

Laparoscopic Type IV Hiatal Hernia Repair with Toupet Fundoplication Clinical Outcomes and Lessons Learned

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BACKGROUND

Laparoscopic repair of type IV hiatal hernia is challenging. Prior studies have reported on outcomes of Nissen fundoplication. The aim of the study was to assess clinical outcomes of laparoscopic repair of type IV hiatal hernia with Toupet fundoplication and identify lessons learned.

METHODS

Patients who underwent laparoscopic repair of type IV hiatal hernia from 03/31/2011 08/30/2016 by a single surgeon were included in the study, and were followed prospectively, using a phone questionnaire. All procedures were performed by the same anesthesia and OR team. The steps of the procedure and the laparoscopic views are shown in (Figures 1-3). The postoperative care was provided by a trained team of thoracic nurses. The distal esophageal angulation, defined as the angle between the distal esophagus and a horizontal line perpendicular to the spine, in the upright position, was measured, before repair and on POD#1.

RESULTS

There were 294 hiatal hernia repairs. 101 consecutive type IV were included. There were 99 Toupet, 1 Dor and 1 crural closure. Values are presented as median and (IQR). There were 80 (79%) females, 21 (21%) males, age: 68 (60-77), ASA: 3 (2-3), BMI: 29.4 (25.4-34.4). The median % herniated stomach (Figure 4) was 80% (50-100). Other organs included omentum in all, 5 colon, 4 small bowel (Figure 5) and 1 pancreas. The 3 most common chief complaints included: 22% dysphagia, 18% epigastric pain, 13% heartburn. None had strictures, 14% esophagitis, 3% Barrett's esophagus, 4% Schatzki's ring.

The operative data and postoperative course are shown in (Table 1). The median distal esophageal angulation before repair was measured in 62 patients and showed a median value of 43.5 degrees (24-59). The angulation was measured in 83 patients on POD#1 and showed a median value of 76 degrees (66-85). Comparison for 52 matched

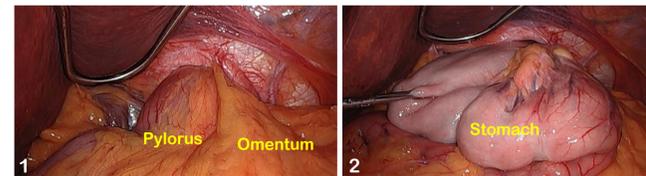


Figure 1 Laparoscopic view of steps of dissection for a Toupet fundoplication in a patient with type IV hiatal hernia with intrathoracic stomach and herniated omentum (1). The hernia sac is excised and the stomach and the omentum are reduced into the abdomen (2).

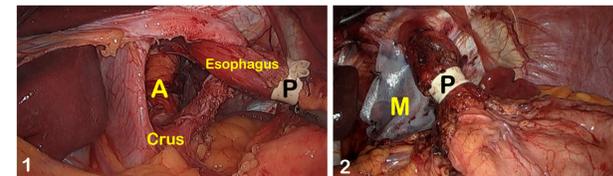


Figure 2 Tension free intra-abdominal length is achieved (1) following mediastinal esophageal mobilization, including separation of the esophagus from the aorta (A) and without the need for Collis gastroplasty. The Penrose (P), shows the location of the gastroesophageal junction. The crural closure is reinforced with a tailored Mesh (M), as indicated (2).

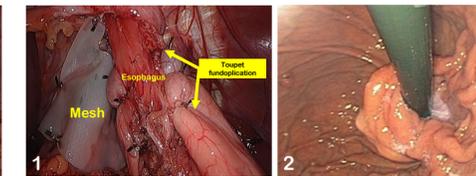


Figure 3 Laparoscopic view of a Toupet fundoplication (1). Retroflexed, endoscopic view of a Toupet fundoplication (2).

Table 1. Operative Data and Postoperative Course

The duration of operation	143 (125-179) min
Required Collis gastroplasty	None
Mesh	88%
Conversion	1
Leak	1
Transfusion	1
Length of stay	2 (1-3)
30 day or in hospital mortality	None

Table 2. Complications

Perioperative Complications	
NGT placement	8
Re-intubation	5
Atrial fibrillation	4
DVT	2
Laparoscopic retrieval of Penrose	1
Heparin-induced thrombocytopenia	1
Postoperative Complications	
Esophageal dilations	2
Pulmonary embolism	2
Port site hernia	1
Bowel obstruction	1
Empyema	1
Mediastinal hematoma	1

Table 3. Follow-up Questionnaire Via Phone 83/98 (85%) at 14 months

Free of dysphagia	77/83 (93%)
Free of epigastric pain	83/83 (100%)
Free of heartburn	80/83 (96%)
Free of preoperative symptoms	74/83 (89%)
Able to eat as desired	80/83 (96%)
Satisfied with operation	79/83 (95%)
Returned to daily activities in less than 2 weeks	61/83 (73%)
PPI use	77% before vs 14% after, (p<0.001)
Weight change	-0.5 lbs (-10.0- 4.5)
Diarrhea	6/83 (7%)
Excessive gas	14/83 (17%)
Bloating	11/83 (13%)
Reoperation for symptomatic recurrent hiatal hernia	6/83 (7%)

values showed a significant improvement of 32 degrees after repair. An example of measurement of angles before and after is shown in (Figure 6). All patients had clear liquid diet in the post anesthesia recovery room and were discharged home on full liquid diet.

Complications are shown in (Table 2). Postoperative complications included 1 port site hernia at 5 1/2 months after surgery which required surgical repair, 1 bowel obstruction 2.5 months after surgery, treated conservatively, 1 empyema 6 weeks after surgery, requiring decortication, 1 mediastinal hematoma 4 weeks after surgery, requiring surgical drainage, 2 pulmonary emboli, at 14 days (LOS 2 days) and at 16 days (LOS 4 days) after discharge.

At the time of questionnaire there were 3 non related deaths. Questionnaire was obtained in 83/98 (85%) at 14 months (9-28). The results are shown in (Table 3).

Reoperation for symptomatic recurrent hiatal hernia was required in 6/83 (7%), 1 at POD #3 and 5 at 18 months (8.4-29.0), 4 were repaired laparoscopically and 2 underwent Roux en-Y esophagojejunostomy. None of the remaining patients had a reoperative hiatal hernia repair at our institution.

CONCLUSIONS

Laparoscopic repair of type IV hiatal hernia with Toupet fundoplication can be performed with low morbidity and excellent patient satisfaction. The most common chief complaint prior to repair is dysphagia that resolves in 93%. Leak and conversion can be minimized over time. Tension free esophageal length can be achieved with mediastinal esophageal mobilization and without the need for Collis gastroplasty. Reoperation for symptomatic recurrence is rare.

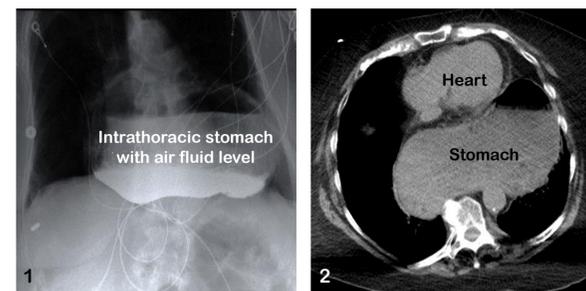


Figure 4 Intrathoracic stomach with air fluid level on esophagram (1) and on CT scan (2)

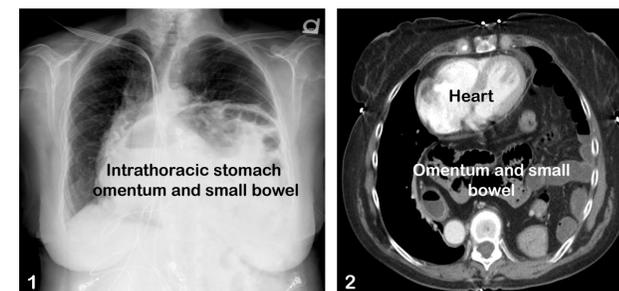


Figure 5 Intrathoracic stomach with herniated omentum and small bowel on chest X-ray (1). The CT scan shows herniated omentum and small bowel (2).

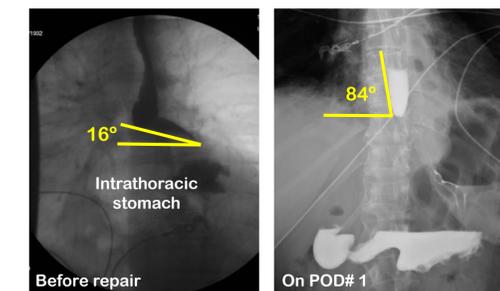


Figure 6 The distal esophageal angulation, defined as the angle between the distal esophagus and an horizontal line perpendicular to the spine, in the upright position was measured, before repair and on POD#1. (Example is shown)