Management of Achalasia:  
Breakout Session 4

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Center for Esophageal Diseases and Swallowing  
University of North Carolina

Objectives

• Understand the pathophysiology behind achalasia
• State the subtypes of achalasia by the Chicago classification
• Be familiar with the treatment options for achalasia
• Know how the subtype of achalasia might impact your treatment choice
You make the call…

- 54 year old o/w healthy female with complaints of progressive dysphagia to solids and liquids for 14 months
  - No chest pain, SOB, LAN
- Associated 14 lb weight loss, down to her current BMI of 22
- Exam normal

Work-up

- EGD – unremarkable
  - Proximal and distal bx’s to r/o EoE negative
- BaS at right
High Resolution Mano

What Does She Have?

A. Diffuse Esophageal Spasm
B. Achalasia type II
C. Achalasia type III
D. Jackhammer esophagus
What Should You Do For Her?

A. Botox
B. Pneumatic Dil
C. Heller
D. POEM
E. Nitrates

Achalasia: “Failure to Relax”

• Esophageal motor disorder involving the smooth muscle esophageal body and the LES
  – LES-
    • Impaired relaxation
    • Hypertensive LES
  – Esophageal body
    • Aperistalsis
      – Absent peristalsis
      – Spasm
      – Variant
• Symptoms/Complications
  – Dysphagia
  – Regurgitation
  – Chest Pain
  – Aspiration
Achalasia Diagnosis: Standard Manometry

Pressure Topography of Esophageal Motility

More akin to an imaging modality
HRM has permitted the identification of 3 distinct types of achalasia

Pandolfino JE et al. Gastroenterology 2008;135:1526

Type I Achalasia
Nicholas J. Shaheen, MD, MPH, FACG

How Do You Tell What is What?

- **Achalasia**
  - Subtypes I, II, III
  - IRP ≥ upper limit of normal AND absent peristalsis

- **EGJ Outflow Obstruction**
  - IRP ≥ upper limit of normal AND some instances of intact or weak peristalsis

- **Absent Peristalsis**
  - IRP is normal AND some instances of intact or weak peristalsis
  - IRP is normal AND some instances of intact or weak peristalsis
  - IRP is normal AND some instances of intact or weak peristalsis

- **Rapid contraction**
  - Mean IRP > 10 mmHg

- **Hypertensive Peristalsis**
  - Mean IRP > 15 mmHg

- **Weak Peristalsis – TZ defect**
  - Mean IRP > 15 mmHg

- **Frequent Failed Peristalsis**
  - Mean IRP > 15 mmHg

- **Not Achalasia**
  - Mean IRP > 15 mmHg

Chicago Classification: Refining Subtypes

- **Swallow Pattern**
  - 100% failed peristalsis

- **Type I achalasia**
  - Mean IRP > 10 mmHg

- **Type II achalasia**
  - Mean IRP > 15 mmHg

- **Type III achalasia**
  - Mean IRP > 15 mmHg

- **Spasm (DES)**
  - Mean IRP > 15 mmHg

- **Not Achalasia**
  - Mean IRP > 15 mmHg

Why Should I Care?

The Chicago Classification of likely predicts natural history
Does the Chicago Classification provide insight into Natural History?

Early
Type II or III
EGJOO

Chronic
Type II/III–I

Late
Type I

Evolution of Achalasia: EGJOO to Type II

Intact Peristalsis

Weak Peristalsis

Type II Achalasia
The Chicago classification appears to predict outcomes in achalasia

### Response Rates of Achalasia Treatments

*83 Patients categorized by pressure topography subtype*

<table>
<thead>
<tr>
<th>Achalasia Intervention</th>
<th>Type I Classic</th>
<th>Type II compression</th>
<th>Type III Spasm</th>
<th>All Types</th>
</tr>
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<tbody>
<tr>
<td>Botulinum toxin</td>
<td>0% (0/2)</td>
<td>86% (6/7)</td>
<td>22% (2/9)</td>
<td>39% (7/18)</td>
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<td>Pneumatic dilation</td>
<td>38% (3/8)</td>
<td>73% (19/26)</td>
<td>0% (0/11)</td>
<td>53% (24/45)</td>
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<tr>
<td>Heller Myotomy</td>
<td>67% (4/6)</td>
<td>100% (13/13)</td>
<td>0% (0/1)</td>
<td>85% (17/20)</td>
</tr>
<tr>
<td>All (any) interventions</td>
<td>44% (7/16)</td>
<td>83% (38/46)</td>
<td>9% (2/21)</td>
<td>56% (47/83)</td>
</tr>
</tbody>
</table>

**Subsequent Interventions**

- Number of interventions: 1.6 ± 1.5
- Successful last intervention: 56%
- Last intervention type: B-0,P-10,M-6

*P<0.05 vs Type I, †p<0.05 vs Type III*
### Response Rates of Achalasia Treatments

**Patients categorized by pressure topography subtype**

<table>
<thead>
<tr>
<th>Author</th>
<th>Subtype</th>
<th>No. patients (%)</th>
<th>Success rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pandolfino</td>
<td>I</td>
<td>21 (21.2)</td>
<td>56*</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>49 (49.5)</td>
<td>96*</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>29 (29.3)</td>
<td>29*</td>
</tr>
<tr>
<td>Salvador (LHM)</td>
<td>I</td>
<td>96 (39)</td>
<td>84.6</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>127 (51.6)</td>
<td>95.3</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>23 (9.4)</td>
<td>69.3</td>
</tr>
<tr>
<td>Pratap (PD)</td>
<td>I</td>
<td>24 (47.1)</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>24 (47.1)</td>
<td>39.0</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>3 (5.8)</td>
<td>33.3</td>
</tr>
<tr>
<td>Rohof (PD &amp; LHM)</td>
<td>I</td>
<td>44 (25)</td>
<td>85.7</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>114 (64.7)</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>18 (10.2)</td>
<td>40</td>
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LHM, laparoscopic heller myotomy; PD, pneumatic dilatation.

Rohof W, Gut 2011; 60 (Suppl 3)
Response Rates of Achalasia Treatments
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</tr>
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LHM, laparoscopic heller myotomy; PD, pneumatic dilatation.

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The Chicago classification may inform treatment choice in achalasia in the future.
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**Rohoff et al**

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<td>45%</td>
</tr>
<tr>
<td>Heller Myotomy</td>
<td>81%</td>
<td>93%</td>
<td>86%</td>
</tr>
<tr>
<td>P-value</td>
<td>NS</td>
<td>0.03</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Rohoff et al. Gastroenterology 2013 Apr;144:718-725
Pandolfino et al, Gastroenterology 2008 Nov;135(5):1526-33

### Case 2

- A 45 year old male with type II achalasia wants your opinion as to the best initial therapy for his condition. His goals are symptom relief and durability. Do you recommend:
  - A. Heller myotomy
  - B. Pneumatic dilation
  - C. Botox injection
  - D. POEM
Treatment of Achalasia

- Medical therapy
- Botulinum toxin
- Pneumatic dilation (PD)
- Laparoscopic Heller’s myotomy (HM)
- Esophageal stent
- Peroral Endoscopic Myotomy (POEM)

Medical Treatment of Achalasia

- Based on small (8-23 pts) studies, medical therapy with calcium channel antagonists (nifedipine 10-20 mg) or nitrates (isosorbide dinitrate 5-10 mg) appears modestly effective at relieving symptoms and reducing LES pressure
- Therapy should be delivered SL not PO
- Side effects often limiting
- Consider in patients who are not candidates for invasive procedures, those awaiting more definitive therapy and those with mild symptoms
Nicholas J. Shaheen, MD, MPH, FACG

Pneumatic Dilators used for Treating Achalasia

Microvasive® Dilator (3.0, 3.5, or 4.0 cm)
Passed over guidewire, imaged with fluoroscopy

The NEW ENGLAND JOURNAL of MEDICINE

Pneumatic Dilation versus Laparoscopic Heller’s Myotomy for Idiopathic Achalasia

Guy E. Boeckxstaens, M.D., Ph.D., Vito Annese, M.D., Ph.D., Stanislas Bruley des Varannes, M.D., Ph.D., Stanislas Chaussade, M.D., Ph.D., Mario Costantini, M.D., Ph.D., Antonello Cuttitta, M.D., J. Ignasi Elizalde, M.D., Uberto Fumagalli, M.D., Ph.D., Marianne Gaudric, M.D., Ph.D., Wout O. Rohof, M.D., André J. Smout, M.D., Ph.D., Jan Tack, M.D., Ph.D., Aeilko H. Zwinderman, Ph.D., Giovanni Zaninotto, M.D., Ph.D., and Olivier R. Busch, M.D., Ph.D., for the European Achalasia Trial Investigators

Pneumatic Dilation versus Laparoscopic Heller’s Myotomy for Idiopathic Achalasia

- 14 European centers
- Primary outcome defined by symptom improvement (Eckardt score < 3) at yearly follow up
- Patients excluded for severe cardiopulmonary disease, unacceptable surgical risk, previous treatment achalasia, megaesophagus (>7 cm), previous UGI surgery, diverticula
- Powered as a superiority study with estimates of success of 90% (HM) vs 70% (PD)
- Mean follow up period 43 months

Table 2. Primary and Secondary Outcomes at 1 and 2 Years of Follow

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Baseline</th>
<th>2 Yr</th>
<th>Percentage-Point Difference, LHM–PD</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment success — mean % (95% CI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modified ITT analysis</td>
<td>90 (84 to 96)</td>
<td>86 (77 to 93)</td>
<td>4 (-6 to 13)</td>
<td>0.46</td>
</tr>
<tr>
<td>Per-protocol analysis</td>
<td>90 (84 to 96)</td>
<td>93 (88 to 99)</td>
<td>3 (-5 to 11)</td>
<td>0.33</td>
</tr>
<tr>
<td>Eckardt score:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (95% CI)</td>
<td>7.4 (7.0 to 7.8)</td>
<td>7.9 (7.6 to 8.2)</td>
<td>0.15</td>
<td>1.1 (0.9 to 1.3)</td>
</tr>
<tr>
<td>Range</td>
<td>4 12</td>
<td>4 10</td>
<td>0 3</td>
<td>0 4</td>
</tr>
<tr>
<td>LES — mean mm Hg (95% CI)</td>
<td>31 (28 to 33)</td>
<td>33 (30 to 37)</td>
<td>0.17</td>
<td>10 (8.7 to 12)</td>
</tr>
<tr>
<td>Height of barium-contrast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>column after 5 min — cm</td>
<td>2.1 to 3.8</td>
<td>2.9 to 4.1</td>
<td>0.02</td>
<td>1.2 to 1.5</td>
</tr>
<tr>
<td>Median</td>
<td>12 12</td>
<td>1.9 3.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interquartile range</td>
<td>1.1 to 1.8</td>
<td>2.9 to 4.1</td>
<td>0.02</td>
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Pneumatic Dilation versus Laparoscopic Heller's Myotomy for Idiopathic Achalasia

Figure 2. Kaplan–Meier Curves for the Rate of Treatment Success.

Pneumatic Dilation versus Laparoscopic Heller’s Myotomy for Idiopathic Achalasia

Pneumatic dilation protocol:

- Rigiflex 5 PSI x 1 min followed by 8 PSI for 1 min
- Initial protocol started with 35 mm balloon but perforation in 4/13 (31%)! Patients excluded from analysis. Revised protocol started with 30 mm followed 1-3 weeks later with 35 mm.
- All patients underwent at least 2 dilations. If continued symptoms, third dilation to 40 mm.
- Recurrence treated with 35 to 40 mm dilation.
- Third series of dilations allowed if symptoms recurred greater than 2 years after second series
- Treatment failure defined by continued symptoms post 40 mm in first series or recurrent symptoms within 2 years after second series

Complications of Treatment

- Perforation
  - Pneumatic Dilation (PD)
    - Esophageal perforation 4%
    - 3 perforations with 30 mm; 1 with 35 mm
    - 2 underwent surgery; 2 conservative care
  - Heller Myotomy (HM)
    - Mucosal tear in 13/106 (12%)
    - Repaired during initial surgery

- GERD
  - Increased acid exposure similar: 15% PD; 23% HM
  - Erosive esophagitis similar: 19% PD; 21% HM

So it was a toss-up!

Why to choose myotomy

- Up to seven dilations before patient was considered “failure”
- Perforations
  - Overall perforation rate was 4% per pt, including 3 at 30 mm
- Declining experience
  - This study was performed at expert centers
  - Generalizable?
- Chronic antireflux therapy
  - Pneumatic dilation provides no antireflux therapy

Time to become symptomatic following pneumatic dilation by patient age. Kaplan-Meier curve.
Peroral Endoscopy Myotomy (POEM)

Peroral Endoscopy Myotomy (POEM)


Back to our 1st case...
What Does She Have?

A. Diffuse Esophageal Spasm
B. Achalasia type II
C. Achalasia type III
D. Jackhammer esophagus

What Should You Do For Her?

A. Botox
B. Pneumatic Dil
C. Heller
D. POEM
E. Nitrates
Utilizing HRM/EPT in the Management of Achalasia

Symptoms of dysphagia ± chest pain and bland regurgitation

Upper Endoscopy

Obstructive process: ring, stricture, etc.  Normal  Esophageal dilatation

High Resolution Manometry

*esophagram may be helpful when manometry is technically difficult to perform

EPT Diagnosis

EGJ Outflow

Absent Peristalsis

• If clinical scenario c/w achalasia, a timed barium esophagram should be performed
• Potentially advanced GERD or scleroderma
• Potentially achalasia phenotype with hypotensive LES

Achalasia I

• Severe dilatation associated with poor treatment response
• Consider myotomy as initial therapy

Achalasia II

• Best treatment response
• Esophagram can be normal without barium retention or esophageal dilatation
• Frequently misdiagnosed with conventional manometry

Achalasia III

• Worst treatment response
• May benefit from treatment directed at spasm
• Often diagnosed as DES on esophagram

DES

• Extremely rare
• Difficult to treat
• Many cases are misdiagnosed Type III achalasia