Utility of a Modified Laparoscopic Toupet Fundoplication as an Effective Alternative to Nissen Fundoplication in the Management of Recalcitrant Gastroesophageal Reflux Disease

Matthew J. Schuchert and Rodney J. Landreneau

Department of Cardiothoracic Surgery
University of Pittsburgh Medical Center
We have no disclosures associated with this presentation.
INTRODUCTION

- Laparoscopic fundoplication is an effective therapeutic modality in patients with refractory GERD

- Nissen fundoplication can be associated with significant post-op sequelae (dysphagia, gas/bloat)
  - May create a restrictive barrier about the lower esophagus impairing esophageal transit – particularly important in patients with impaired esophageal motility
  - Fundoplication reduces gastric compliance related to proximal vagal denervation leading to postprandial increased gastric pressure resulting in bloat sensation
  - Reduced top-off valve (ability to belch) related to total restrictive property of fundoplication may also cause difficulty
Modified Toupet Fundoplication

PURPOSE

We describe a “modified partial fundoplication” as an alternative to Nissen fundoplication which may result in less post-operative adverse sequelae and equivalent reflux control.
PATIENT POPULATION

491 patients with medically recalcitrant GERD
62% Female (n = 305)
Mean age 56 years (range 18-89)
 Modified Toupet Fundoplication

PATIENT POPULATION
Unique Clinical Characteristics

- GERD symptoms: 91%
- GPEH: 22%
- Atypical symptoms (primarily pulmonary): 26%
- Dysphagia symptoms: 8%
Modified Toupet Fundoplication

OPERATIVE TECHNIQUE
Modified Toupet Fundoplication

POSITIONING AND PORT PLACEMENT
Modified Toupet Fundoplication

Developing the Retroesophageal Window
Modified Toupet Fundoplication
Developing the Retro-esophageal Window
Modified Toupet Fundoplication

Repair of hiatal hernia: crural approximation
Modified Toupet Fundoplication
Crural Approximation
Modified Toupet Fundoplication

Right crural fixation

• Fundus to the right crus at 11 o’clock position

• Fundus to the lower aspect of right crus near the arcuate ligament
Modified Toupet Fundoplication
Right Crowning Suture
Right Crural Fixation
Modified Toupet Fundoplication

CREATION OF TRIANGULATION SUTURE

Upper lateral aspect of left sided fundus

Lateral wall of the esophagus 3cm above angle of His

Left crus at the 2 o’clock position
Modified Toupet Fundoplication
Left Crowning Suture
**Modified Toupet Fundoplication**

**CREATION OF ANTERIOR FUNDIC FLAP**

Point 5cm inferior from triangulation suture on fundus

↓

Right crus half way between 11 and 12 o’clock position
Modified Toupet Fundoplication
Anterior Fundic Flap
Modified Toupet Fundoplication

APPROXIMATION OF ANTERIOR FUNDIC FLAP TO POSTERIOR FUNDIC FLAP

Pexy positioned 2cm below GE junction

Allow fundus to fundus approximation without creating a circumferential wrap
Modified Toupet Fundoplication
Lower Flap Approximation
Modified Toupet Fundoplication
Final Wrap Appearance
Modified Toupet Fundoplication

Floppy Dynamic Fundoplication

Cross Sectional View

#1 Right crural fixation

#2 Triangulation suture

#3 Anterior fundic flap fixation (Dor modification)
Modified Toupet Fundoplication

Operative time: 45 minutes ± 3
Length of stay: 3 days ± 0.2
EBL: 44cc ± 6
Intra-operative Complications: 0.8% (n=4)

Data are mean ± SEM
RESULTS

Implication of fundoplication on esophageal function and reflux parameters

Clinical abnormality (%)

ETS  UGI - reflux  UGI - hiatal hernia

Mean follow up: 34 months

Pre-Op  Post-Op
<table>
<thead>
<tr>
<th>Postoperative Complications</th>
<th>9% (n=43)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary retention</td>
<td>1.6% (n=8)</td>
</tr>
<tr>
<td>Pleural effusion</td>
<td>&lt;1% (n=4)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>&lt;1% (n=4)</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>&lt;1% (n=4)</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>&lt;1% (n=4)</td>
</tr>
<tr>
<td>Respiratory failure</td>
<td>&lt;1% (n=3)</td>
</tr>
<tr>
<td>Ileus</td>
<td>&lt;1% (n=3)</td>
</tr>
<tr>
<td>VP shunt obstruction</td>
<td>&lt;0.5% (n=1)</td>
</tr>
<tr>
<td>Peritonitis</td>
<td>&lt;0.5% (n=1)</td>
</tr>
<tr>
<td>Pelvic hematoma</td>
<td>&lt;0.5% (n=1)</td>
</tr>
<tr>
<td>DVT</td>
<td>&lt;0.5% (n=1)</td>
</tr>
<tr>
<td>Wound infection</td>
<td>&lt;0.5% (n=1)</td>
</tr>
<tr>
<td>Subphrenic abscess</td>
<td>&lt;0.5% (n=1)</td>
</tr>
<tr>
<td>90 day mortality</td>
<td>0.5% (n=3)</td>
</tr>
</tbody>
</table>
Modified Toupet Fundoplication

RESULTS

Reoperation: 8% (n=39)
- Duration until reoperation: 24.4 months
- Re-do modified fundoplication (n=29)
- Conversion to Nissen (n=5)
- Conversion to esophago-jejunostomy (n=5)
Modified Toupet Fundoplication

RESULTS

Dysphagia Score

Patient perceived score (%)

Dysphagia Score

- None
- Solids
- Liquids
- Anything

Only 4% of patients with significant dysphagia
Modified Toupet Fundoplication

RESULTS

Post-operative EGD/dilations

Only 2% of patients required chronic dilations
Modified Toupet Fundoplication

RESULTS

Gas and Bloat Scores

- Patient perceived score (%)
- Gas Score
- Bloat Score

- None
- Controlled by medication
- Unimproved or Worse

<10% of patients with perceived unimproved or worse gas bloat symptoms
CONCLUSIONS

• This modified Toupet fundoplication achieves durable reflux control related to a dynamic near 360 degree “wrap” of the lower esophageal segment.

• Also, the dynamic nature of this fundoplication results in an unrestrictive barrier to esophageal transit and the ability to belch when intra-gastric pressure is high.

• This modified Toupet/Dor fundoplication should be considered as an alternative to total fundoplication in the management of most patients with medically recalcitrant GERD.