Multiple Redo Hernia Surgery: Open, Minimally-invasive or Resect?

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No financial disclosures
Multiple Redo Hernia Surgery
Objectives

- Define the ‘failed’ antireflux operation
- Review evaluation of the patient with ‘failed’ ARS
- Review outcomes following antireflux surgery (ARS), i.e. patterns of failure
- Discuss indications for reoperation
- Discuss surgical options
Multiple Redo Hernia Surgery
How frequent?

Patients without reoperation (%)

1997-2005, Denmark
N=2465 patients
5.2 cases/10^5 (all ARS)

Reop 124 pts (5%)
1.5%/yr, 1st two yrs
1%/yr, next two yrs
0.3%/yr thereafter

Multiple Redo Hernia Surgery
Definition of problem

- Symptoms prompting reconsultation
  - Reflux
  - Dysphagia
  - “Heartburn”
  - Bloating
  - Pain (epigastrium or substernal)
Multiple Redo Hernia Surgery
Definition of problem

- Evaluation
  - Barium swallow
  - Endoscopy
  - Continuous pH monitoring
  - Esophageal manometry
Multiple Redo Hernia Surgery

Definition of problem

- Why does “failure” occur after ARS?
  - Initial indication
  - Choice of operation
  - Technical quality

Multiple Redo Hernia Surgery
Definition of problem

- Anatomic failure
  - Displacement
    - Intrathoracic migration/herniation
    - Aboral slippage / 'telescoping'
  - Disruption of fundoplication
  - Too narrow or long
  - Twisted fundoplication (spiral or two-compartment)

Multiple Redo Hernia Surgery
Outcomes following initial ARS

Laparoscopic ARS

Post-operative symptoms:
74/290 (26%)

Pain: 49 (17%)

Dysphagia: 21 (7%)

Heartburn: 15 (5%)

Regurgitation: 10 (3%)

Anatomic Fundoplication Failure After Laparoscopic Antireflux Surgery.
Soper, Nathaniel; Dunnegan, Deanna

Multiple Redo Hernia Surgery

Initial ARS – Reasons for failure

- **Technical**
  - Poor mobilization of fundus (short gastric aa.)
  - No posterior crural repair
- **Diaphragm ‘stressors’**
  - Early postoperative vomiting
  - Chronic cough/sneezing
  - Weight lifting
  - Trauma
- **Initial hernia size >3cm**
- **Other factors (patient age, sex, Barrett’s, type of fundoplication) did not appear to be factors**

Multiple Redo Hernia Surgery
General principles

- Assessment of esophagogastric physiology
- Nonoperative management
  - Esophageal dilatation
    - Likely reoperation if persistent dysphagia, i.e. beyond one year
  - Anti-secretory/pro-kinetic agents
Multiple Redo Hernia Surgery
Systematic review (Furnée, 2009)

81 reports published through 2008
(excluding age <18, initial indication other than GERD, reintervention <30d, cohorts <10 subjects)

**Indications for reoperation (n=4584)**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent reflux</td>
<td>1912</td>
<td>(42%)</td>
</tr>
<tr>
<td>Dysphagia</td>
<td>760</td>
<td>(17%)</td>
</tr>
<tr>
<td>Recurrent reflux and dysphagia</td>
<td>184</td>
<td>(4%)</td>
</tr>
<tr>
<td>Anatomic abnormality</td>
<td>114</td>
<td>(2.5%)</td>
</tr>
<tr>
<td>Gas-bloat syndrome</td>
<td>31</td>
<td>(&lt;1%)</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>148</td>
<td>(3%)</td>
</tr>
<tr>
<td>Not reported</td>
<td>1435</td>
<td>(31%)</td>
</tr>
</tbody>
</table>
# Multiple Redo Hernia Surgery

Systematic review (Furnée, 2009)

<table>
<thead>
<tr>
<th>Types of operations</th>
<th>Primary procedures (n=4750)</th>
<th>Reoperations (n=4584)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total fundoplication</td>
<td>2162 (46%)</td>
<td>2397 (52%)</td>
</tr>
<tr>
<td>Partial fundoplication</td>
<td>471 (10%)</td>
<td>999 (22%)</td>
</tr>
<tr>
<td>Resection</td>
<td>---</td>
<td>327 (7%)</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>657 (14%)</td>
<td>737 (16%)</td>
</tr>
<tr>
<td>Not reported</td>
<td>1460 (31%)</td>
<td>124 (3%)</td>
</tr>
</tbody>
</table>

Multiple Redo Hernia Surgery
Systematic review (Furnée, 2009)

<table>
<thead>
<tr>
<th>Causes of failure of prior ARS</th>
<th>n=3175</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anatomical abnormality</strong></td>
<td></td>
</tr>
<tr>
<td>Intrathoracic wrap</td>
<td>885 (28%)</td>
</tr>
<tr>
<td>Wrap disruption</td>
<td>722 (23%)</td>
</tr>
<tr>
<td>Telescoping</td>
<td>448 (14%)</td>
</tr>
<tr>
<td>Paraesophageal HH</td>
<td>195 (6%)</td>
</tr>
<tr>
<td>Tight wrap/stricture</td>
<td>168 (5%) / 60 (2%)</td>
</tr>
<tr>
<td>Wrong primary diagnosis</td>
<td>49 (1.5%)</td>
</tr>
<tr>
<td>Esophageal dysmotility</td>
<td>13 (&lt;1%)</td>
</tr>
<tr>
<td>No cause identified</td>
<td>194 (6%)</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>347 (11%)</td>
</tr>
<tr>
<td>Not reported</td>
<td>120 (4%)</td>
</tr>
</tbody>
</table>

### Multiple Redo Hernia Surgery

**Systematic review (Furnée, 2009)**

<table>
<thead>
<tr>
<th>Anatomic abnormality depending on indication for reoperation</th>
<th>Recurrent reflux (n=234)</th>
<th>Dysphagia (n=118)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrap migration</td>
<td>104 (44%)</td>
<td>18 (15%)</td>
</tr>
<tr>
<td>Wrap disruption</td>
<td>109 (47%)</td>
<td>12 (10%)</td>
</tr>
<tr>
<td>No identified cause</td>
<td>34 (15%)</td>
<td>51 (43%)</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>64 (27%)</td>
<td>54 (46%)</td>
</tr>
</tbody>
</table>

## Multiple Redo Hernia Surgery

**Systematic review** *(Furnée, 2009)*

### Types of re-operation

<table>
<thead>
<tr>
<th>Surgical approach</th>
<th>n=4584</th>
</tr>
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<tbody>
<tr>
<td><strong>Laparoscopic</strong></td>
<td>1666 (36%)</td>
</tr>
<tr>
<td>Conversion to open</td>
<td>145 (9%)</td>
</tr>
<tr>
<td><strong>Open abdominal</strong></td>
<td>1589 (35%)</td>
</tr>
<tr>
<td><strong>Thoracotomy</strong></td>
<td>1041 (23%)</td>
</tr>
<tr>
<td><strong>Not reported</strong></td>
<td>288 (31%)</td>
</tr>
<tr>
<td><strong>Resection</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Esophagectomy</strong></td>
<td>125 (3%)</td>
</tr>
<tr>
<td><strong>Gastrectomy</strong></td>
<td>202 (4.4%)</td>
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</tbody>
</table>

### Anatomic abnormality depending on initial approach

<table>
<thead>
<tr>
<th></th>
<th>Transabdominal (n=120)</th>
<th>Laparoscopic (n=132)</th>
</tr>
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<tbody>
<tr>
<td>Wrap disruption</td>
<td>48 (40%)</td>
<td>24 (18%)</td>
</tr>
<tr>
<td>Telescoping</td>
<td>32 (27%)</td>
<td>10 (8%)</td>
</tr>
<tr>
<td>Hiatal disruption</td>
<td>23 (19%)</td>
<td>42 (32%)</td>
</tr>
<tr>
<td>Tight wrap</td>
<td>2 (2%)</td>
<td>24 (18%)</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>36 (30%)</td>
<td>42 (32%)</td>
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</table>

Mobilize esophagogastric junction and define the crura
Reverse prior fundoplication(s)
Restore LES geometry
Multiple Redo Hernia Surgery
“Short” esophagus

<table>
<thead>
<tr>
<th>Intra-abdominal esophagus</th>
<th>&gt;2.5 cm</th>
<th>1.5-2.5 cm</th>
<th>&lt;1.5 cm</th>
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<tbody>
<tr>
<td>Before</td>
<td>31 (17%)</td>
<td>81 (45%)</td>
<td>68 (38%)</td>
</tr>
<tr>
<td>After</td>
<td>122 (68%)</td>
<td>24 (13%)</td>
<td>34 (19%)</td>
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Mediastinal mobilization

Observational study, 180 patients, 1\textsuperscript{st} time ARS

Symptom duration and severity, as well as imaging evidence of intrathoracic migration of EGJ were associated with a “short” esophagus

Multiple Redo Hernia Surgery
Collis gastroplasty

Orringer MB and Sloan H. J Thorac Cardiovasc Surg 1974;68:298
Multiple Redo Hernia Surgery
Minimally-invasive gastroplasty

Multiple Redo Hernia Surgery
“Wedge” gastroplasty

Multiple Redo Hernia Surgery
Collis gastroplasty

- Difficult to compare laparoscopic and open (thoracic or abdomen) techniques
- Most appropriate as an initial or second reoperation
- Remains controversial

Multiple Redo Hernia Surgery
Collis gastroplasty - risks

- Continued acid exposure
- Potential exacerbation of esophageal dysmotility
- Need for ongoing endoscopic followup

Multiple Redo Hernia Surgery
Minimally-invasive repair

Surgical options

“Floppy” Nissen
Partial fundoplication
ARS +
esophagomyotomy
Gastric bypass

Multiple Redo Hernia Surgery
Open strategies

Abdominal

Thoracic

Gastrectomy

  Biliary diversion

Esophagectomy

  Gastric conduit

  Colon interposition
Multiple Redo Hernia Surgery Resection

Indications
- Multiple prior GI operations
  - Prior gastroplasty
- Refractory stricture
- Devascularized fundus
- Severe esophageal or gastric dysmotility
  - “Propulsive failure”

### Multiple Redo Hernia Surgery

**Systematic review (Furnée, 2009)**

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## Multiple Redo Hernia Surgery Systematic review (Furnée, 2009)

<table>
<thead>
<tr>
<th>Type</th>
<th>N=454/2123 (21%)</th>
<th>N=546/3491 (16%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intraoperative</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury, esoph. or gastric</td>
<td>278 (13%)</td>
<td></td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>41 (2%)</td>
<td></td>
</tr>
<tr>
<td>Splenectomy</td>
<td>7 (&lt;1%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>49 (2%)</td>
<td></td>
</tr>
<tr>
<td><strong>Postoperative</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary</td>
<td>125 (4%)</td>
<td></td>
</tr>
<tr>
<td>Wound infection</td>
<td>64 (2%)</td>
<td></td>
</tr>
<tr>
<td>Other infection (e.g. UTI)</td>
<td>60 (2%)</td>
<td></td>
</tr>
<tr>
<td>Alimentary tract leakage</td>
<td>52 (2%)</td>
<td></td>
</tr>
<tr>
<td>Cardiac/Hemorrhage</td>
<td>31 (1%) / 22 (0.5%)</td>
<td></td>
</tr>
<tr>
<td>Other/Not reported</td>
<td>136 (4%) / 56 (2%)</td>
<td></td>
</tr>
</tbody>
</table>

# Multiple Redo Hernia Surgery

**Systematic review (Furnée, 2009)**

## Intraoperative complications

<table>
<thead>
<tr>
<th></th>
<th>Laparoscopic</th>
<th>Open abdominal</th>
<th>p-value</th>
<th>χ²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>150/770 (19.5%)</td>
<td>5/92 (9.4%)</td>
<td>&lt;001</td>
<td>χ²</td>
</tr>
</tbody>
</table>

## Postoperative

<table>
<thead>
<tr>
<th></th>
<th>Laparoscopic</th>
<th>Open abdominal</th>
<th>p-value</th>
<th>χ²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>98/642 (15.3%)</td>
<td>55/317 (17.4%)</td>
<td>0.41</td>
<td>χ²</td>
</tr>
</tbody>
</table>

Mortality <1% (37/4329), with no deaths reported in studies reporting only laparoscopic redo, and 1.3% in open abdominal reoperation.

Multiple Redo Hernia Surgery
Outcome measures

Patient satisfaction
SF 12, -36; GERD-HRQL, GIQLI

Functional
Reflux/regurgitation
Dysphagia
Dumping
Multiple Redo Hernia Surgery
Outcome measures

SF 12, SF 36

GERD HRQL: 10 questions
    heartburn (6)
    dysphagia (1), odynophagia (1),
    medication use (1), overall satisfaction

GIQLI

## Multiple Redo Hernia Surgery Outcomes

<table>
<thead>
<tr>
<th>Measure</th>
<th>MIS</th>
<th>Open</th>
<th>Resection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms (excellent-good)</td>
<td>73%-89%</td>
<td>57%-86%</td>
<td>51%-65%</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>70%-78%</td>
<td>67%</td>
<td>83%</td>
</tr>
</tbody>
</table>
Multiple Redo Hernia Surgery Summary

- Symptoms don’t always correlate with anatomic/functional disease
- Minimally-invasive approaches are feasible
- Resection (esophagus or stomach) can be beneficial particularly in the ‘end-stage’ esophagus
Multiple Redo Hernia Surgery Summary

- Both complications and need for conversion increase with the number of prior operations
- Functional outcomes and satisfaction deteriorate with increasing number of operations
- Communication with the patient is essential
Thank you

- AATS
- Mark B Orringer, MD
- Jules Lin, MD
- Raja S Mahidhara, MD
- Rishindra M Reddy, MD
REFERENCES

Spechler SJ. Am J Gastroenter 2004; 99:552-561. (Dallas)
Multiple Redo Hernia Surgery
Resection - References

Esophagectomy

Gastrectomy
Multiple Redo Hernia Surgery
Multiple Redo Hernia Surgery