PARAESOPHAGEAL HERNIAS - 2

Anatomy of GE Junction:

- Phrenoesophageal membrane anchors distal esophagus to diaphragm near squamocolumnar junction at diaphragmatic hiatus
- Swallowing causes physiologic herniation
- Wear and tear may account for age-related degeneration of PE membrane
- LES – 2cm segment of tonically contracted smooth muscle at level of squamocolumnar
- LES and crus act as "double sphincter"

Type I (Sliding) Hernia:

- 95% of hiatal hernias
- Circumferential laxity of the phrenoesophageal membrane
- Definition – 3cm of gastric pouch herniates upwards
- Propensity to develop GERD
- "Two-hit hypothesis" o GERD – decreased LES pressure as well as hiatus hernia, although hiatus hernia may decrease LES pressure
- Hiatus hernia contributes to poor esophageal emptying, as well as re-reflux, which occurs predominantly during inspiration (loss of one-way valve of crura)
- Medical Management
    - step-up vs. step-down therapy
    - lifestyle modification
    - acid suppressive medications (H2 blockers, proton-pump inhibitors)
        - do not supress reflux, but remove caustic elements from refluxate
        - H2 blockers should elicit relief after 6 weeks
        - Proton-pump inhibitors faster and more effective in healing esophagitis
            - carcinoid risk in rats, not in animal models resembling human physiology
            - atrophic gastritis may form in setting of H. pylori infections
        - dose dependent effects on healing from both medications
- Surgical Management
    - Indications
        - inability to tolerate medication
        - Barrett's without severe dysplasia or carcinoma
        - refractory GERD
        - benign stricture
        - refractory extra-esophageal GERD (asthma, laryngeal disease)
    - preoperative testing should include manometry, upper GI to evaluate esophageal length
    - surgical considerations – wrapping distal esophagus circumferentially, or partially, esophageal lengthening, recreating angle of His
        - Nissen fundoplication – 360^{o} wrap, appropriate for
        - Belsey Mark IV – transthoracic partial wrap
        - Toupet, Hill, Dfor – imbrication of anterior/posterior lesser curvature, or greater curvature (partial wraps either with lesser or greater curvature)

- Collis – gastroplasty

Type II, III, IV (Paraesophageal) Hernia:

- 5% of hiatal hernias
- Recognized complication of surgical dissection of the hiatus
- Associated with laxity of gastrocolic and gastrosplenic membranes
- Esophageal shortening secondary to adhesions/scar formation from chronic herniation thought to play a role in persistence of herniation as well as recurrence
- Type II – localized defect in phreno-esophageal membrane, gastric fundus is lead point of herniation, GE junction below the diaphragm
- Type III –elements of Type I and Type II with displacement of the GE junction above the diaphragm
- Type IV – herniation of colon, spleen, small intestine, as well as stomach
- Organoaxial volvulus – rotation of stomach along its own axis
- Mesenteroaxial volvulus – rotation of stomach along the transverse axis
- Symptoms – dysphagia, bleeding (Cameron's ulcers), respiratory complications
- Characterized by progressive enlargement and development into Type III, IV
- Giant paraesophageal hernias defined as > 1/3 stomach above diaphragm
- Surgical repair often recommended – 45% progress with symptoms, 25% death from torsion/gangrene/perforation (as per 1967 paper)
- Elements of repair include: (not all required in all cases)
    - Reduction of herniated stomach into abdomen
    - Excision of the hernia sac (herniotomy)
    - Repair of hernia (herniorrhaphy)
        - mesh
        - no mesh
    - Antireflux procedure
        - Nissen
        - Collis-Nissen
    - Gastropexy (G – tube, pexy to diaphragm)
- Recurrence common

Pierre et al., "Results of Laparoscopic Repair of Giant Paraesophageal Hernias: 200 Consecutive Patients", *Annals of Thoracic Surgery,* 2002, 74(6): 1909-1916

- retrospective review of 200 cases of giant paraesophageal hernias (> 1/3 stomach in chest)
- all patients had UGI and endoscopy
- surgical technique: laparoscopic Collis-Nissen most common
- barium study POD #1
- clears and discharge home POD #2
- results – 69 Nissens, 112 Collis-Nissen, 12 partials, 5 simple reduction with gastrostomy tube, 1 Collis with partial wrap, 1 Roux-en-Y gastric bypass
- 6 leaks, 1 death
- 6 intraoperative esophageal perforations, 1 gastric perforation – repaired laparoscopically

- 18 month follow-up (median) – 84% with excellent quality of life scores, 8% good, 5% fair, 3% poor
- 16% post-op antacid
- 6% dysphagia requiring dilation
- 5/200 recurrence requiring revision surgically

Ferri, et al. "Should Laparoscopic Paraesophageal Hernia Repair be Abandoned in Favor of the Open Approach?", Surgical Endoscopy, November 2004.

	Open	Laparoscopic	*p* Value
Characteristics			
Number	25	35	
Age (years)	66 (41–84)	68 (30–84)	0.4
Gender (male) *n* (%)	10 (40)	13 (37)	0.8
ASA > 2 *n* (%)	10 (40)	14 (40)	1.0
BMI (mg/kg^2)	28.8 ± 4.9	28.1 ± 4.5	0.6
Prior abdominal Surgery *n* (%)	9 (36)	19 (52)	0.4
Symptoms[a] *n* (%)			
Postprandial pain	11 (44)	16 (46)	NS
Heartburn	7 (28)	13 (37)	NS
Regurgitation	10 (40)	10 (28)	NS
Dysphagia	7 (28)	6 (17)	NS
Bleeding/anemia	7 (28)	7 (20)	NS
Asymptomatic	3 (12)	3 (9)	NS

ASA, American Society of Anesthesiology score; BMI, body mass index; NS, not significant

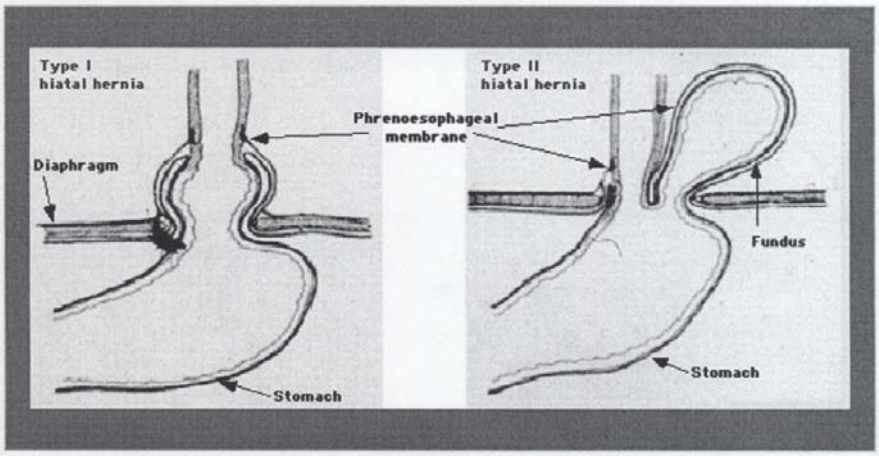
[a] Patient may have had more than one symptom

Table 2 Operative and short-term outcomes after open and laparoscopic paraesophageal hernia repair

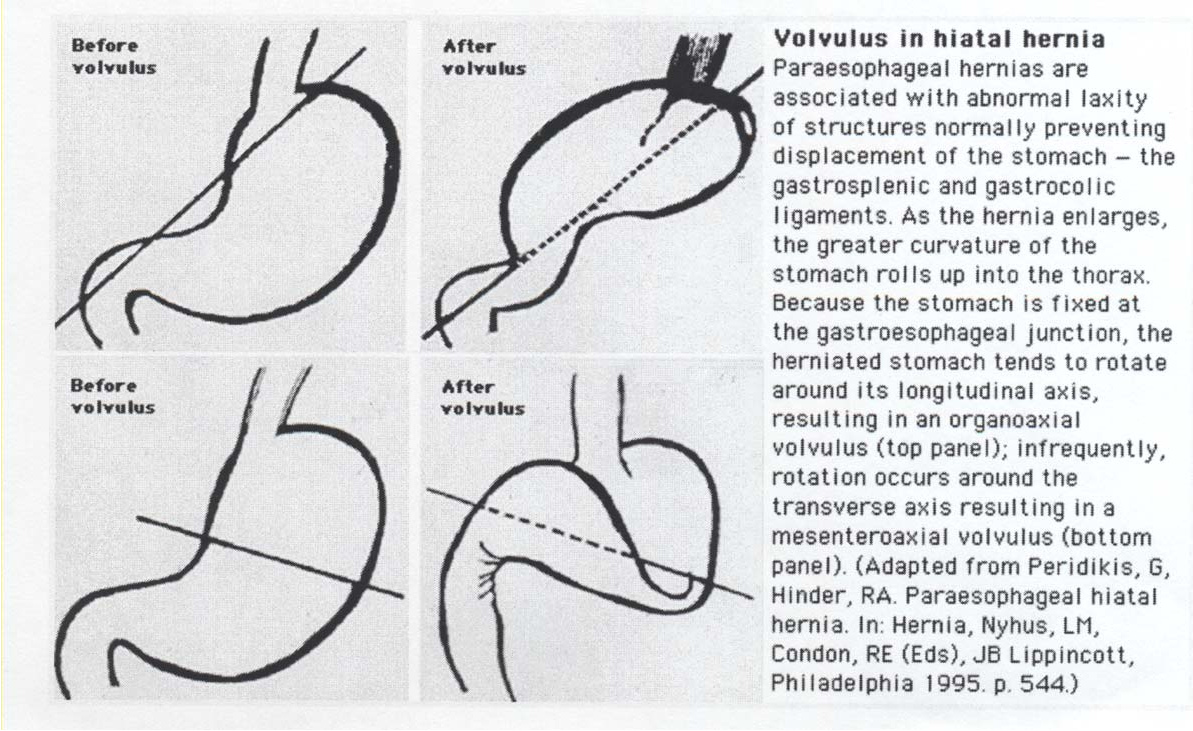
	Open	Laparoscopic	*p* Value
Operative			
Time (min)	123 (30–153)	120 (65–190)	0.6
Blood loss (ml)	300 (50–1500)	50 (25–250)	<0.001
Complications *n* (%)	6/25 (24%)	2/35 (6%)	0.01
	Splenectomy × 4	Gastrotomy	
	Liver laceration	Bleeding (converted)	
	Esophageal perforation		
Short term			
Time to oral intake (days)	4 (2–35)	1 (1–3)	<0.001
LOS (days)	13 (6–86)	3 (1–6)	<0.001
Morphine (mg)	109 (50–243)	19 (0–175.6)	<0.001
Complications (postop)[a] *n* (%)	8/25 (32%)	5/35 (14%)	0.18
Minor (class I)	5	4	
Major (class II-IV)	3	1	

LOS, length of stay

[a] Complication classification as proposed by Clavien et al. [12]



Sliding versus paraesophageal hiatal hernia Schematic representation of sliding and paraesophageal hiatal hernias. A sliding hiatal hernia (left) is characterized by widening of the muscular hiatal tunnel and circumferential laxity of the phrenoesophageal membrane, allowing a portion of the gastric cardia to herniate upward. The phrenoesophageal membrane remains intact and the hernia is contained within the posterior mediastinum. In contrast, a paraesophageal hiatal hernia (right) results from a localized defect in the phrenoesophageal membrane, while the gastroesophageal junction remains fixed to the preaortic fascia and the median arcuate ligament. Thus, the gastric fundus serves as the leading point of herniation. (Adapted from Skinner, DB. Hernias (hiatal, traumatic, and congenital). In: Gastroenterology, Berk, JE (Ed), WB Saunders, Philadelphia 1985. p. 705.)



Volvulus in hiatal hernia
Paraesophageal hernias are associated with abnormal laxity of structures normally preventing displacement of the stomach – the gastrosplenic and gastrocolic ligaments. As the hernia enlarges, the greater curvature of the stomach rolls up into the thorax. Because the stomach is fixed at the gastroesophageal junction, the herniated stomach tends to rotate around its longitudinal axis, resulting in an organoaxial volvulus (top panel); infrequently, rotation occurs around the transverse axis resulting in a mesenteroaxial volvulus (bottom panel). (Adapted from Peridikis, G, Hinder, RA. Paraesophageal hiatal hernia. In: Hernia, Nyhus, LM, Condon, RE (Eds), JB Lippincott, Philadelphia 1995. p. 544.)

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