Guerron AD, et al. The incidence of hiatal hernia and technical feasibility of repair during bariatric surgery. Surgery (United States) 2015;158(4):911–8.
  - Milles, H et al, 2023 (Meta-analysis, 17 studies)
    - HHR may be performed safely and effectively at the time of MBS
    - "*Considering the findings, we recommend that surgeons consider concurrent HHR and MBS. Individual patient suitability and surgeon experience are important considerations for each case*"


Obesity Surgery (2023) 33:3755–3766
https://doi.org/10.1007/s11695-023-06914-7

IFSO

ORIGINAL CONTRIBUTIONS

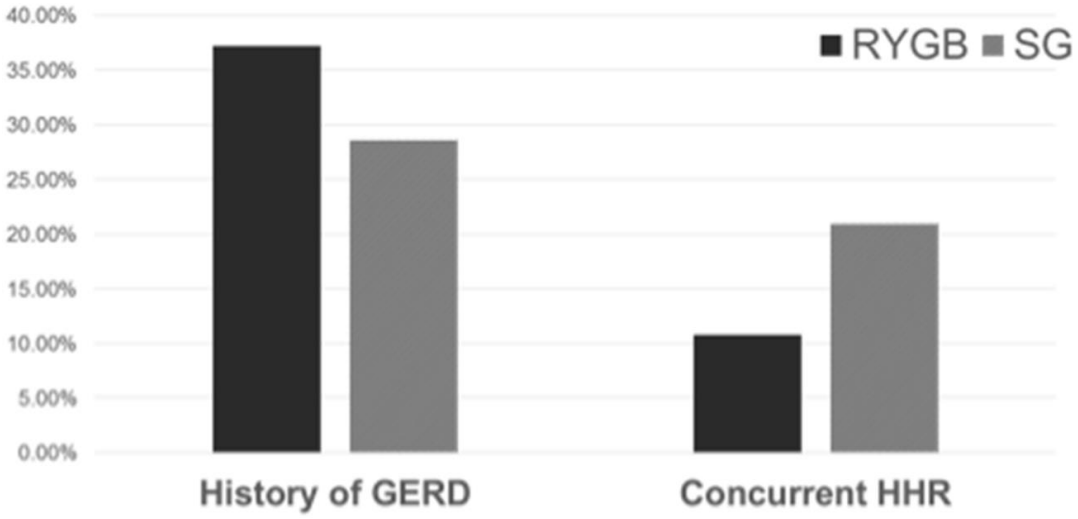
Check for updates

Outcomes of Concurrent Hiatus Hernia Repair with Different Bariatric Surgery Procedures: a Systematic Review and Meta-analysis

Henry Mills[1] · Yousef Alhindi[2,3,4] · Iskandar Idris[2,5] · Waleed Al-Khyatt[1,3,6]

HHR concomitant with RYGB

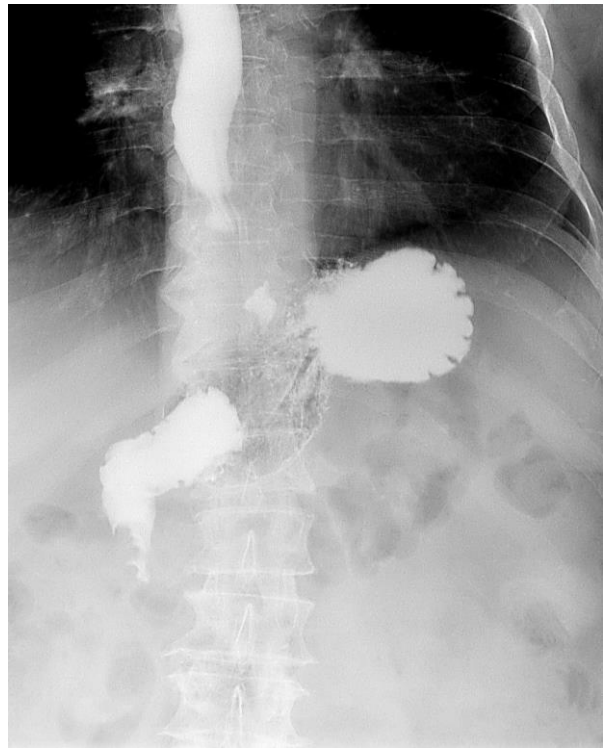
- MBSAQIP (Docimo, 2019)
  - **130,772** cases - RYGB (30.5%) and SG (69.5%).
  - 17.9% of the entire cohort had HHR
  - **10.8%** of patients underwent concurrent HHR at the time of RYGB



Docimo S, Rahmana U, Bates A, Talamini M, Pryor A, Spaniolas K. Concomitant hiatal hernia repair is more common in laparoscopic sleeve gastrectomy than during laparoscopic Roux-en-Y gastric bypass: an analysis of 130,772 cases. Obes Surg 2019;29(2):744–6.

Why HHR is not always concomitant with GBP?

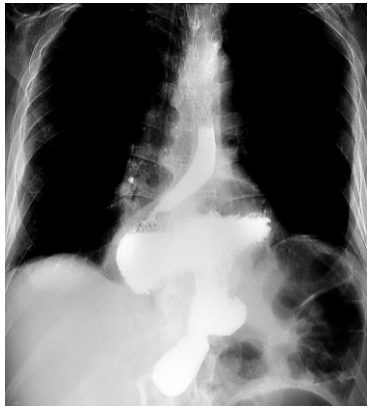
- Hiatal hernias left unrepair (possible scenarios)
  - Preoperative/ intraoperative missed HHs?
    - No preoperative symptoms, limited preoperative explorations
  - No need for HHR!?
    - Too small (<2cm)
    - Too complex (MO)
    - Increasing the operative time and risk of the GBP procedure
    - GB has a powerful AR mechanism
    - Reduced risk of postoperative GERD/HH related complications



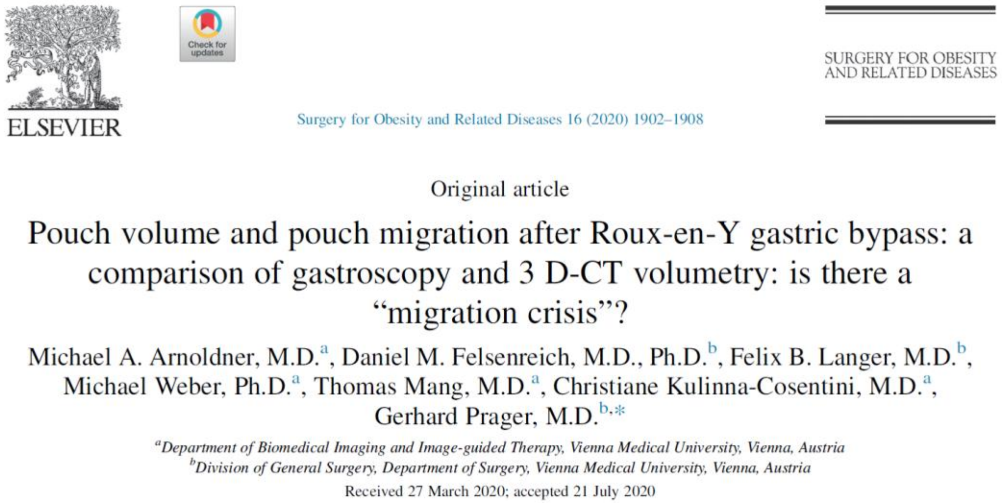
HHR concomitant with RYGB

Hernia size considerations

- *HH size may affect the surgeon's decision on whether to perform HHR at the time of MBS.*
  - **Large Hernias** (type IV) – particular decision
  - **Small Hiatal Hernias**
    - Radiologic and endoscopic small HH, no GERD symptoms, no need to perform more functional studies
    - Are often considered as clinically "silent" and therefore repair unnecessary.
    - *However, a consensus is that due to the weight loss experienced post-MBS, the HH can be observed to enlarge due to fat loss around the GOJ, and so lead to the **intra-thoracic migration** of the stomach or other organs.*



ITM after Gastric Bypass



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Surgery for Obesity and Related Diseases 16 (2020) 1902–1908

SURGERY FOR OBESITY AND RELATED DISEASES

Original article

Pouch volume and pouch migration after Roux-en-Y gastric bypass: a comparison of gastroscopy and 3 D-CT volumetry: is there a "migration crisis"?

Michael A. Arnoldner, M.D.[a], Daniel M. Felsenreich, M.D., Ph.D.[b], Felix B. Langer, M.D.[b], Michael Weber, Ph.D.[a], Thomas Mang, M.D.[a], Christiane Kulinna-Cosentini, M.D.[a], Gerhard Prager, M.D.[b,*]

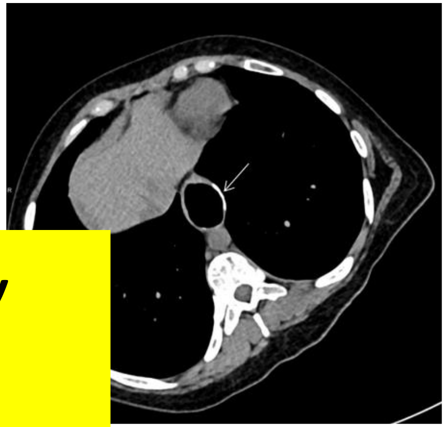
[a]Department of Biomedical Imaging and Image-guided Therapy, Vienna Medical University, Vienna, Austria
[b]Division of General Surgery, Department of Surgery, Vienna Medical University, Vienna, Austria

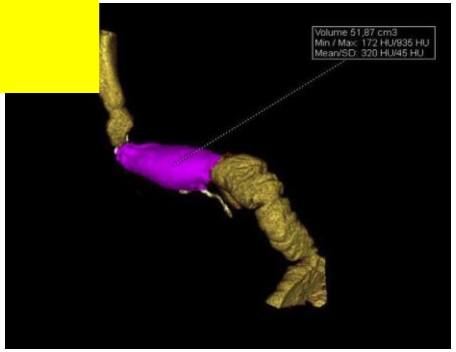
Received 27 March 2020; accepted 21 July 2020

- ITM was found in 20 of 30 (66.7%) patients in CT, whereas gastroscopy did not correctly identify any herniation.

Is the herniation of the small and narrow gastric pouch responsible for reflux or obstructive symptoms?

  - ITM is an underreported finding after revised RYGB and missed in gastroscopy.





GERD after RYGBP

- A nationwide cohort study of all adults with preoperative reflux who underwent gastric bypass in Sweden between 2006 and 2015, with complete follow-up through 2016.
- 2454 pts, Sweden

- **Conclusions:** Reflux symptoms decrease rapidly after gastric bypass, but around **half of operated patients require continuous anti-reflux medication**. The treatment efficacy of gastric bypass on reflux symptoms might have been overestimated.

- Holmberg, D., et al. (2019). "Gastric bypass surgery in the treatment of gastro-oesophageal reflux symptoms." Aliment Pharmacol Ther **50**(2): 159-166.

GERD after OAGB

- Reflux (non-acid) after OAGB

Surgical Endoscopy (2023) 37:3832–3841
https://doi.org/10.1007/s00464-022-09857-9

ORIGINAL ARTICLE

Esophageal function and non-acid reflux evaluated by impedance-24 h-pH-metry, high-resolution manometry, and gastroscopy after one-anastomosis gastric bypass—outcomes of a prospective mid-term study

D. M. Felsenreich[1] · M. L. Zach[1] · N. Vock[1] · J. Jedamzik[1] · J. Eichelter[1] · M. Mairinger[1] · L. Gensthaler[1] · L. Nixdorf[1] · P. Richwien[1] · C. Bichler[1] · I. Kristo[1] · F. B. Langer[1] · G. Prager[1]

Table 4 Functional testing (HRM and impedance-24 h-pH-metry) before OAGB and at follow-up

All patients			
	Basis OAGB ($n=21$)	Follow-up ($n=21$)	p-value
Manometry			
LESP (mmHg) (10-35 mmHg)	25.5 ± 10.7	28.0 ± 15.6	0.576
Time liquid bolus (s) (< 12 s)	7.2 ± 1.8	4.7 ± 2.2	**0.001**
IRP (mmHg) (< 15 mmHg)	13.6 ± 4.5	11.5 ± 5.8	0.244
DCI (mmHg-cm-s) (450—8000 mmHg-cm-s)	2546.6 ± 1929.5	1410.7 ± 923.9	**0.036**
Impedance-24 h-pH-metry			
Acid exposure time (% of 24 h) (normal < 4.2%)	4.1 ± 3.9	1.2 ± 1.2	**0.004**
Total number of refluxes (normal < 40)	52.1 ± 20.8	58.2 ± 32.1	0.479
Number non-acid refluxes	24.0 ± 15.2	48.0 ± 29.4	**0.003**
Number acid refluxes	28.1 ± 19.4	10.2 ± 8.7	**0.001**
DeMeester score (normal 14.72)	17.5 ± 15.7	7.5 ± 8.9	**0.017**

OAGB one-anastomosis gastric bypass; *HRM* high-resolution manometry; *LESP* lower esophageal sphincter pressure; *IRP* integrated relaxation pressure; *DCI* distal contractile integral; *s* seconds

Complications of hiatal hernia after RYGBP

Fig 1. Abdominal and thoracic computed tomography showing the dilated segment of small intestine within the left thoracic cavity.

ELSEVIER

CrossMark

Surgery for Obesity and Related Diseases 13 (2017) 1929–1931

SURGERY FOR OBESITY AND RELATED DISEASES

Case report

Hiatal hernia containing the alimentary limb and the gastric pouch: a rare cause of small bowel obstruction after Roux-en-Y gastric bypass

Miguel Bouzas Cardaci, M.D.*, Robert De Keuleneer, M.D., Fadi Massaarani, M.D.

Department of Abdominal Surgery, Regional Hospital of Val de Sambre, Verviers, Belgium

Received July 17, 2017; accepted August 19, 2017

Concurrent hiatal hernia repair and bariatric surgery

2010-2017
US insurance
claims data set

LSG+HHR vs LSG
RYGB+HHR vs RYGB

Incidence of repeat operation or endoscopy at up to 3 years

At 1 year follow-up:

Abdominal re-operation: *

2.3%	4.2%

Add'l endoscopy: *

7.1%	9.5%

* p< .05

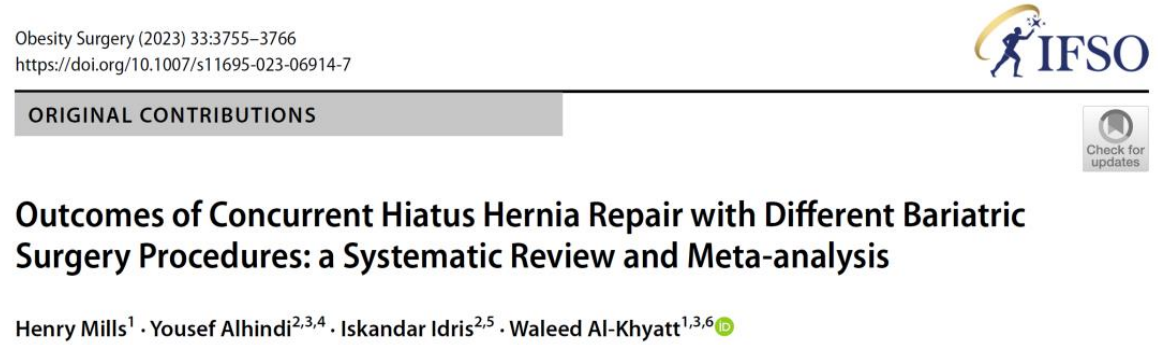
Abdominal re-operation:

4.5%	6.4%

Add'l endoscopy: *

16.5%	21.4%

Concurrent LRYGB + HHR


Obesity Surgery (2023) 33:3755–3766
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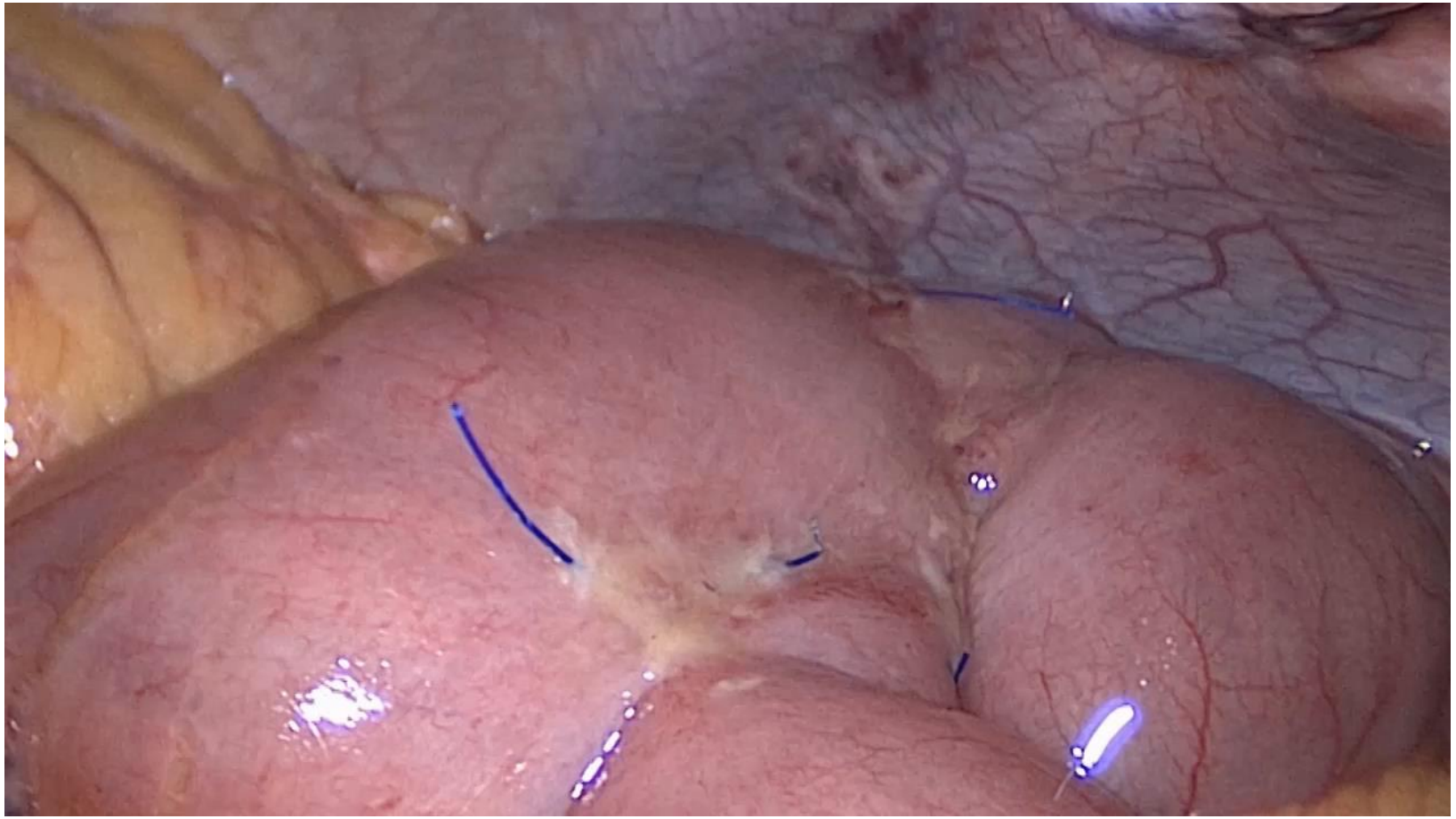
Outcomes of Concurrent Hiatus Hernia Repair with Different Bariatric Surgery Procedures: a Systematic Review and Meta-analysis

Henry Mills[1] · Yousef Alhindi[2,3,4] · Iskandar Idris[2,5] · Waleed Al-Khyatt[1,3,6]

- The Effect of HHR
  - Sys rev and meta-analysis (17 studies)
  - GERD, bleeding, infection, LOS - Not significant differences
  - *"At this time and from the information provided **HH of any size should be repaired at the time of MBS** to prevent further complication"*

Acute ITM after HHR concomitant with RYGBP



HHR concomitant with RYGB
Prevention of recurrence/ITM

Strategies used for HHR concomitant with GBP

- Crura Approximation
- Rarely used:
  - Mesh reinforcement
  - Cardio/esophago pexy
    - i.e. Reconstruction of PEL (rPEL)
- Exceptionally used:
  - Remnant Fundoplication
  - Teres ligamentum

Strategies used for HHR after GBP

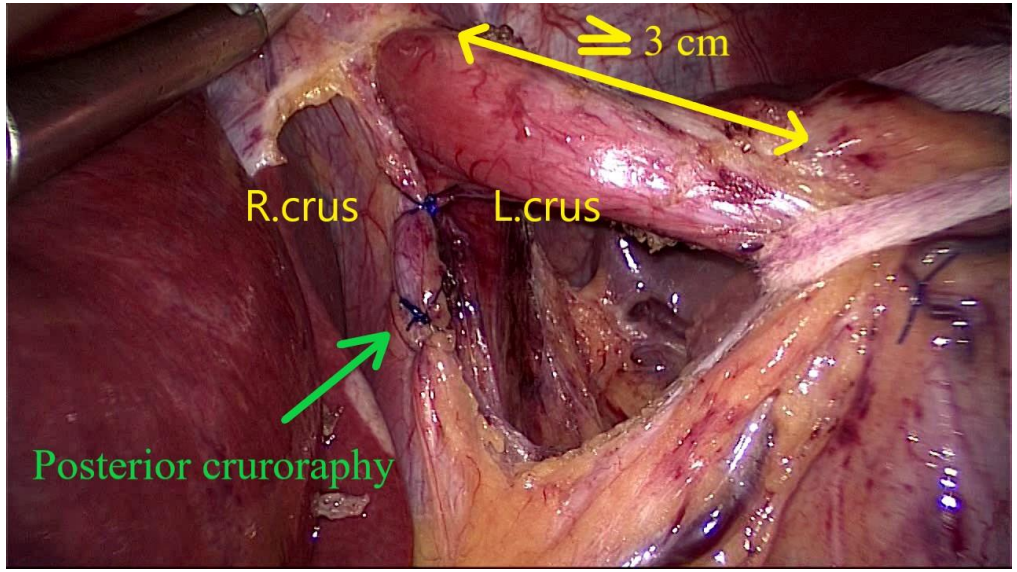
- Crura approximation +
  - Cardio/esophago pexy (rPEL)
  - LINX
  - Teres ligamentum
  - Mesh reinforcement
  - Fundoplication
    - Using remnant, “ Modified Nissen”)

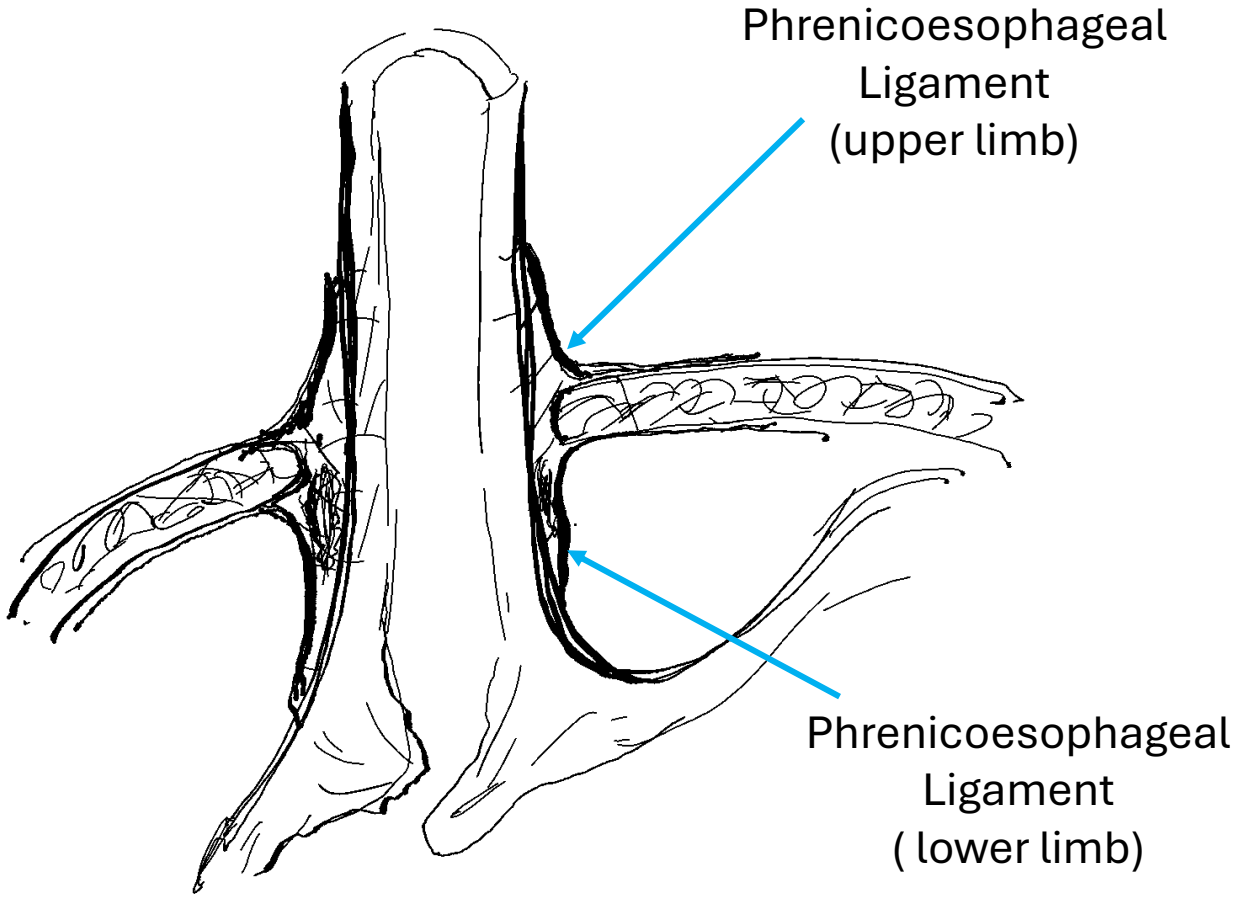
Kawahara et al.
Copaescu c et al

Hiatal Hernia Repair concomitant with GBP/SG

Dissection & Cura Approximation

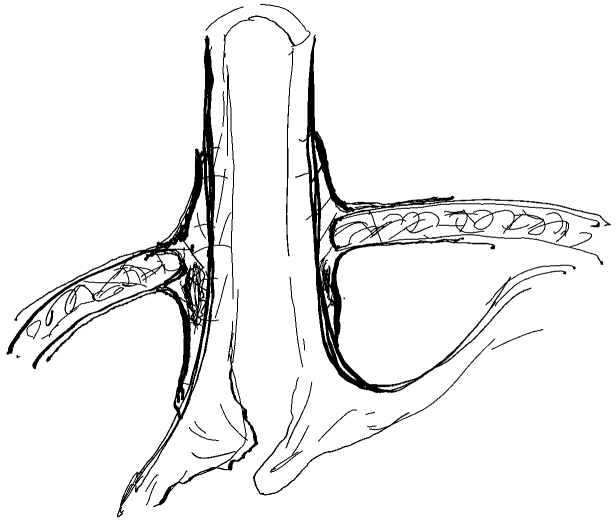
Reconstruction of Phrenico-Esophageal Ligament





Reconstruction of Phrenico-Esophageal Ligament Surgical Technique

- **R-PEL - Concept**
  - Seromuscular non-resorbable 3.0 stitches are passed on the esophagus to bond it to the diaphragm (at 6, 10 and 2 o'clock)
- AIM:
  - To maintain the LES & cardia below the diaphragm and,
  - To guide the scarring tissue formation as a surrogate for the divided PEL



Surgical Endoscopy
https://doi.org/10.1007/s00464-022-09829-z

Check for updates

Reconstruction of the phreno-esophageal ligament (R-PEL) prevents the intrathoracic migration (ITM) after concomitant sleeve gastrectomy and hiatal hernia repair

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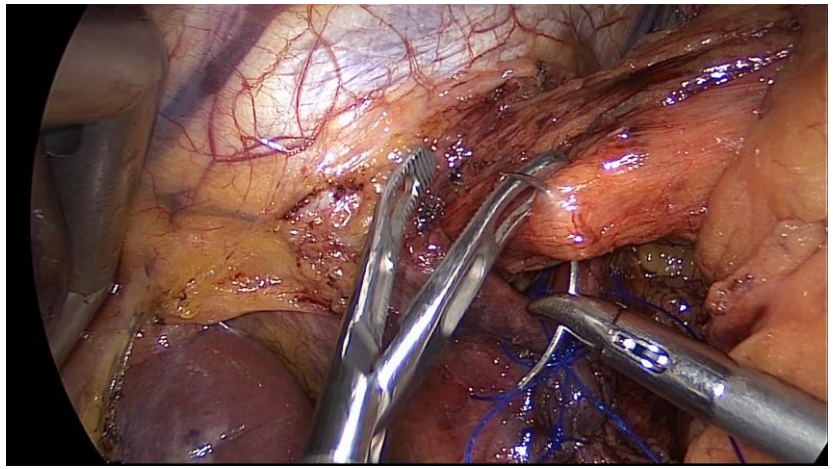
Received: 1 September 2022 / Accepted: 12 December 2022

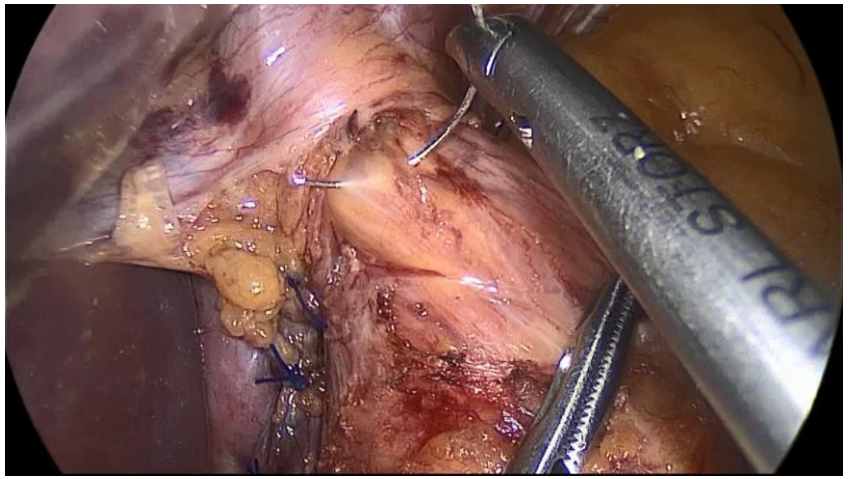
PONDERAS ACADEMIC HOSPITAL

Reconstruction of Phrenico-Esophageal Ligament (R-PEL)

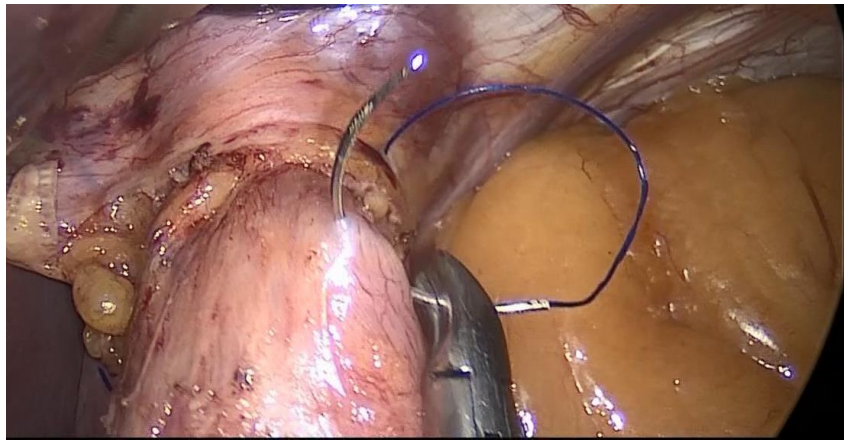
6 o'clock

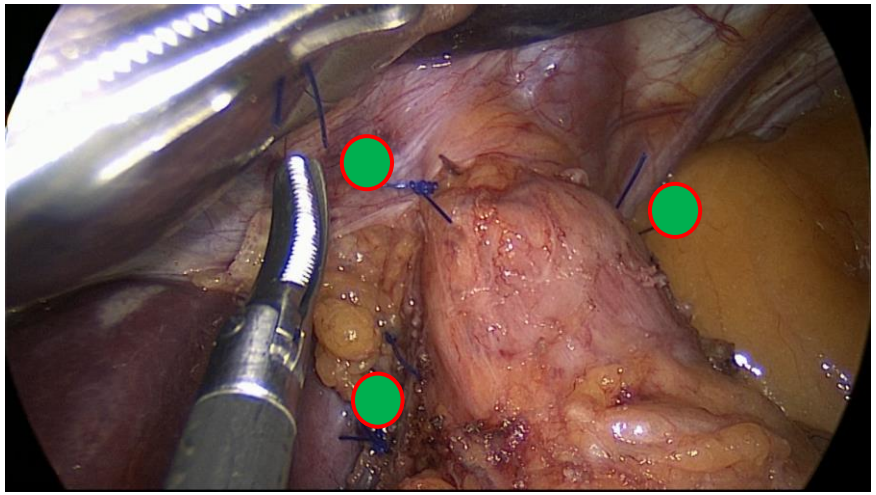


10 o'clock



2 o'clock

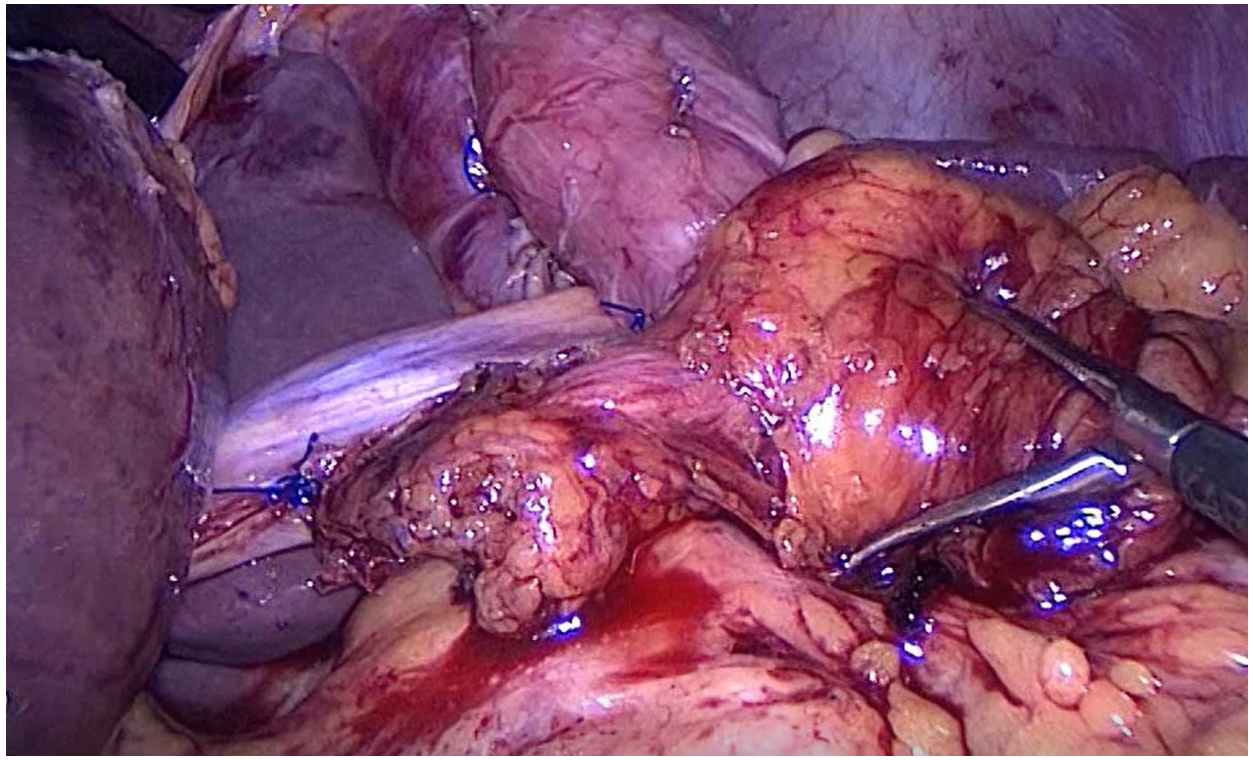




HHR concomitant with RYGB

Prevention of recurrence/ITM

Ligamentum teres Cardiopexy



Obesity Surgery (2019) 29:3765–3768
https://doi.org/10.1007/s11695-019-03990-6

IFSO

BRIEF COMMUNICATION

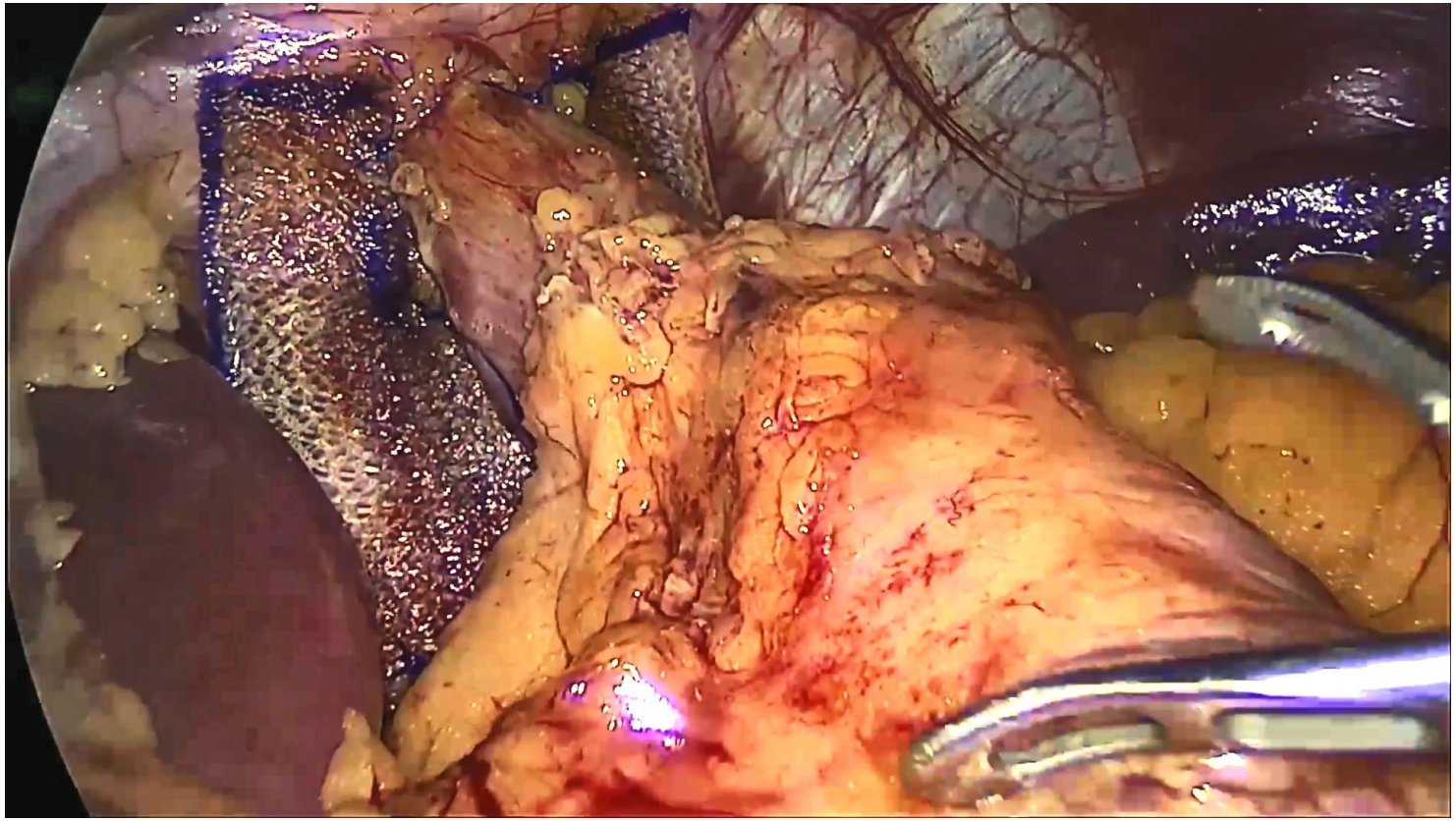
Check for updates

Ligamentum Teres Cardiopexy as a Late Alternative for Gastroesophageal Reflux Disease in a Patient with Previous Reversal of Gastric Bypass to Sleeve Gastrectomy and Hiatal Hernia Repair

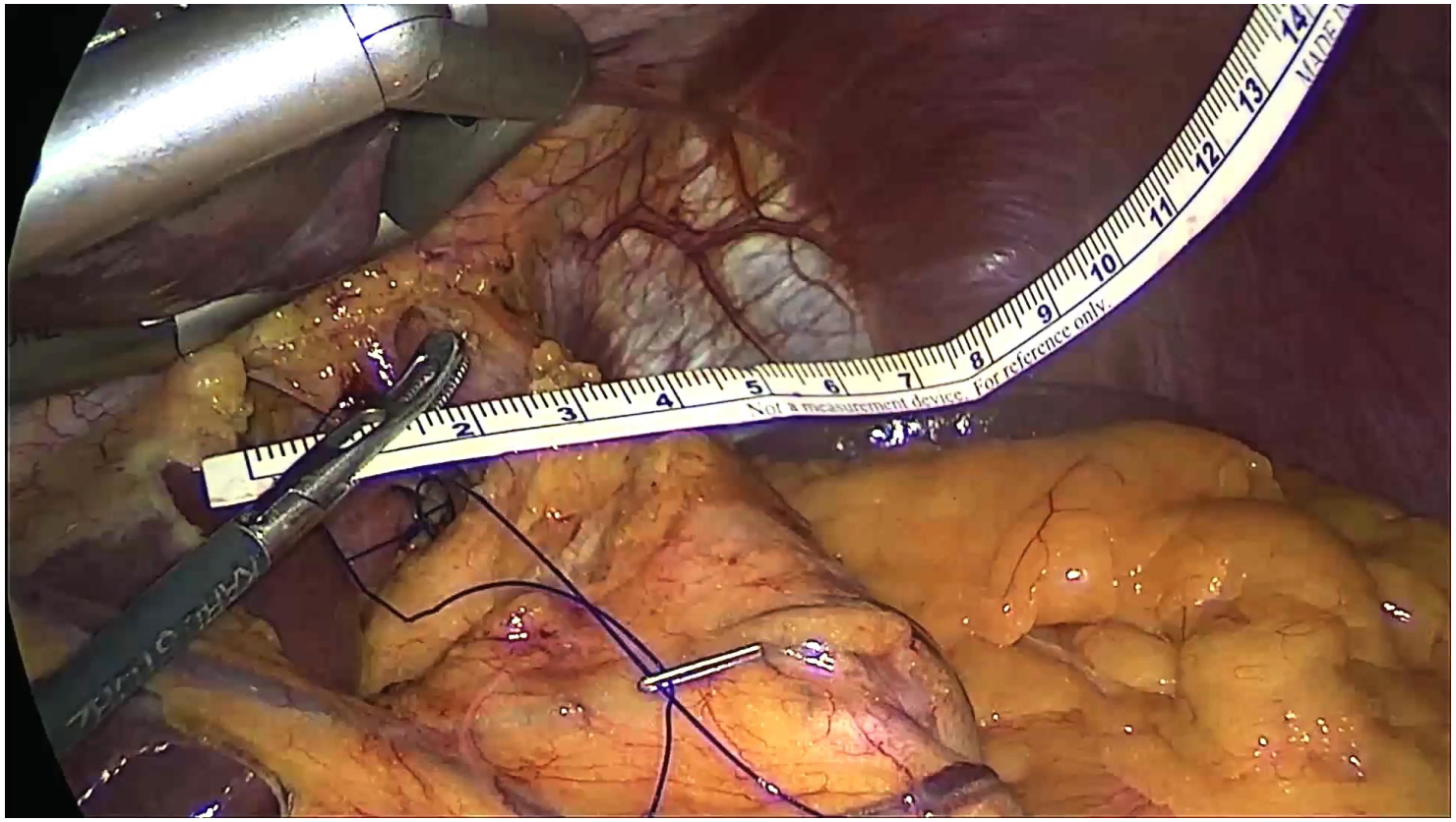
Ramon Vilallonga[1] · Sergi Sanchez-Cordero[2] · Piero Alberti[3] · Ruth Blanco-Colino[3] · Amador Garcia Ruiz de Gordejuela[1] · Enric Caubet[1] · Oscar Gonzalez[1] · Renato Roriz-Silva[4] · Manel Armengol[3] · José Manuel Fort[1]

HHR & RYGB/OAGB

Prevention of recurrence/ITM

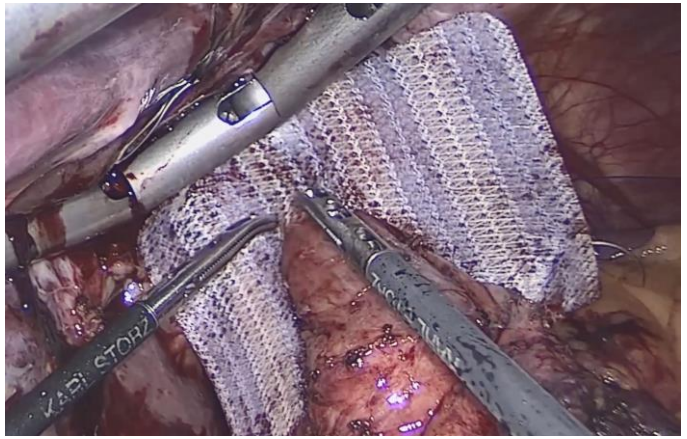


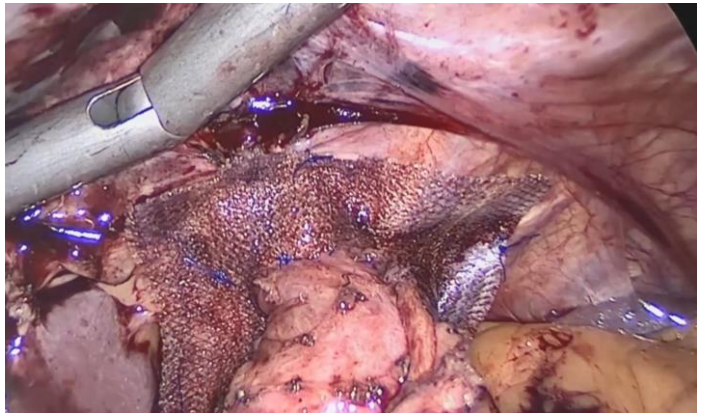
HHR & RYGB/OAGB
Prevention of recurrence/ITM

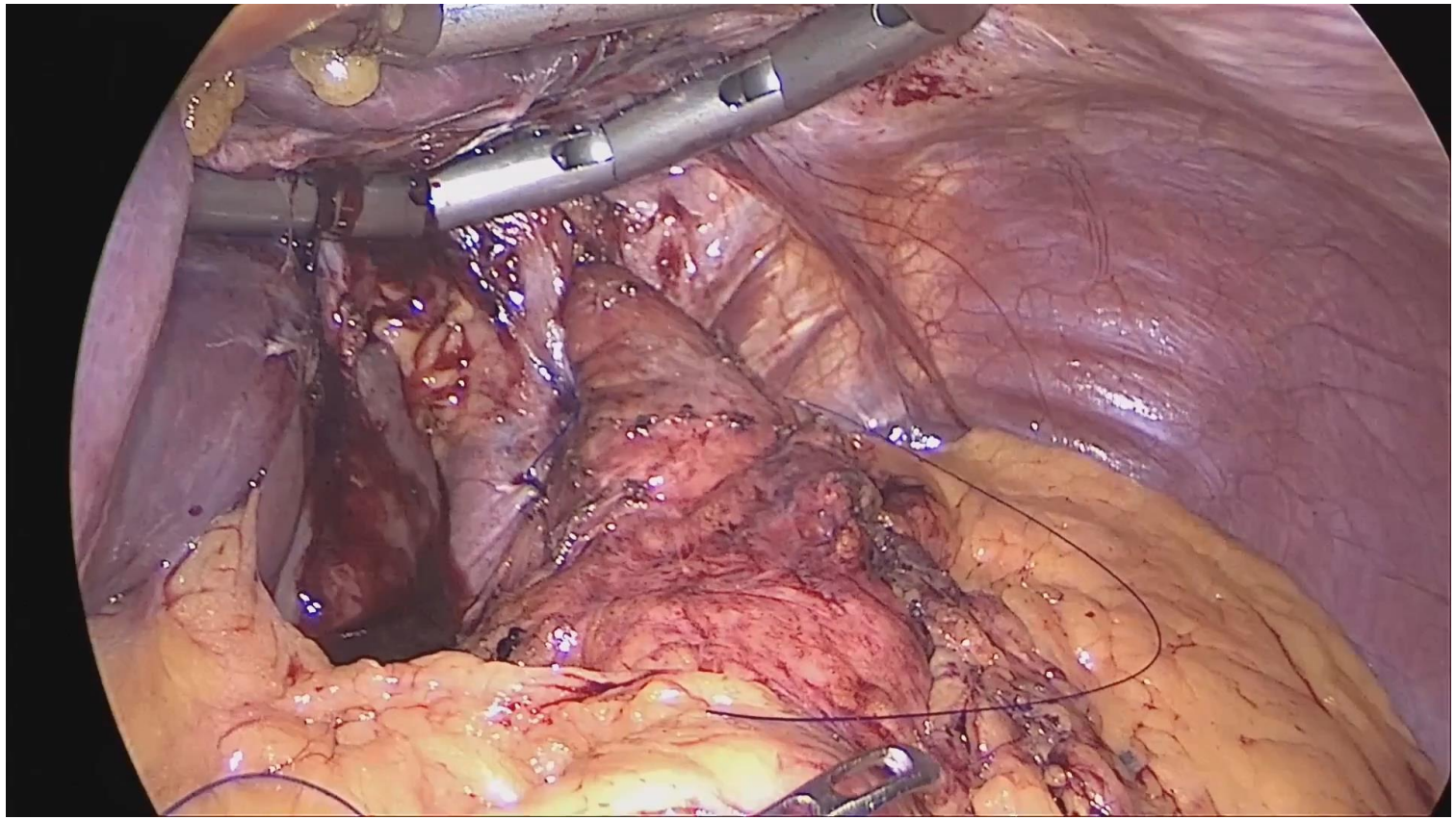


HHR & RYGB/OAGB

Prevention of recurrence/ITM

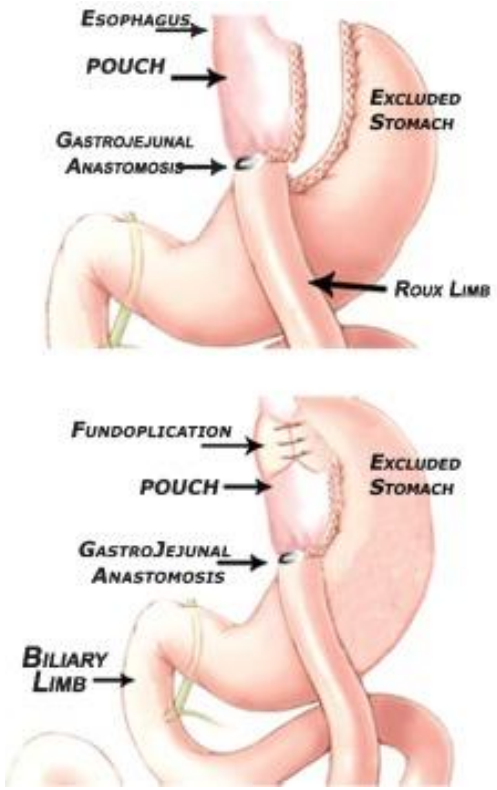


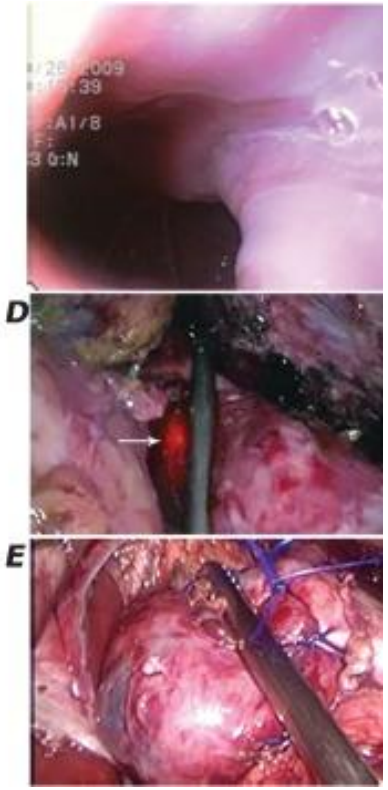




HHR & RYGB/OAGB
Prevention of recurrence/ITM

- Modified Nissen fundoplication



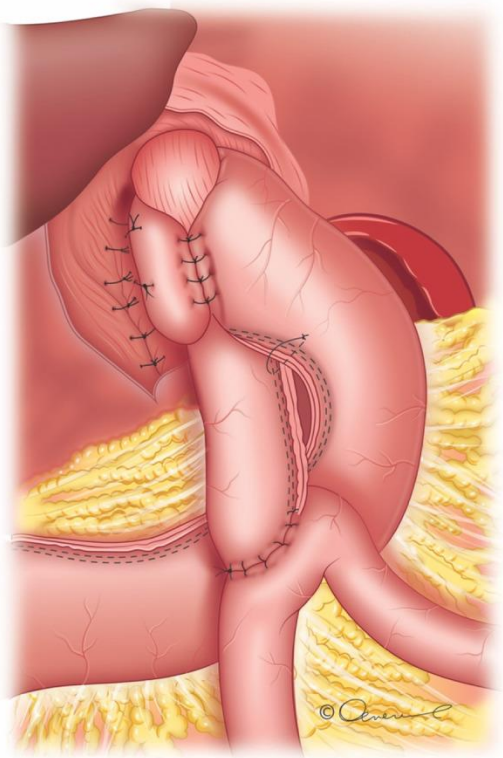


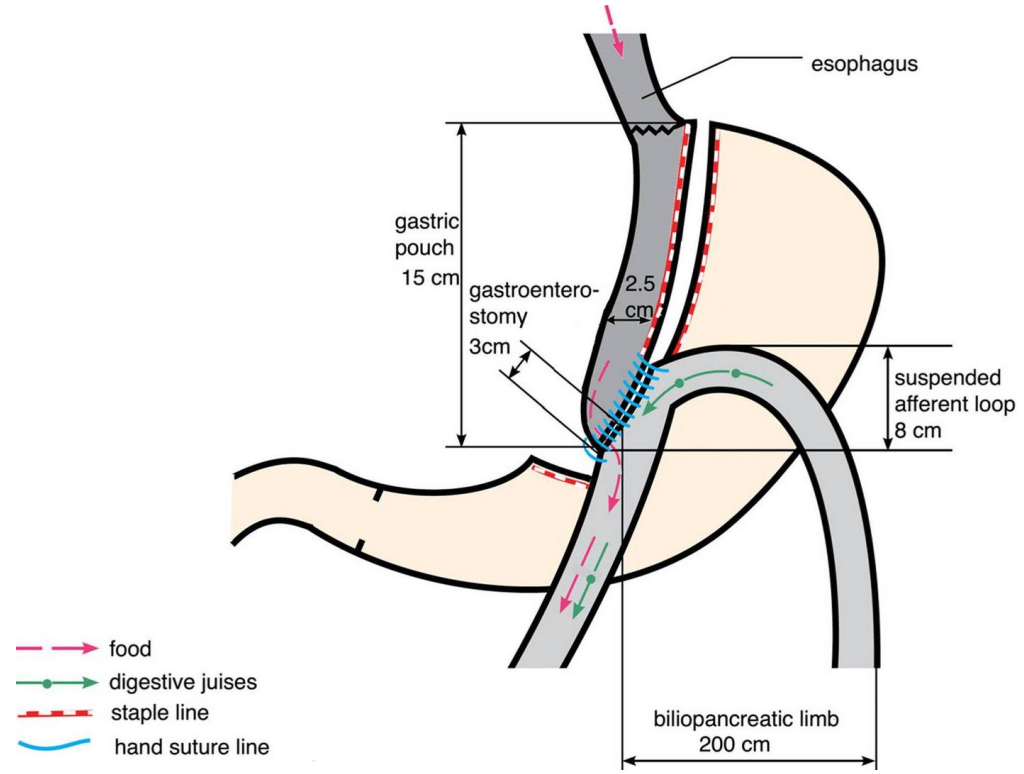
Kawahara NT, Alster C, Maluf-Filho F, Polara W, Campos GM, Poli-de-Figueiredo LF. Modified Nissen fundoplication: laparoscopic antireflux surgery after Roux-en-Y gastric bypass for obesity. Clinics (Sao Paulo). 2012;67(5):531-3

HHR & RYGB/OAGB

Prevention of recurrence/ITM

FundoRingOAGB trial

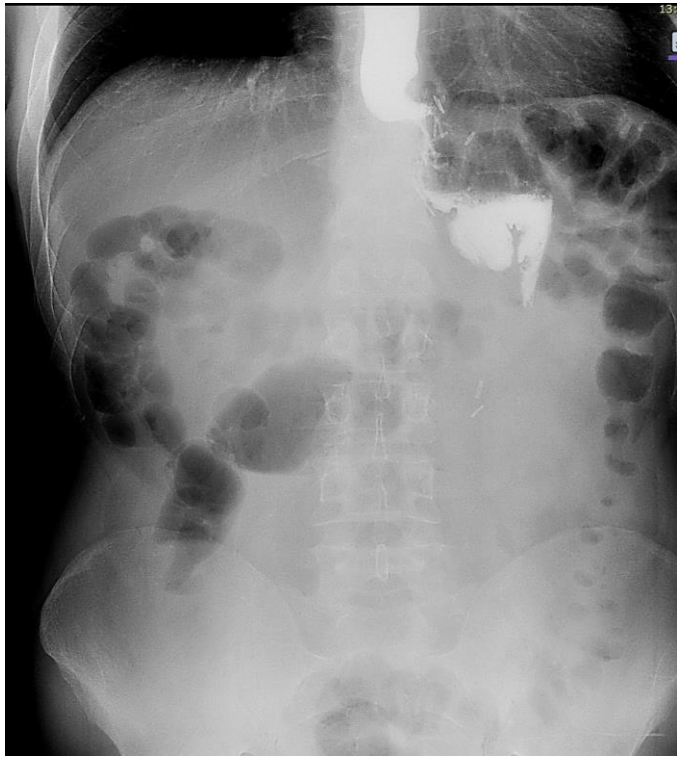




Ospanov O, Yeleuov G, Fursov A, Yelembayev B, Fursov R, Sergazin Z, Mustafin A. A laparoscopic one anastomosis gastric bypass with wrapping versus nonwrapping fundus of the excluded part of the stomach to treat obese patients (FundoRingOAGB trial): study protocol for a randomized controlled trial. Trials. 2022 Apr 7;23(1):264

Recurrent Hiatal Hernia after HHR & RYGBP

- 46 yo male, 7 years after RYGBP&HHR



Recurrent Hiatal Hernia after HHR & RYGBP

- 46 yo male, 7 years after RYGBP&HHR

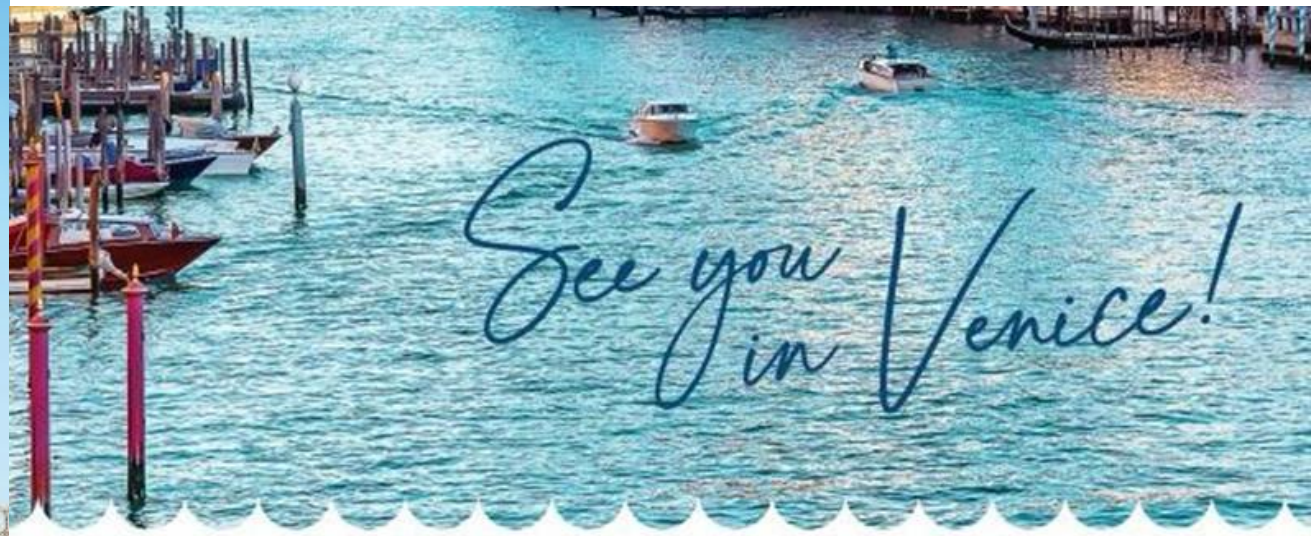
Conclusions

- HH is highly prevalent in bariatric surgery candidates
- HH of any size should be repaired at the time of MBS to prevent further complication
- Preventing the intrathoracic migration will be always considered for primary and revisional HHRs

IFSO
European Chapter

13th Congress of the International Federation for the Surgery of Obesity (IFSO) European Chapter

15-17 May 2025 | Venice, Italy



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