

LAPAROSCOPIC PARTIAL FUNDOPLICATION FOR GASTROESOPHAGEAL REFLUX DISEASE (GERD) WITH IMPAIRED ESOPHAGEAL MOTILITY

By

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Background: Gastroesophageal reflux disease (GERD) is frequently associated with impaired esophageal peristalsis, and many authorities consider this condition not suitable for Nissen fundoplication.

Methods: To investigate the outcome of antireflux surgery in the presence of impaired esophageal peristalsis, 33 GERD patients with poor esophageal contractility underwent laparoscopic partial fundoplication. Upper gastrointestinal endoscopy, esophageal manometry, and 24-hour pH monitoring were performed preoperatively.

Results: After antireflux surgery, 30 patients (93%) were free of heartburn, regurgitation and bloating and had no esophagitis on endoscopy. Twenty-eight patients (86%) were completely free of symptoms. The rate of dysphagia decreased from 44% preoperatively to 9% postoperatively ($P < .001$). The median DeMeester score on 24-hour esophageal pH monitoring decreased from 34.5 to 1.15 ($P < .001$).

Conclusions: Esophageal motility is the main determining factor to determine the extent of wrap in fundoplication. Partial posterior fundoplication provides an effective antireflux barrier in patients with impaired esophageal body motility. Postoperative dysphagia is diminished, probably because of improved esophageal body function.

Keywords: Reflux disease, laparoscopic, partial wrap, Nissen, esophageal motility, esophagitis.

INTRODUCTION

Since the introduction of the laparoscopic Nissen fundoplication in 1991^(1,2). There has been a worldwide increase of interest in the pathophysiology and medical and surgical treatment of gastroesophageal reflux disease (GERD). The Nissen fundoplication is the most commonly performed and the most effective surgical treatment of GERD⁽³⁻⁶⁾. However, in the subset of patients with complicated disease, the Nissen fundoplication may not be the best surgical procedure.

Impaired esophageal body motility is one of the most common complications of GERD, with a prevalence of up to 25% in patients with mild disease and 50% in patients with severe disease^(7,8). The Nissen fundoplication does not improve esophageal peristalsis in these patients⁽⁹⁾, it

creates a relatively high lower esophageal sphincter (LES) resting pressure, possibly resulting in high outflow resistance of the esophagus⁽¹⁰⁾. Patients with poor esophageal body function are likely to be at greater risk of postoperative dysphagia if a complete fundoplication is performed. The main difference between the Nissen and the partial fundoplication is the extent of the wrap covering the circumference of the abdominal esophagus. However, it has been suggested that partial posterior fundoplication may fail in the long term⁽¹¹⁾.

This study was performed to determine the outcome of partial fundoplication of gastroesophageal reflux disease (GERD) patients with impaired esophageal peristalsis.

PATIENTS AND METHODS

The study population consisted of 33 patients with GERD with impaired oesophageal motility (21 male and 12 female; median age, 45 years; age range, 17-61 years) in the period between January 1998 to August 2001. Patients underwent upper gastrointestinal endoscopy, esophageal manometry, and 24-hour esophageal pH⁽¹²⁾ monitoring preoperatively.

Esophageal manometry was performed by a stationary pull-through technique & Impaired esophageal motility was diagnosed if 20% or more of the esophageal contraction waves were defective in 10 swallows of a 5-mL water bolus⁽⁹⁾.

Preoperative and postoperative dysphagia was rated according to the following grading system: It was considered mild if there was no weight loss and if it was easily tolerated, it was considered moderate if there was no weight loss but dysphagia interfered with lifestyle, and it was considered severe if weight loss occurred.

Esophagitis was graded endoscopically according to the Savary Miller classification system⁽¹³⁾.

A DeMeester score of more than 14.8 on 24-hour esophageal pH monitoring indicated abnormal acid reflux⁽¹²⁾.

Operative technique^(3, 14) The procedure was performed in the lithotomy and reverse Trendelenburg position while the patient was under general anesthesia. Placement of four trocars, two in the subcostal region on both sides for the right and left working hands, the laparoscope (thirty degrees) is placed in the midline midway between xiphoid & the umbilicus, lastly the liver retractor of the static type is placed in the subxiphoid region & fixed to the operating table. The anatomy of the esophago-gastric region is delineated by the esophageal endoilluminator which was used in all cases (Fig. 1). This was followed with division of

the gastrohepatic ligament, dissection of the esophagus and the hiatal crura, and establishment of a window behind the esophagus. Hiatal hernias were reduced, and the hiatal crura were approximated behind the esophagus with one to three sutures.

The gastric fundus was grasped and pulled through the window behind the esophagus (Fig. 2). The right side of the wrap was sutured to the adjacent crus with three stitches. Then the right limb of the fundic wrap was sutured to the right anterior side of the esophagus with three 2-0 nonabsorbable sutures (Fig. 3). The same procedure was performed on the left side, with about 90 degrees of the anterior esophagus left uncovered by the wrap. Division of short gastric vessels was usually not necessary to create a tension-free 270-degree wrap⁽³⁾.

RESULTS

The mean duration of symptoms was 8 years. Patients were taking H2-blockers, proton pump inhibitors, or both for a mean of 2 years. On preoperative endoscopy, 8 patients (25%) had mild esophagitis (grade 0-2), 20(60%) had severe esophagitis (grade 3-4), and 5(15%) had Barrett's metaplasia. The mean operation time was 2.3 hours (range, 1.4-6 hours). There were two conversions to laparotomy because of inability to retract a huge left lobe of the liver, & bleeding that could not be controlled laparoscopically. The mean hospital stay was 4 days (range, 2-21 days). Postoperative complications occurred in 3 patients (9%), a deep venous thrombosis of the leg in one patient, pleural effusion in another & pneumonia in the third. There were no operative deaths.

At a median of 12 months after the surgical procedures, 30 patients (93%) were free of heartburn, regurgitation and bloating and had no esophagitis on endoscopy. Twenty-eight patients (86%) were completely free of symptoms. The postoperative problems of the remaining 5 patients (after one year follow-up) are shown in Table I.

Table I. Symptoms following fundoplication after surgery

| <i>Symptom</i> | <i>No.(%)</i> |
|----------------|---------------|
| Heart Burn | 1(3%) |
| Regurgitation | 1(3%) |
| Bloating | 1(3%) |
| Nausea | 2(6%) |
| Total | 5 (15%) |

The rate of dysphagia decreased from 44% preoperatively to 9% postoperatively ($P < .001$; Table II).

Table II. Number of patients with dysphagia preoperatively and after fundoplication

| | <i>Mild</i> | <i>Moderate</i> | <i>Severe</i> | <i>Total</i> |
|---------------|-------------|-----------------|---------------|--------------|
| Preoperative | 7 | 11 | 2 | 20 (45%) |
| Postoperative | 2 | 2 | 0 | 4 (9%) |



Fig. (1) The Endoillumintor placed at the beginning of the procedure to delineate the esophagogastric junction.



Fig. (2) Grasping the fundus by a Babcock clamp behind the esophagus



Fig. (3) Partial wrap around the esophagus with the illuminator placed inside the esophagus acting as a boogie.

The median DeMeester score decreased from 34.5 (17.6-48.5) preoperatively to 1.15 (0.39-2; $P < .001$) postoperatively. Only 1 patient (3%) had a pathologic reflux score after partial posterior fundoplication; and complained of occasional heartburn. Manometry for this patient showed a pathologic LES pressure (7.1 mm Hg).

DISCUSSION

Impaired esophageal body motility with subsequent dysphagia is common in patients with long-standing gastroesophageal reflux⁽¹⁰⁾. Acute esophagitis with submucosal edema, loss of muscle fibers, and an increase in submucosal collagen due to chronic inflammation of the distal esophagus are supposed to be causative factors for the impairment of esophageal peristalsis in GERD⁽⁵⁾.

Laparoscopic fundoplication was introduced into clinical practice in 1991⁽⁸⁾. After that, evidence rapidly accumulated to indicate that the procedure is highly effective in controlling symptomatic gastro-esophageal reflux⁽¹⁶⁻¹⁹⁾.

Although the Nissen fundoplication is the standard operation for patients with normal esophageal peristalsis, it may not be the proper procedure for patients with impaired esophageal body function. Persistent dysphagia is rare after the Nissen fundoplication in the presence of normal esophageal peristalsis,^(4,5) but it is found more frequently in the presence of impaired esophageal peristalsis⁽²⁰⁾.

Even though Nissen fundoplication can be performed in a very floppy fashion, the problem of impaired LES relaxation still remains^(4,21,23). Therefore data demonstrating improvement of impaired esophageal body motility after Nissen fundoplication with a low rate of postoperative dysphagia are controversial⁽²³⁾.

Partial posterior fundoplication creates a sufficient antireflux barrier, even in the long term, and therefore effectively prevents gastroesophageal reflux. This is demonstrated by the fact that almost all of our patients had normal 24-hour esophageal pH monitoring postoperatively. Effective healing of esophagitis is achieved by partial posterior fundoplication, and this is another factor in the improvement of esophageal peristalsis⁽¹⁴⁾.

Dysphagia is one of the severest symptoms of GERD, and one that destroys quality of life. Preoperatively, 45% of our patients had dysphagia, more than half of them complaining of moderate to severe problems. Dysphagia may be due to impaired esophageal body function, but it may also be due to the hiatal hernia itself⁽²⁴⁾. This significant reduction of dysphagia after partial posterior fundoplication in patients with impaired esophageal contractility may be partly explained by improved esophageal peristalsis and also by the reduction of the hiatal sac.

Our study confirms previously published short-term data^(14,20) & showed that after the surgical procedures, 30 patients (93%) were free of heartburn and regurgitation and bloating and had no esophagitis on endoscopy. Twenty-

eight patients (86%) were completely free of symptoms. The incidence of bloating was also low due to selecting patients with impaired esophageal motility for the partial wrap. This study also confirms the effectiveness of the partial wrap in the treatment of reflux disease in patients with impaired esophageal motility similar to other studies reported (14,20,25). One patient with partial wrap had a pathological reflux score but with minimal symptoms and this was explained by pathological pressure in the LES.

Conclusions:

Esophageal motility is the main factor that determines the extent of wrap in fundoplication. The Nissen fundoplication is the "gold standard" of antireflux surgery in patients with normal esophageal peristalsis because it has been shown to be effective over the long term in a large series of patients worldwide in the past two decades. Partial posterior fundoplication provides an effective antireflux barrier in patients with impaired esophageal body motility. Postoperative dysphagia is diminished, probably because of improved esophageal body function.

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