

Paraesophageal Hiatal Hernias: Is This Hernia Different From All Other Hernias? Why, and How to Repair.

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Hiatal Hernia

- Widening of the space between the diaphragmatic crura
- Weakening of the phrenoesophageal membrane
- Protrusion of the stomach into the thoracic cavity

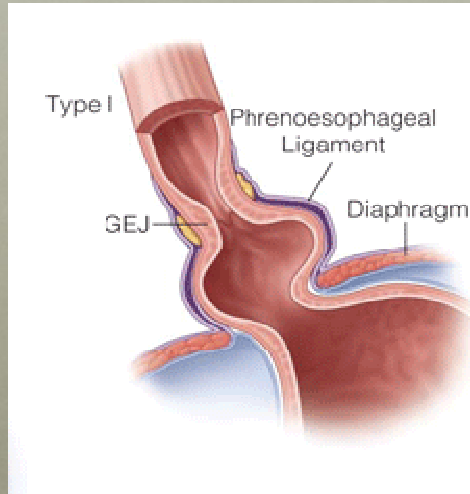


History of Paraesophageal Hernias

- Ake Akerlund first used the term “hiatus hernia” in 1926 and described 3 subtypes
- Allison (1951) association of HH with GERD
- Belsey (1961) Smaller hernias (type I) result in reflux
- Massive hernias (type II) asymptomatic
- Sporadic reports of incarceration 1950’ s

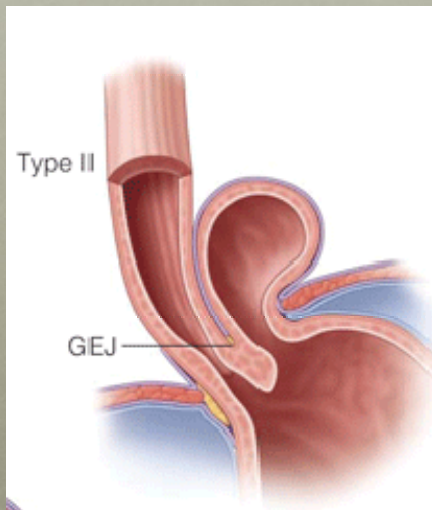
Type 1 Sliding HH

- EG Junction above/proximal to stomach
- 95% of HH's
- 60% have GERD
- Can progress to type 3 or 4

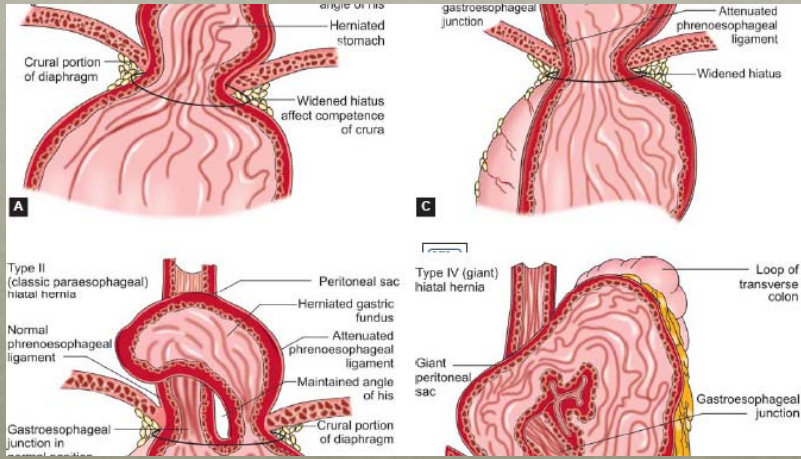


Type 2 Pure Para-Esophageal

- EG Junction below diaphragm
- Isolated herniation of stomach
- Usually antero-left lateral
- Rare

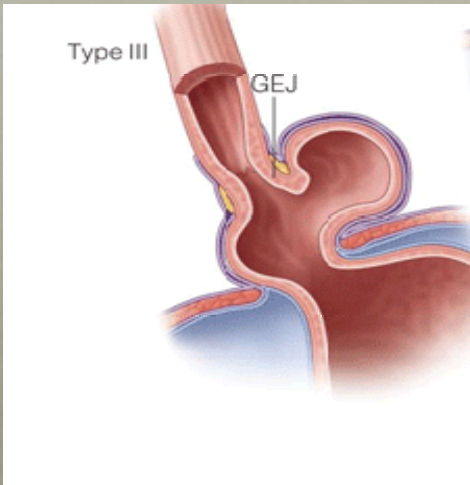


Type 3 Mixed Para-Sliding HH

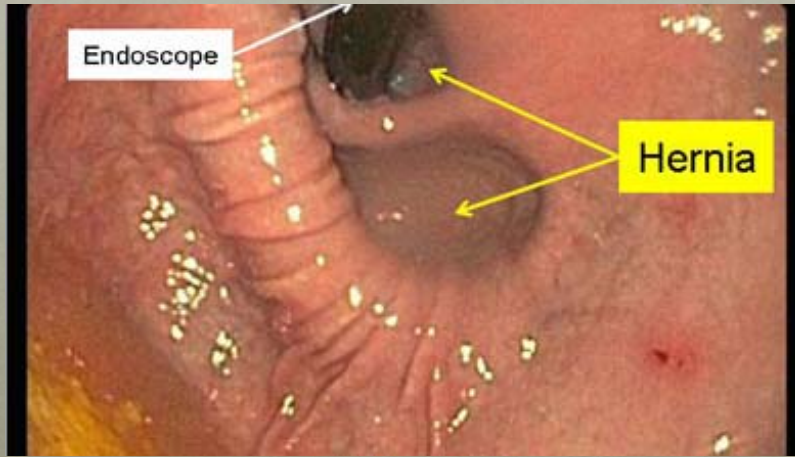


Type 3 Mixed Sliding/Paraesophageal

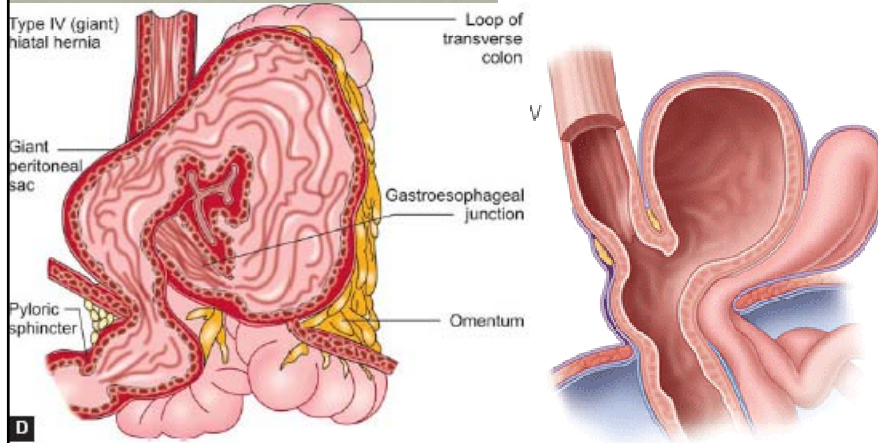
- EG junction above diaphragm
- Fundus above EG junction
- Most common type of PEH



Type 3



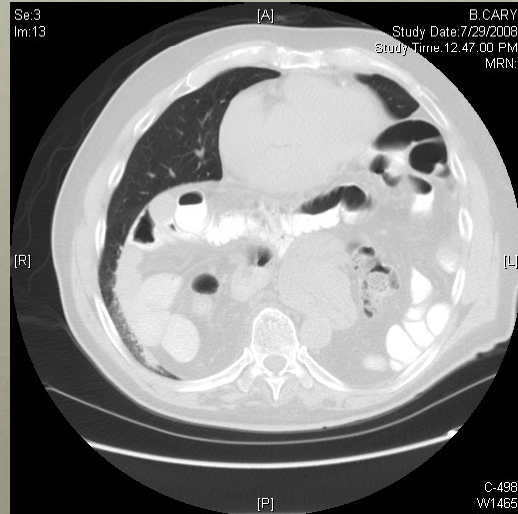
Type 4 Giant/Complex HH



Type 4 with Colon in Chest



Type 4

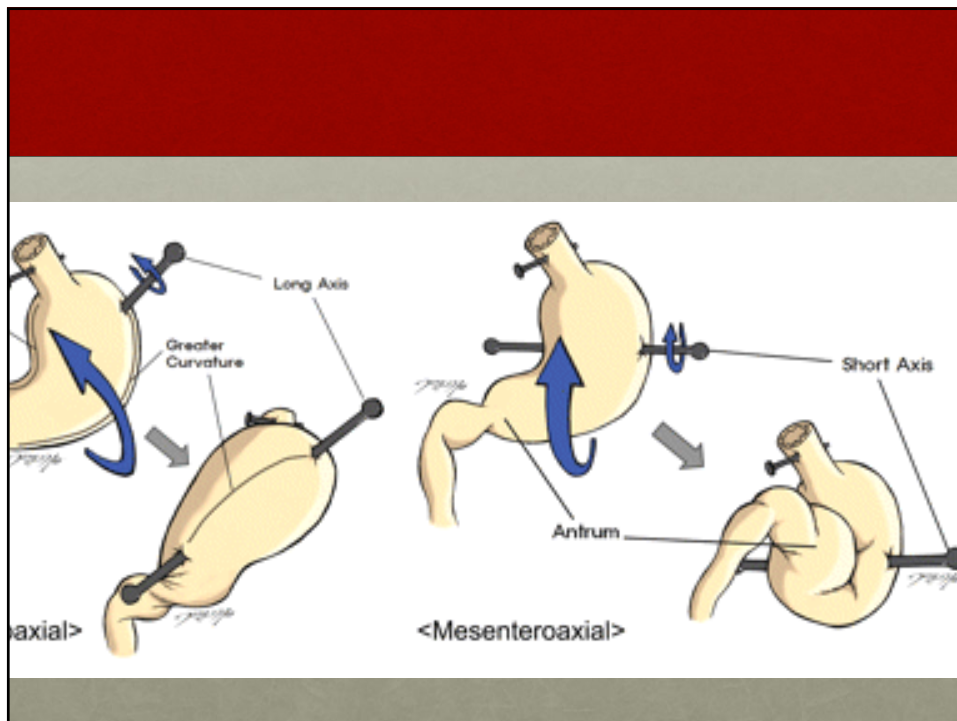


Symptoms

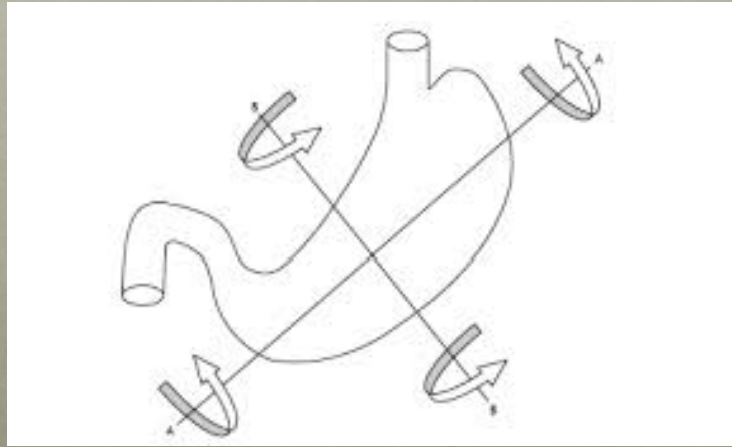
- “Most PEH are asymptomatic”
- Early satiety / Bloating 50%
- Nausea or vomiting
- Dysphagia – 45%
- Post prandial chest pain
- Reflux - 60%
- Exertional dyspnea – 30%

Complications of Paraesophageal Hiatal Hernia

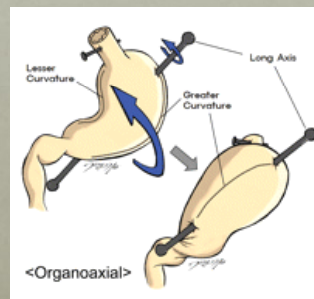
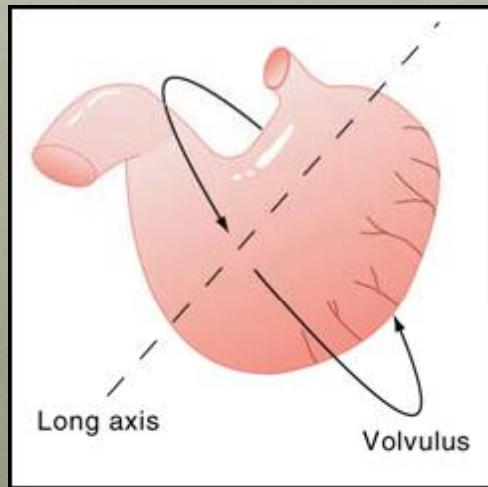
- Most paraesophageal hernias occur as a progression of sliding hernia and reflux can resolve as a result
- Chronic Anemia
 - Cameron's ulcers
- Aspiration
- Hoarseness
- Volvulus
- **Strangulation/Perforation**



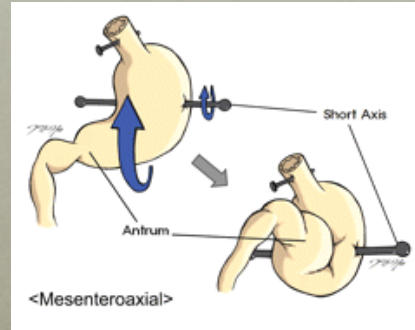
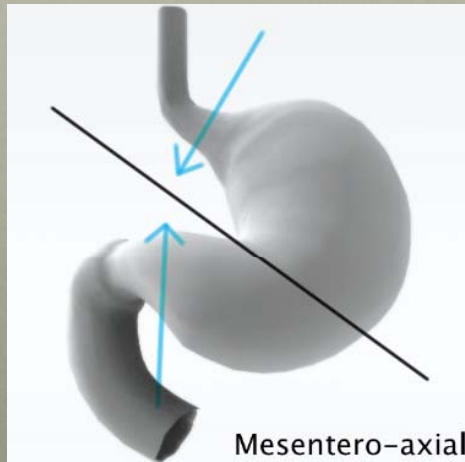
Volvulus



Organoaxial Volvulus



Mesoaxial Volvulus



Borchardt's Triad

- Epigastric or chest pain
- Inability to vomit
- Failure to pass a nasogastric tube

- Incarceration/Strangulation
- Emergent Evaluation

Surgical Dogma

- The presence of PEH is indication for repair
- Hill LD. Incarcerated paraesophageal hernia. A surgical emergency. Am J Surg. 1973;126:286–291
- Of twenty-nine patients with paraesophageal hernia, incarceration and strangulation occurred in ten or 30.4 per cent
- In four patients in whom a nasogastric tube could not be passed making immediate operation mandatory, the mortality was 50 per cent
- This experience suggests that paraesophageal hernia should be corrected unless the patient is not a candidate for surgery

Risk of Death from PEH

- Paraesophageal hernias: operation or observation?
Stylopoulos N, Gazelle GS, Rattner DW. Ann Surg. 2002;236:492–501
- Acute complications 1.1% per year
- Those with acute complications had 5% mortality
- Overall low yearly mortality

Indications for Surgery

- Many patients with paraesophageal hernias are elderly
- Risk of incarceration vs. Risk of surgery
- All patients with symptoms of recurrent painful episodes
- Chronic anemia
- Severe symptoms

Components of Repair

- Complete reduction of stomach
 - Excision of the hernia sac
- Mediastinal esophageal mobilization
 - Axial tension - Collis gastroplasty
- Crural repair
 - Lateral tension - crural relaxing incision
 - Reinforcement
- Fundoplication

Controversies

- Open vs Laparoscopic Approach
- Reduce/Excise Sac
 - Most or all now in agreement
- Need for Collis Gastroplasty
- Mesh reinforcement

First Laparoscopic Case Report

- Cuschieri A, Shimi S, Nathanson LK. Laparoscopic reduction, crural repair, and fundoplication of large hiatal-hernia. *Am J Surg.* 1992;163:425–430
- Sac excision was not part of the operation

Open vs Laparoscopic

- Controversies in paraesophageal hernia repair: a review of literature. Draaisma WA, Gooszen HG, Tournoij E, et al. Surg Endosc. 2005;19:1300–1308
- Complications 0% to 14% in Lap and 5.3% and 25% in open series.
- The median mortality rate in the laparoscopic reports was 0.3% (range, 0% to 5.4%) and 1.7% (range, 0% to 3.7%) after open repair.
- In addition, the median hospital stay after laparoscopic repair was shorter

Open vs Laparoscopic

- Utilization and outcomes of laparoscopic versus open paraesophageal hernia repair. Nguyen NT, et al. Am Surg. 2011;77:1353–1357
- University Health System Consortium database
- Laparoscopic (n = 2069) or Open (n = 657) PEH repair between 2007-10.
- Laparoscopic repair 81%
- Shorter hospital stay 3.7 vs 8.3 days, (P < 0.01),
- ICU 13% vs 35%, (P < 0.01),
- Complications 2.7% vs 8.4%, (P < 0.01),
- 30-day readmissions 1.4% vs 3.4%, (P < 0.01)
- Cost \$15,227 vs \$24,263, (P < 0.01).
- Mortality 0.4 % versus 0% for open repair.
- In patients presenting with obstruction or gangrene, utilization of laparoscopic repair was 57%

Laparoscopic repair of PEH

- 20 studies reviewed, safety & durability
- 1415 patients attempted repair
- Mean age 65
- 94% antireflux operation
- 5% operative complications
- 10 studies follow up performed (mean 16 months)
- Anatomic recurrence 26.9%

Surg Laparosc Endosc Percutan
Tech 2006

Recurrence Rates Following Open Repair

Open Recurrence Rates

Author	n	Gastroplasty	Recurrence	Reoperation	F/U
Altorki	47	0	1 (2%)	2%	Pt Contact
Pearson	94	80%	2 (2%)	2%	Interview/UGI At 1, 5, 10 yrs
Allen	124	66%	1 (1%)	1%	Chart, interview, questionnaire
Ellis	119	0	13 (11%)	8%	Chart, interview, questionnaire

Laparoscopic Repair: Objective Followup Reveals High Recurrence Rate

Bremner, J Am Coll Surg, 2000

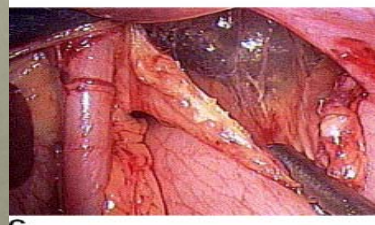
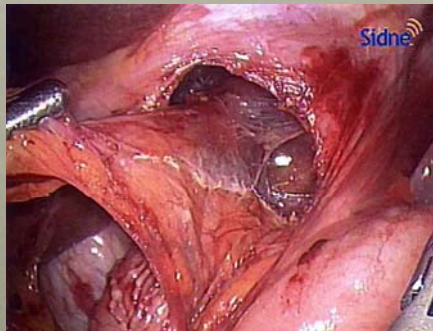
Video Esophagram Recurrence Rates

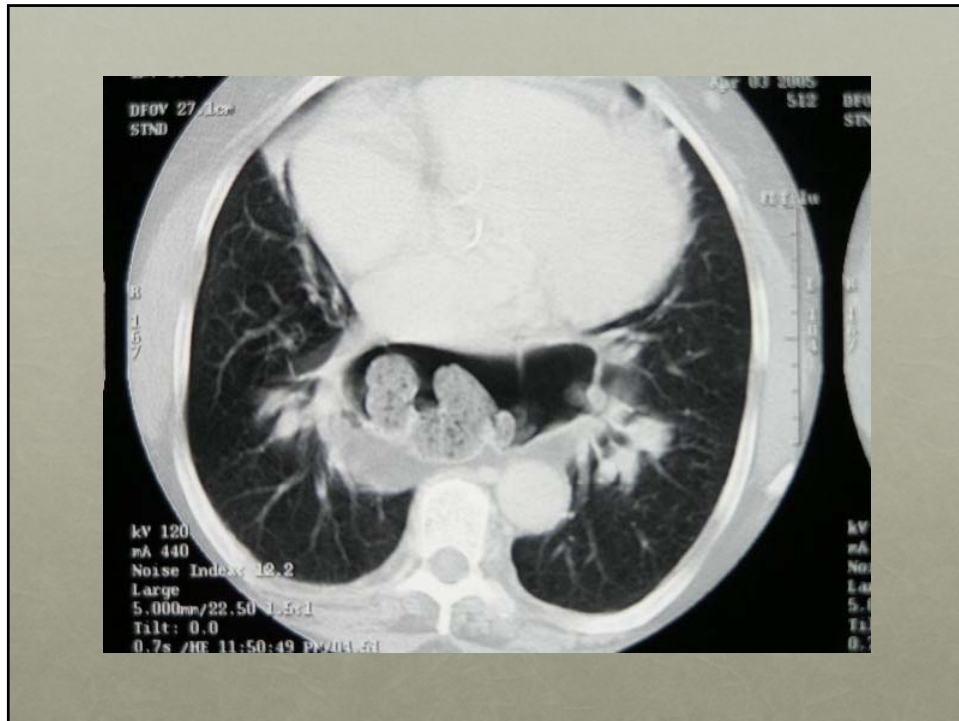
Open*	3/20 (15%)
Laparoscopic	9/24 (42%)

P < 0.001

*2 transabdominal, 1 thoracic

Sac Excision





Esophageal Length

- No routinely accepted technique/definition for determining short esophagus
- Herbella FA, Del Grande JC, Colleoni R. Short esophagus: literature incidence. *Dis Esophagus*. 2002;15:125–131
- 11.8% Short esophagus with PEH
- Others have shown over 20%

The short esophagus: Intraoperative assessment of esophageal length

Sandro Mattioli et al. Division of Esophageal and Pulmonary Surgery Villa Maria Cecilia e San Pier Damiano Hospitals, University of Bologna, Bologna, Italy

- observational prospective study from September 10, 2004, to October 31, 2006, was performed at 8 centers
- measured intraoperatively before and after esophageal mediastinal dissection; a distance of 1.5 cm was arbitrarily determined to categorize cases as long (>1.5 cm) or short (\leq 1.5 cm).
- True short esophagus is present in about 20% of patients undergoing routine antireflux surgery. Radiology, severity, and duration of symptoms are predictors of true foreshortening.

Laparoscopic repair of PHH

- Prospective series 01/1995 to 06/2005
- Impact of age on repair
- 171 patients: 72% women
- Mean age 65
- Mean follow up 25 months
- Recurrence 26% (“adequate follow up “)

Washington University Surgery
2006

Antireflux surgery for Barrett's esophagus: comparative results of the Nissen and Collis-Nissen operations

L.-Q. Chen, P. Ferraro, J. Martin, A. C. Duranceau
Department of Surgery, Division of Thoracic Surgery, Centre Hospitalier de l'Université de Montréal, Quebec,
Canada

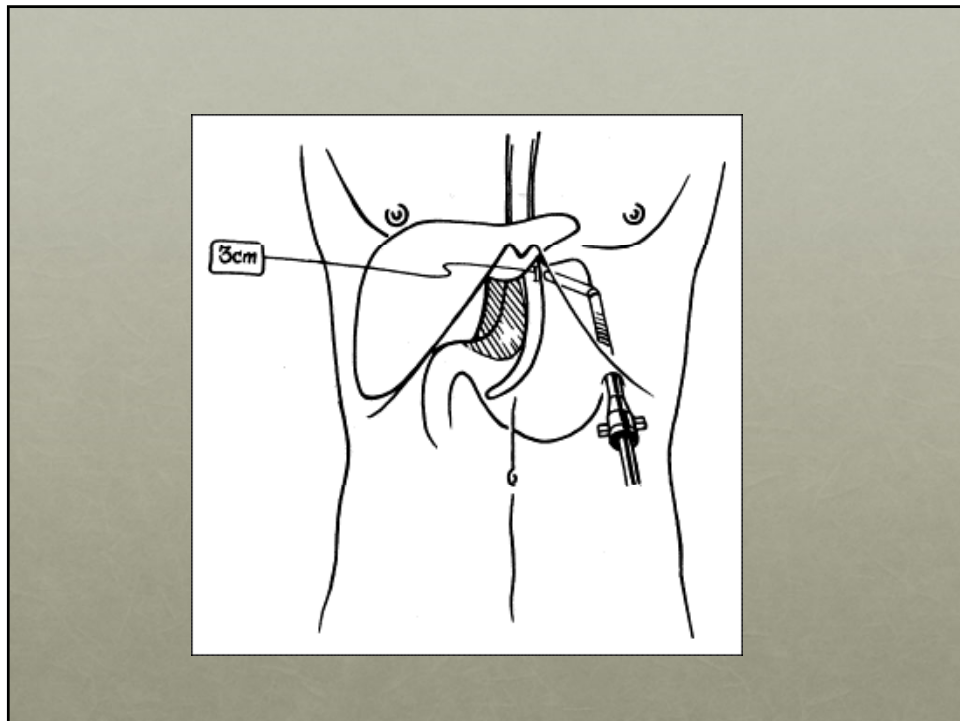
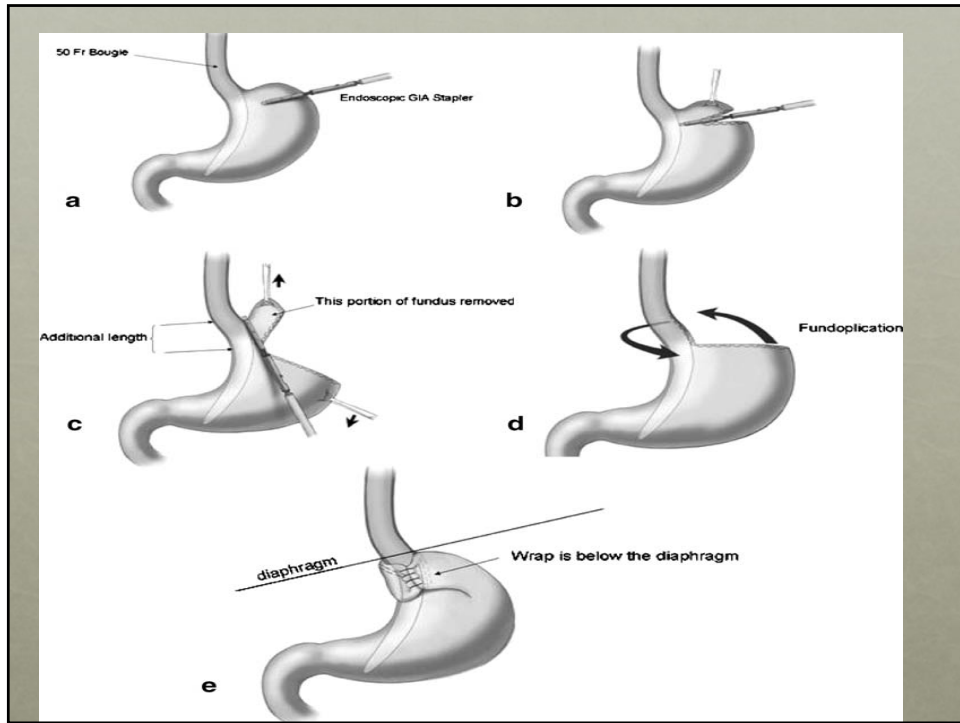
- Nissen and Collis-Nissen operations when treating Barrett's esophagus (1976-1989)
- 33 Nissen fundoplication.
- 51 Collis-Nissen operation
- Postoperative reflux symptoms were more frequent in the Nissen group (52%) when compared to the Collis group (7%, $P < 0.001$). These symptoms correlated with the 24-h pH recordings revealing an increased acid exposure in the Nissen group (3.4%) as opposed to 1% in the Collis group ($P = 0.003$).

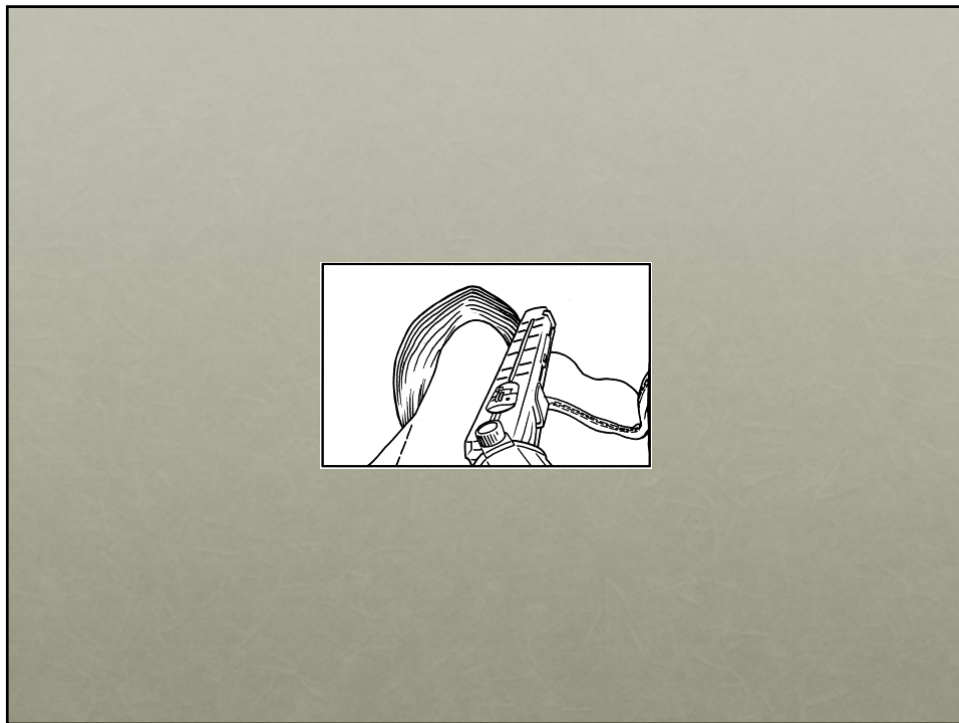
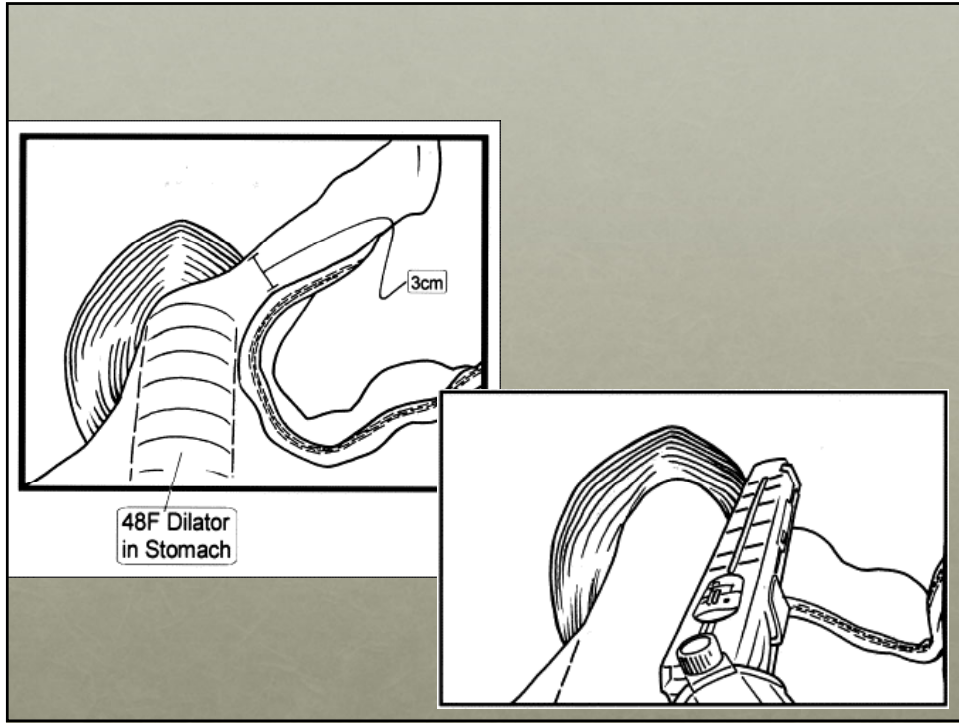
Historical background of the wedge Collis gastroplasty

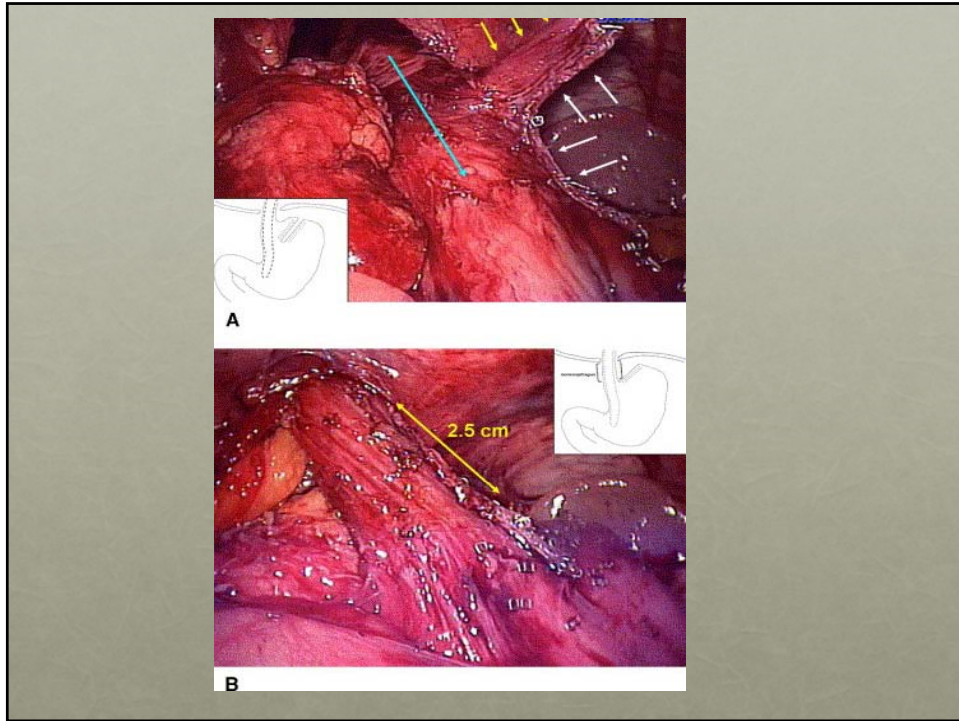
J.K. Champion M.D., F.A.C.S.
video presentation at Society of Gastrointestinal
Endoscopic Surgeons in 2000

Stapled-wedge Collis gastroplasty for the shortened esophagus

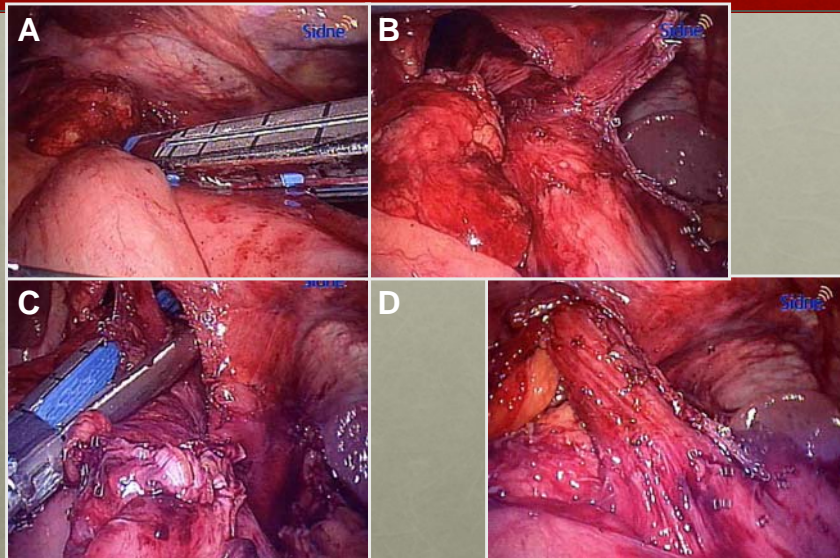
M.L. Terry et al. Am J Surg 188 (2004)



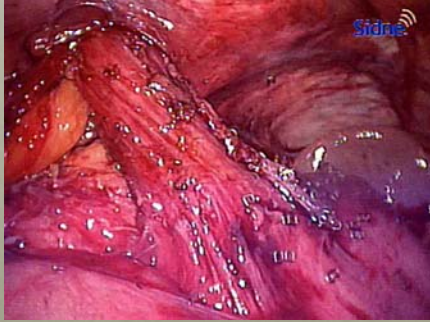




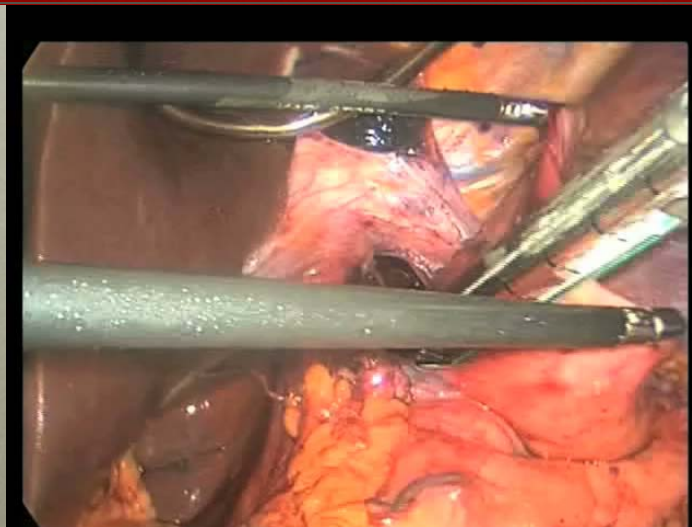
Wedge Collis Gastroplasty



Completed Gastroplasty



Wedge Gastroplasty



Wedge Gastroplasty Results

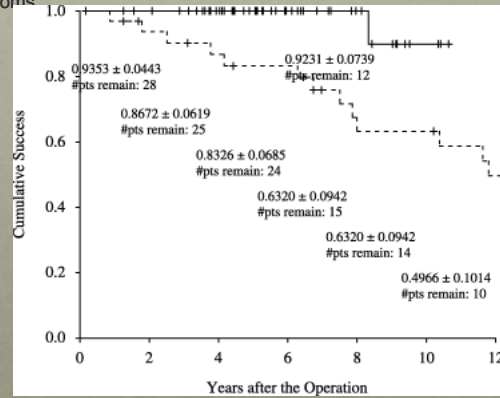
- Hunter, Oregon
 - 16 patients
- Houghton, Paiolero, Mayo
 - 63pts, 47 wedge gastroplasty
 - 2%recurrence
- Maddaus et al.
 - 61 patients wedge gastroplasty, 20% after previous failed repair
 - 4%recurrence

Collis Outcomes

- **Quality of life after Collis gastroplasty for short esophagus in patients with paraesophageal hernia.** Nason et al. Ann Thorac Surg. 2011 Nov;92(5):1854-60
- 795 Lap PEH repairs, Collis, n = 454; fundoplication alone, n = 341.
- Collis patients had significantly larger GPEH ($p = 0.027$) and fewer comorbidities ($p = 0.002$).
- Radiographic recurrences were similar ($p = 0.353$).
- Symptom improvement was significant for both ($p < 0.001$), although Collis was associated with better pain resolution ($p < 0.001$) and less gas bloat ($p = 0.003$).
- Quality of life was good to excellent in 88% (90% Collis versus 86% fundoplication alone, $p = 0.17$).

Antireflux surgery for Barrett's esophagus: comparative results of the Nissen and Collis-Nissen operations

Repair failure were either the endoscopic/histologic evidence of mucosal erosion/ulcer/stricture on the latest follow-up, or radiologic/endoscopic evidence of a displaced/disrupted overtight fundoplication, irrespective of the presence of reflux symptoms



What about Mesh

- All other hernias routinely repaired with mesh
- 50-90% reduction in recurrence rates

However

- Concerns with erosion or stenosis
- Complex problems can result

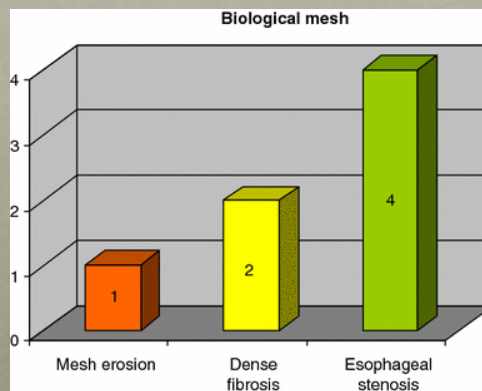
When Mesh Goes Bad!

- Reoperative Intervention in Patients with Mesh at the Hiatus is Associated with High Incidence of Esophageal Resection-A Single-Center Experience. Nandipati et al. J. Gastrointest Surg.
- 26 pts presented for re-op
- 15 dysphagia, 3 erosion
- 56% synthetic mesh others biologic
- Almost 50% had resection

Mesh complications after prosthetic reinforcement of hiatal closure: a 28-case series

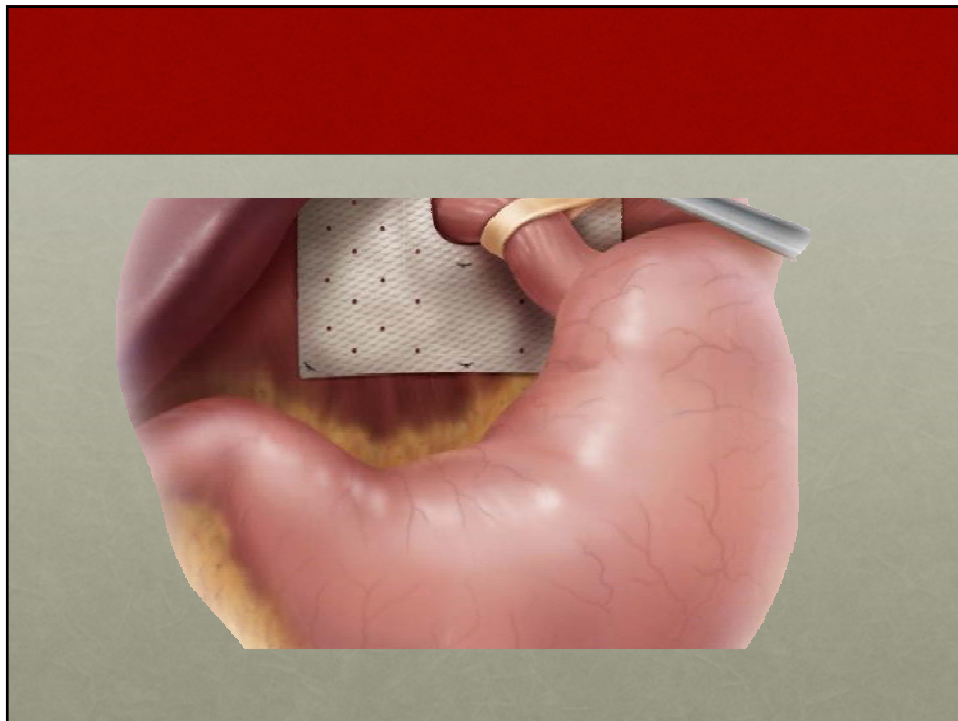
Rudolf J. Stadhuber¹, Amr El Sherif¹, Sumeet K. Mittal¹, Robert J. Fitzgibbons Jr¹, L. Michael Brunt², John G. Hunter³, Tom R. DeMeester⁴, Lee L. Swanstrom⁵, C. Daniel Smith⁶ and Charles J. Filipi¹

- 28 cases
- 8 polypropylene
- 12 PTFE
- 7 Biologic
- 15/21 synthetic had erosion
- Only 1/7 biologic
- 9 required resection
- 5 on tube feeds

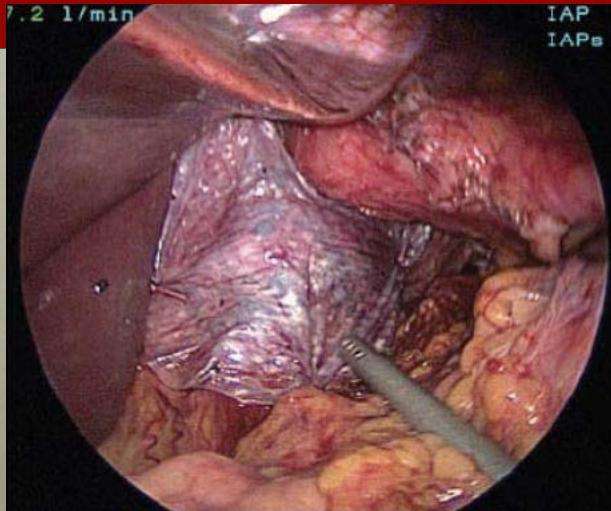
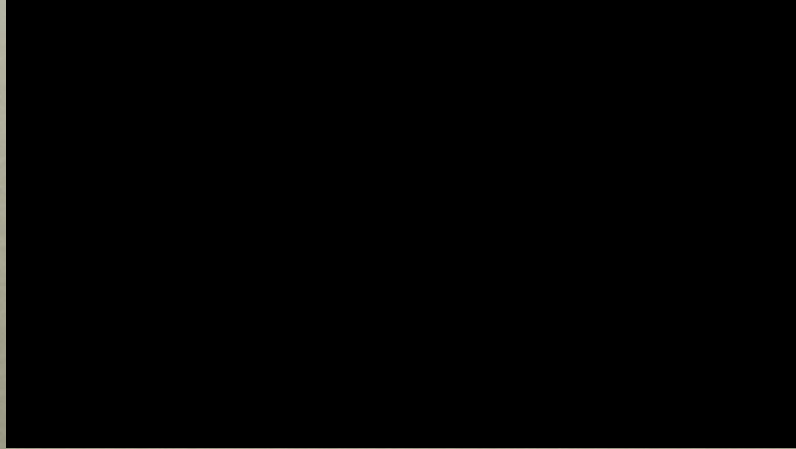


Biologic Grafts

Graft	Animal	Tissue	Crosslinked
Biodesign®	Porcine	Submucosa	
Strattice®	Porcine	Dermis	
Xenmatrix®	Porcine	Dermis	
Surgimend®	Bovine	Dermis	
Permacol®	Porcine	Dermis	X
Veritas®	Bovine	Pericardium	



Hiatal Closure



Technical Points



Is mesh safe, effective, or necessary in paraesophageal hernia repair?

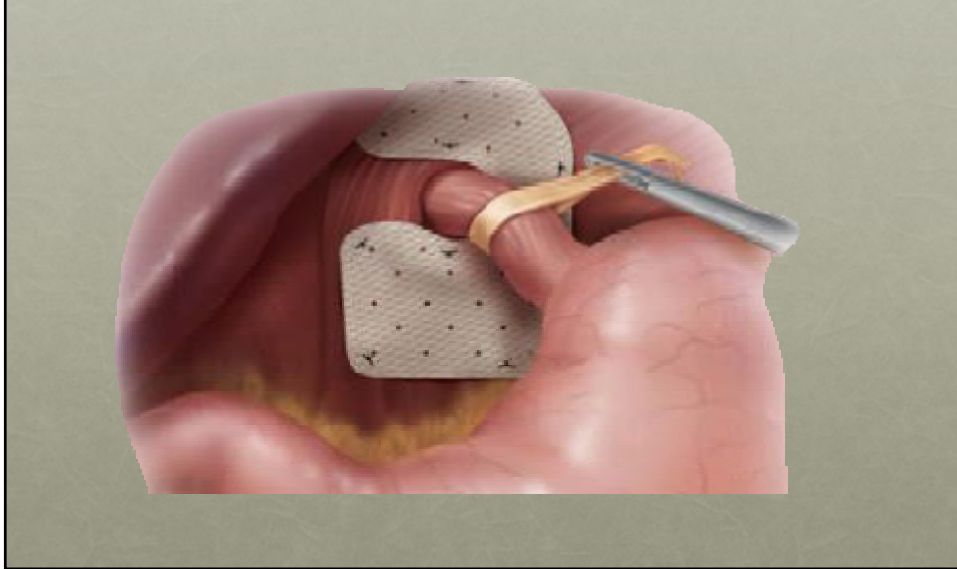
Biologic Prosthesis to Prevent Recurrence after Laparoscopic Paraesophageal Hernia Repair: Long-term Follow-up from a Multicenter Prospective Randomized Trial

J Am Coll Surg 2011;213:461-468.

Brant K Oelschlager, MD, FACS, Carlos A Pellegrini, MD, FACS, John G Hunter, MD, FACS, Michael L Brunt, MD, FACS, Nathaniel J Soper, MD, FACS, Brett C Sheppard, MD, FACS, Nayak L Polissar, PhD, Moni B Neradilek, MS, Lee M Mitsumori, MD, Charles A Rohrmann, MD, Lee L Swanstrom, MD, FACS

- 108 patients
- Primary vs. SIS mesh
- Recurrence @ 6 months: 24% vs. 9%
- Recurrence, symptoms, and QOL @ 5 years: no difference

New Mesh Configurations



So Why is PEH Different

- Axial tension in addition to radial tension that is usual with hernias
- Negative pressure on thoracic side
- Hollow viscus must cross through defect
- Functional concerns / Dysphagia
- Little room for mesh overlap
 - IVC, Liver
- Closest analogy is parastomal hernia

Summary

- PEH repair is technically challenging
- High recurrence rates
- Patient selection
- Axial and Radial tension
- Appropriate use of lengthening, relaxing and mesh techniques
- Still in evolution