Peroral Endoscopic Myotomy (POEM) for Treatment of Esophageal Spastic Disorders

Alireza Sedarat, MD
UCLA Division of Digestive Diseases
40th Annual Seminar for GI Nurses and Associates
September 24, 2016
Disclosures

• Research support from Pentax Corporation and ERBE Medical
• Consultant for Olympus Corporation
• Consultant for Boston Scientific
• Devices discussed may be used for off-label indications
Achalasia subtypes

• Type I: (classic) aperistalsis, impaired LES relaxation
• Type II: panesophageal pressurization
• Type III: >20% spastic contractions
Classic Achalasia
Aperistalsis, impaired EGJR, dilated esophagus

Pressure Topography Plot

Landscape plot

Pandolfino JE et al, Gastroenterology 2008 Nov;135(5):1526-33
Achalasia with Esophageal Compression

Aperistalsis, impaired EGJ, panesophageal pressurization

Pressure Topography Plot

Landscape plot

Spastic Achalasia
Impaired EGJR, ≥20% spastic contractions

Pressure Topography Plot

Landscape plot

History of Achalasia Therapy

• 1672: Sir Thomas Willis, “Cardiospasm” treated with dilation using whale bone
• 1913: Ernest Heller, myotomy
• 1937: Lendrum, failure of LES relaxation: “Achalasia”
• 1962: Dor, anterior partial fundoplication
• 1963: Toupet, posterior partial fundoplication
• 1981: Witzel, endoscopic pneumatic dilation
• 1991: Shimi, Laparoscopic Heller’s myotomy
• 1995: Pasricha and Kalloo, Botox
• 2010: Inoue, POEM
Achalasia Rx

- Medical (dietary changes, G tube, CCB, nitrates)
- Botulinum toxin injection
- Pneumatic dilation
- Surgical myotomy (Heller)
- Per oral endoscopic myotomy (POEM)
- Esophagectomy
POEM

• Endoscopic myotomy that recreates Heller myotomy
• Most widely adapted clinical NOTES procedure
• History
  • 1980: direct myotomy without tunnel in 6 dogs and 17 patients (Ortega et al)
  • 2007: submucosal balloon dissected tunnel in porcine model (Parischa et al)
  • 2010: submucosal electrosurgical dissection in 17 patients (Inoue et al)
  • 2016: POEM performed worldwide in thousands of patients by surgeons and gastroenterologists
POEM for all?

**Indications**
- Achalasia (type I, II, III)
- Spastic disorders
- Redo
- Sigmoid esophagus
- Extremes of age

**Contraindications**
- Portal hypertension
- Uncorrectable coagulopathy
- Severe pulmonary disease
- Prior EMR, ablation, or banding of the esophagus
- Mediastinal/esophageal radiation
Pre-POEM evaluation

- Assessment of symptomatology
- EGD +/- EUS
- Esophagram (timed?)
- High resolution esophageal manometry
- CT chest/abdomen if high suspicion of pseudo-achalasia
- Pre-operative risk assessment
Eckardt Score

**Table 1** | Clinical scoring system for achalasia (Eckardt score)

<table>
<thead>
<tr>
<th>Score</th>
<th>Weight loss (kg)</th>
<th>Dysphagia</th>
<th>Retrosternal pain</th>
<th>Regurgitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>&lt;5</td>
<td>Occasional</td>
<td>Occasional</td>
<td>Occasional</td>
</tr>
<tr>
<td>2</td>
<td>5–10</td>
<td>Daily</td>
<td>Daily</td>
<td>Daily</td>
</tr>
<tr>
<td>3</td>
<td>&gt;10</td>
<td>Each meal</td>
<td>Each meal</td>
<td>Each meal</td>
</tr>
</tbody>
</table>

Pre-POEM preparation

- Management of antithrombotics and antiplatelets
- 72 hour liquid diet
- 5 days of nystatin s/s
- NPO p MN
Per oral endoscopic myotomy for the treatment of achalasia.
Stavropoulos, Stavros; Modayil, Rani; Friedel, David
Submucosal injection
Mucosal incision
Submucosal tunnel dissection
Hemostasis
Myotomy
Entry site closure
POEM setup

- Fluoro capable OR bed
- HD scope with cap
- Injection needle
- Electrosurgical Knife
- Coagulation forceps
- Closure devices (clips, suture, OTSC)

- Large channel scope
- Ultrathin gastroscope
- Fluoroscopy
- EndoFLIP
- Balloon tip catheter
- Peritoneal decompression needle in room
POEM setup

- CO2 (Mandatory!) with low flow tubing/attachments
- Supine, abdomen exposed
- Foley, SCDs, warming blanket
- Arterial line setup
- Endoscope jet irrigation (x2) with three way stopcock

- IV antibiotics
- IV dexamethasome
- Type and screen
- Gentamycin lavage solution
- Worksheet for measurements
- Recording equipment
Anesthesiology related care

- General anesthesia
- Paralyzed
- Subglottic suction port on ET tube (or frequent oral suction)
- Labile BP and/or ventilation may be encountered
- Arterial line
- Frequent ABG intraop and in recovery may be necessary
- Close monitoring of peak airway pressures and ventilation parameters
Post-POEM

- Planned overnight observation admission
- Nausea and pain control
- NPO until esophogram POD#1 to r/o leak
- If no leak, discharged on soft diet, Abx, PPI
- Diet advanced slowly to regular after 2 weeks
- ~3-6 months post POEM
  - EGD with Bravo pH off PPI
  - Repeat esophagram +/- manometry
Outcomes

• Efficacy >90% (follow up 4 months to 3 years)
• Comparable to Heller myotomy
• Retrospective series suggestive POEM equal or superior to LHM
• Possibly superior to LHM for type III achalasia (98% vs 81%)
• Ongoing RCT POEM vs LHM (Europe) and POEM vs pneumatic dilation (India)

Inoue et al Journal of ACS 2015
Stavropoulous et al Curr Op Gastro 2015
Barbieri et al United Euro Gastro 2015
Patel et al Dis Esoph 2015
Kumbhari et al Endosc Int Open 2015
POEM for non-achalasia Dx

• Diffuse (distal) esophageal spasm, Jackhammer esophagus, Nutcracker esophagus, Esophageal outlet obstruction
• Efficacy may be less than for achalasia (70-80% vs >90%)
• Appear to be promising in limited series; further study is needed

Khashab et al, GIE 2015
GERD after Myotomy

• Dilemma:
  1. Lower reflux because of preservation of angle of His and phrenoesophageal ligament vs higher reflux because of lack of antireflux procedure?
  2. How do you measure reflux?

• LHM+fundoplication: 8.8% vs 31.5%
• Low rates of symptomatic reflux (<10% in early studies)
• Up to ½ of LHM patients have asx GERD

Campos et al Ann Surg 2009
Stavropoulous et al Curr Op Gastro 2015
Barbieri et al United Euro Gastro 2015
Patel et al Dis Esoph 2015
GERD after Myotomy

- Abnormal acid exposure by pHmetry 31-38%
- Erosive esophagitis 27-59%
- Symptomatic GERD 8-23%
- Retrospective series similar abnormal acid exposure: 39% of 23 POEM vs 32% of 31 LHM
- Appears responsive to PPI
Adverse events

• Serious: 1-2%
  • Pneumothorax requiring tube (CO2 mandatory!)
  • GEJ leaks requiring surgery
  • Tunnel or luminal bleeding (transfusion, endoscopic therapy, blakemore tube)
  • Tunnel dehiscence requiring metal stent

• Minor 10-15%
  • Mucosotomy requiring clip closure
  • Capnoperitoneum requiring needle decompression
POEM - Conclusions

• An excellent, minimally invasive modality for treatment of achalasia and other spastic disorders of the esophagus
• Probably equal to Heller myotomy for type I and II achalasia
• Probably superior for type III achalasia
• Expanding indications to non-achalasia diagnoses are promising, but require appropriate selection
• Reflux management is important
• Appears to be emerging as the preferred treatment modality for achalasia and other motility disorders of the esophagus
• Long-term and comparative data are needed
• A multidisciplinary approach is key
Special thanks to Dr. Greg Ginsberg and Dr. Mouen Khashab for their guidance and mentorship.
“When we mistake what we can know for all there is to know, a healthy appreciation of one’s ignorance in the face of a mystery... gives way to the hubris that we can treat nature as a machine.”

Michael Pollan, *The Omnivore’s Dilemma*