Paraesophageal Hiatal Hernia

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Paraesophageal Hiatal Hernia

- PEH can be repaired laparoscopically safely and with excellent results.
- Although laparoscopic PEH repair is associated with high recurrence rates, excellent symptom improvement still occurs regardless of recurrence.
- Repair with synthetic mesh lowers recurrence, but is associated with dysphagia & visceral erosion.
- Biologic mesh – shown to reduce recurrence without mesh-related complications / side effects.

Paraesophageal Hiatal Hernia

- Optimal management is controversial in several ways.
- Points of controversy
  - Appropriate evaluation of patients
  - Optimal surgical approach
  - Option of laparoscopic technique
  - +/- antireflux procedure accompanying PEH repair
  - Mesh reinforcement of hiatus
  - Short esophagus needing Collis.

Classification

Hiatal hernias are classified according to the position of the esophagogastric junction and the existence of a true hernia sac.

- Type I (sliding)
  - Most common
  - Leading edge of the hernia is the EGJ, which is displaced into an intrathoracic position.
  - The longitudinal axis of the stomach is aligned with the esophagus.
  - There is no true hernia sac nor any paraesophageal component.
The EGJ moves through the hiatus to the visceral mediastinum.

Increased abdominal pressure (pregnancy, obesity, or vomiting) and vigorous esophageal contraction may contribute to the development of the hernia.

GERD & esophagitis may occur due to loss of tone of the LES.

Type II & Type III are referred to as “paraesophageal hernias”.

Type II (rolling)
- The EGJ is in its normal intraabdominal location.
- The hernia sac (containing portions of the gastric fundus and body) develops alongside the esophagus.

Uncommon
- Phrenoesophageal membrane is not weakened diffusely but focally.
- Gastric fundus protrudes through hiatus.

Combination of Type I & Type II
- EGJ displaced into thorax (Type I), and a hernia sac contains portions of gastric fundus / body (Type II).
- Frequently occurs when Type II PEH present for many years.
Classification: Type IV

- Refers to herniation of organs other than the stomach
- T-colon & omentum most commonly involved.
- Spleen & small intestine are less commonly involved.

Abbara S et al. AJR 2003;181:403-414

PEH: Relative Frequency

PEH: Basic Prevalence
- Type I: hatched bars
- Type II & III: solid bars

PEH: Associated Symptoms

- Increasingly common with advancing age
- More often among women than men
- PEH often associated with GERD

<table>
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<th>AUTHOR</th>
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</table>

Table 1 Clinical Findings in Patients with Paraoesophageal Hernia

PEH: Associated Symptoms

- Increasingly common with advancing age
- More often among women than men
- PEH often associated with GERD

Diagnosis

- Typical symptoms
- Suspicious CXR
- Chest CT
- Upper GI Series

In urgent situations:
- Placement of NG tube with subsequent “coiling in the chest”
**PEH: Presentation**

- Intrathoracic stomach / "elevated left hemidiaphragm"

**Diagnosis**

- Classic barium UGI study confirms the diagnosis.

**PEH: Management**

- ± Evaluation of LES
  - Endoscopy
  - Esophageal manometry / motility studies
  - 24 hr pH monitoring
  - 1/3 of pts will have atypical peristalsis of the esophageal body
  - ½ of symptomatic pts will have abnormal pH results
- Indications for Surgery
  - Type I – significant GERD
    - Elevated DeMeester score: > 14.72
    - EGD, 24 hr pH, esophageal manometry

**Management**

- Indications for Surgery - Type II & III
  - Associated with a high incidence of complications from volvulus
    - Bleeding, incarceration, obstruction, strangulation and perforation
    - Gastritis and ulceration can occur - the result of poor gastric emptying & torsion / ischemia / inflammation of gastric wall
  - Schedule surgery electively when PEH identified
  - Urgent repair when symptomatic (symptoms do not predict risk however)
  - "Catastrophic presentation" in up to 20% of symptomatic pts with delay in surgery
Findings that may prompt urgent surgery

- Symptoms of obstruction
- Reflux – Severe GERD
- Anemia
- Systemic concern of gastric ischemia

Goal: to avoid

- Aspiration
- Hemorrhage / transfusion requirements
- Gastric necrosis - mortality 50%

**Management:**
Clinical presentation risks related to gastric volvulus

**PEH Risk: Volvulus**

- Organoaxial rotation
- Mobile greater curvature moves anteriorly and superiorly so that in 180° organoaxial rotation, mirror image of stomach is created with convex greater curvature located above and to right of concave lesser curvature

- Mesenteroaxial rotation
- Rotation of stomach is shown along axis (dotted lines) perpendicular to long axis (solid line).
- Mobile antrum and duodenum move anteriorly and superiorly.
- Greater curvature remains on left.
- Gastric fundus and antrum may be in reversed positions.
Surgical Technique

- Transthoracic or transabdominal approach
  - Thoracoscopic / laparoscopic or open
- Principles similar to other hernia operations
  - Reduction of hernia contents
  - Excision of sac
  - Mediastinal mobilization of esophagus to ensure adequate intraabdominal length
  - Closure of hiatus primarily (with or without biologic mesh buttressed repair)
- Controversy
  - Fundoplication
  - Anchor stomach: Hill gastropexy / Stamm gastrostomy
  - Collis gastroplasty

Surgical Technique: Domain
Thoracic -> laparoscopic surgeons

- Operative approach – surgeon experience / comfort
  - Intrathoracic / mediastinal dissection easier via thoracotomy
  - Transthoracic PEH reduction may not eliminate risk of gastric volvulus, & can actually produce or precipitate gastric body volvulus
  - Laparoscopy – typical benefits
    - Less pain
    - Fewer days in ICU / hospital
    - Earlier resumption of diet
    - Earlier return to normal activity / work

Surgical Technique
Concurrent fundoplication / antireflux surgery?

- Previously controversial – less so now
- Indicated in all Type II / III pts, & Type I with GERD
- Most surgeons perform 360° wrap
  - GERD: 20-30% will reflux postoperatively
  - Circumferential dissection of GEJ disrupts natural antireflux mechanism
  - Facilitates intraabdominal gastric fixation / anchor
Operative Approach

- Hill suture plication:
  - 3 interrupted nonabsorbable sutures between lesser curve of the stomach and preaortic fascia
- Stamm gastrostomy: 2 functions
  - Eliminates the need of NG tube
  - Fixes the stomach to the abdominal wall / can help prevent volvulus
- Non-physiologic & not commonly performed anymore due to preponderance of laparoscopic approach

PEH: Operative Technique

Laparoscopic Approach

- Technically feasible, safe, effective
- Can be very difficult
- Advantages over open repair
- However….can be much more challenging for less experienced surgeons

PEH: Laparoscopic Repair

- Relocated EGJ / hernia contents ± volvulus
  - can obscure normal anatomy
- Dissection of large sac - complex
- Mediastinal bleeding
- Redundant tissue at GEJ
  - Can make fundoplication difficult
- Large diaphragmatic defect

PEH: Laparoscopic Challenges

- Experience – these procedure should be done by experienced hands
**PEH: Surgical Technique**

**Position: Lithotomy**

- Large angle at hips to allow for instruments to move easily
- Support with bean-bag or tape to facilitate steep Fowler / reverse Trendellenberg position

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**Port Placement**

- 5 mm
- 11 mm
- 5 mm
- 10 mm
- 5 mm

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**PEH: Surgical Technique**

**Reduction of hernia contents**

- Atraumatic graspers
- Care while reducing hernial contents as stomach wall may be ischemic / atrophic and prone to perforation
- Experienced assistant providing safe retraction

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**PEH: Surgical Technique**

**Reduction of hernia contents**

- Atraumatic graspers
- Care while reducing hernial contents as stomach wall may be ischemic / atrophic and prone to perforation
- Experienced assistant providing safe retraction
**PEH: Surgical Technique**

Reduction of hernia contents: hand over hand

- Dissect sac on a curved line from left to right
- Dissect left first because left gastric artery may be stretched and distorted

JD Luketich, Ann Surg 2000


Circumferential Identification hiatal defect

- Lighted bougie facilitates esophageal identification
- Endoscopy helps find the GEJ
- Complete circumferential dissection of hiatus and distal esophagus to promote hiatal closure & maximize intraabdominal esophageal length
- Leave fascia / parietal peritoneum overlying crura
- Identify and protect vagus nerves
- Change visual field often to give improved perspective

PEH: Surgical Technique

Hiatal dissection pearls

- Hiatal closure over Bougie
- Nonabsorbable, heavy suture
- Simple interrupted closure
- ± Pledgets
- ± Mesh
- (~ Relaxing incision)
Peters JH, DeMeester TR, Crookes P et al.

The "Short Esophagus"?

- < 2.5 cm of intraabdominal esophagus without tension
- Difficult to identify preoperatively
- Suggested if:
  - Large hiatal hernia
  - Esophageal stricture
  - Barrett's esophagus
  - Reoperative surgery
  - LES < 35 cm from incisors
**PEH: Surgical Technique**

The “Short Esophagus”?

- Excise GEJ redundant tissue
- Mobilize mediastinal esophagus circumferentially as high as possible
- A few cm gained by anterior displacement of esophagus with posterior diaphragm repair
- Lengthening procedure required in 5-10%
  - Nissen-Collis

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JD Luketich, Ann Surg 2000

JD Luketich, Ann Surg 2000
Mesh use for very large defects?


Mesh repair
PEH: Surgical Results

LPEH: High Recurrence Rate
Hashemi et al, JACS (2000) 190:553-561

Review of Reported LPEH Repair Outcomes

<table>
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<tr>
<th>Lead author</th>
<th>Year</th>
<th>n</th>
<th>Fundoplication (%)</th>
<th>Mean followup (mo)</th>
<th>Morbidity (%)</th>
<th>Excellent/good symptomatic outcome (%)</th>
<th>Hernia recurrence (%)</th>
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<td>12</td>
<td>16</td>
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*On video conducted at 3 to 5 months.

LPEH: High Recurrence Rate
Hashemi et al, JACS (2000) 190:553-561

Perioperative Course

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<th>Open</th>
<th>p Value</th>
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<td>184</td>
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<td>Time to oral diet (d)</td>
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<td>Hospital stay (d)</td>
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<td>Major complications‡</td>
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*Number of patients with complications, NS, not significant.
Symptomatic Outcomes

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<th>Outcomes</th>
<th>Laparoscopic (%)</th>
<th>Open (%)</th>
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<td>Excellent</td>
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<td>Good</td>
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<td>Excellent/good</td>
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<td>88</td>
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<td>Poor</td>
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<tr>
<td>Satisfied</td>
<td>96</td>
<td>96</td>
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Cumulative recurrence free 5 yr follow-up

Significant drop off for the laparoscopic arm

Conclusions

Laparoscopic repair of type III hiatal hernias is associated with a disturbingly high (42%) prevalence of recurrent hernia. More than half such recurrences have few, if any, symptoms.

Possible rationale

- Laparoscopic learning curve
- No pledgets / mesh
- Hernia sac removed via open approach / dissected but left behind laparoscopically
- Wide confidence intervals
- No Collis

No RCT or prospective evaluation describing a standardized operation & follow-up
Sept 1991 – Sept 2005
- 85 pts underwent LPHR
  - With (25 pts) or without (60) crural reinforcement
- 2 (3%) reoperations for severe dysphagia & symptomatic recurrence
- Subjective outcome in 64 pts – symptom questionnaire
  - Significant improvement at mean f/u: 118 months
- Radiographic recurrence in 23 (66%)
  - Median f/u: 99 months
  - Independent of age, PEH type, crural reinforcement,
  - No impact on QOL

Conclusions:
- Although providing excellent symptomatic results, long-term objective evaluation of LPHR reveals a high recurrence rate even with reinforced cruroplasty.
- A tailored, lengthening gastroplasty and reinforced cruroplasty based on objective intraoperative evaluation, and not only on surgeon’s personal judgment, may be the answer to recurrences.
108 pts underwent LPEHR at 4 institutions
Randomized to
- primary repair 1° (n = 57) or
- primary repair buttressed with SIS (n = 51) using a standardized technique
Primary outcome measure
- evidence of recurrent hernia (2 cm) on UGI, read by a study radiologist blinded to the randomization status, 6 months after operation

Conclusion:
- Adding a biologic prosthesis during LPEHR reduces the likelihood of recurrence at 6 months, without mesh-related complications or side effects.
- More PRCTs needed to determine best practice for surgical repair of PEH
**PEH repair: in summary**

- Management of PEH can be challenging
- Optimal management is controversial – though becoming more standard (slowly)
- Operative principles of hernia surgery must be maintained
  - Reduce hernia contents atraumatically
  - Excise sac & mobilize esophagus
  - Repair diaphragm without tension over Bougie
    - Simple sutures → pledgets → mesh (biologic)
    - 360° fundoplication

**Paraesophageal Hiatal Hernia**

- PEH can be repaired laparoscopically safely and with excellent results.
- Laparoscopic PEH repair is associated with high recurrence rates, though excellent symptom improvement still occurs regardless of recurrence.
- Biologic mesh – shown to reduce recurrence without mesh-related complications/ side effects
  - Repair with synthetic mesh lowers recurrence, but is associated w/dysphagia & visceral erosion
- Difficult cases → experienced surgeon.
- More long-term, well organized prospective randomized studies needed