ACHALASIA

- Definition
- Historical Perspective
- Spectrum of Disease and Patient Characteristics
- Diagnosis – Barium Swallow, EGD and Esophageal Manometry

- Options in the Management of Achalasia
  - Endoscopic Botox Injection
  - Endoscopic Dilation
  - Surgical Myotomy

- Technique for Laparoscopic Heller Myotomy, Dor Fundoplication

ACHALASIA

- Primary Esophageal and LES Motility Disorder
  - 1764 - First treatment, whalebone padded sponge through LES.
  - Endoscopic Dilation, Botox Injection (1991)
  - Open Surgery (1913, Heller), MIS Techniques (1991)

- Incidence
  1 to 3:100,000/year (1,000 to 3,000 cases in the U.S/year)

- Clinical Picture
  Dysphagia liquids and solids – 60%
  Heartburn - 40%

- Etiology – LES primary disease (?) – Auto-Immune Mechanism (?)
  - Damage LES and Esophageal myenteric plexus,
  vaga nuclei and dorsal vagal nuclei.
  - Irreversible loss LES NO neurons / post-gang. PS
  - Intact post-gang. cholinergic neurons

Sugarbaker, D.J. – Primary Motor Disorders.
**ACHALASIA – DIAGNOSIS**

**ESOPHAGEAL MANOMETRY**

- Aperistalsis esophageal body
- Incomplete LES relaxation
- Increased LES pressure (50%)
- Elevated intra-esophageal baseline relative to gastric baseline (35%)

OPTIONS IN THE MANAGEMENT OF ACHALASIA

- The goal of therapy is to promote relief of dysphagia while preventing gastroesophageal reflux (GER).
- Commonly used treatments are:
  - endoscopic botulin toxin injection (EBTI),
  - endoscopic balloon dilation (EBD), and
  - surgical myotomy with or without a fundoplication;
- Reported outcomes and treatment guidelines mostly come from cohort studies and expert opinions.

OBJECTIVE

- To summarize and compare the efficacy and morbidity of endoscopic and surgical treatment for esophageal achalasia based on the results of a systematic literature review and meta-analysis of articles on esophageal achalasia published between 1975 and 2006.

METHODS

Treatments reviewed

- Endoscopic botulinum toxin injection (EBTI).
- Endoscopic balloon dilation (EBD) using 30 to 40 mm diameter balloons, other endoscopic dilation methods (ED) used in the available randomized controlled trials,
- Surgical myotomy: open transabdominal, open transthoracic, thorascoscopic or laparoscopic techniques, with/without fundoplication.
RESULTS

- 3,478 articles identified and screened
- 105 articles - 7,855 patients selected
- 98 articles cohort studies
  - 41 prospective cohorts/case control series
  - 57 retrospective cohorts/case control series
- 7 articles randomized controlled trials.

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<th>METHODS</th>
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<tr>
<td><strong>% patients with symptom improvement:</strong> improvement + complete relief symptoms.</td>
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<td><strong>overall posttreatment GER:</strong> posttreatment GER symptoms + posttreatment GER using 24h pH monitoring</td>
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<td><strong>posttreatment GER 24h pH monitoring:</strong> calculated separately.</td>
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<table>
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<tbody>
<tr>
<td><strong>Endoscopic Botox Injection</strong> 9 315</td>
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<tr>
<td><strong>Endoscopic Balloon Dilation</strong> 15 1,065</td>
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<tr>
<td><strong>EBTI vs. ED</strong> 7 261</td>
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<tr>
<td><strong>ED vs. surgical myotomy</strong> 10 1,373</td>
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<tr>
<td><strong>Open transabdom. myotomy</strong> 10 732</td>
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<tr>
<td><strong>Transthoracic myotomy</strong> 13 842</td>
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<td><strong>Thoracoscopic myotomy</strong> 8 211</td>
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<tr>
<td><strong>Laparoscopic myotomy</strong> 39 3,086</td>
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</table>

Six articles reported results for two myotomy techniques.
**Endoscopic Botox Injection**
9 articles (315 patients)
Mean follow-up: 18 mo (6-30mo)

- % patients symptom improvement:
  - 1 MO: 78.7
  - 3 MO: 70
  - 6 MO: 53.3
  - >12MO: 40.6

153 patients (48.5%) needed repeated treatment

**Endoscopic Balloon Dilation**
15 articles (1,065 patients)
Mean follow-up: 31 mo (6-111mo)

- % patients symptom improvement:
  - 1 MO: 84.8
  - 6 MO: 73.8
  - 12 MO: 67.4
  - >36 MO: 56.3

279 patients (26.2%) needed repeated treatment, 17 (1.6%) perforation

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**Meta-regression analyses of outcomes after EBTI or EBD**

Better SI at 12 months when EBD was used (67.4% vs. 40.6%; OR 3.5, 95% CI 1.2 to 10.2, p=0.03).

The need additional therapy greater receiving EBTI (48.5% vs. 26.2%; OR 2.7, 95% CI 1.04 to 7.1, p=0.04).

7 RCT’s and Prospective cohorts EBTI vs. ED (261 pts)

Greater decrease LES pressure, ED vs. EBTI
- 52% vs. 30%, p=0.07

Greater % pts. with SI, ED vs. EBTI
- 68% vs. 24%; OR 6.4, 95% CI 3.4 to 12.0, p<0.01

Perforation rate ED higher than EBD only
- 11.2% vs. 1.6%; OR 17.6, 95% CI 3.9 to 80.9, p=0.002

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Campos GM et al.
Endoscopic and Surgical Treatments for Achalasia – A Systematic Review and Meta-Analysis.
RESULTS

- EBTI: 9 articles (315 patients)
- EBD: 15 articles (1,065 patients)
- EBTI vs. ED: 7 articles (261 patients)
- ED vs. surgical myotomy: 10 articles (1,373 patients)
- Open transabdominal myotomy: 10 articles (732 patients)
- Transthoracic myotomy: 13 articles (842 patients)
- Thoracoscopic myotomy: 8 articles (211 patients)
- Laparoscopic myotomy: 39 articles (3,086 patients)

Six articles reported results for two myotomy techniques.


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### SI and GER after Laparoscopic Myotomy (n=3,086)

**With (n=2,526) and Without (n=560) ARP**

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<th>WITH Fundop</th>
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<td>%SI</td>
<td>89.9</td>
<td>90.3</td>
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<td>%GER</td>
<td>8.8</td>
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**OR 4.3, 95% CI 1.9 to 9.7, p=0.0001**


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### Abnormal 24 pH after Laparoscopic Myotomy, n=725

**With (n=583) and Without (n=142) ARP**

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<td>%GER</td>
<td>14.5</td>
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**OR 4.2, 95% CI 1.5 to 12.8, p=0.01**

Results - Open and MIS Myotomy

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<tr>
<th>% Complications</th>
<th>OpenAB n=732</th>
<th>TransThor n=842</th>
<th>Thoracos n=211</th>
<th>Laparosc n=3,086</th>
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**Analyses of outcomes after Surgical Myotomy vs. Dilation**

- **Intra-operative perforation lap. Myotomy:** 182 patients (6.9%). All inadvertent injuries repaired during the index operation.
  - 19 (0.7%) pts. developed post-operative manifestations

  - Perforation EBD similar laparoscopic myotomy (1.6% vs. 0.7%; OR 1.7, 95%C.I. 0.8 to 3.7; p=0.14)
  - Perforation ED higher laparoscopic myotomy (8.8% vs. 0.7%; OR 13.3, 95%C.I. 7.8 to 22.8; p<0.01)

- Complications laparoscopic myotomy was higher than for EBD only (6.3% vs. 1.6%; OR 3.0, 95%C.I. 1.5 to 6.3; p=0.004)
- Similar to ED (6.3% vs. 8.8%; OR 0.8, 95%C.I. 0.6 to 1.1; p=0.2)

**LIMITATIONS**

- Rare nature of achalasia and few controlled trials available.
- Heterogeneity and publication bias may impact the results.
  - Control for heterogeneity by defining a priori: inclusion and exclusion criteria and the outcomes to be studied
  - When compared pooled data of all cohorts to controlled trials, results and conclusions were concordant.
  - Large number of patients studied is an advantage of large systematic reviews, and possibly dissipates some of the limitations indicated.

**CONCLUSIONS**

- EBD is superior to EBTI.
- Laparoscopic myotomy with fundoplication was the most effective surgical technique and can be considered the procedure of choice and first line of treatment for most patients.
Laparoscopic Myotomy for Achalasia

Laparoscopic Heller Myotomy for Achalasia

8
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