Redo laparoscopic repair of benign esophageal disease

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Laparoscopic fundoplication for gastroesophageal reflux disease has been associated with excellent symptom control. Compared with medical treatment, laparoscopic Nissen fundoplication has shown favorable control of typical reflux symptoms. However, in approximately 2% to 17% of patients, surgical treatment fails. The role of reoperative repair for reflux disease and the factors that contribute to it are examined. (J Thorac Cardiovasc Surg 2012;144:S71-3)

Approximately 44% of patients experience reflux-related symptoms once a month and approximately 7% to 10% of patients experience reflux-related symptoms on a daily basis.¹ Most of these conditions are treated with diet modifications and medications. Proton pump inhibitors, the most popular treatment, generate more than \$13 billion in revenue and are the third most commonly prescribed drug class.^{2,3} However, more recent data have indicated an increase risk of osteoporosis and fractures, increased *Clostridia difficile* infections and pneumonia, and increased interaction with cardiac medications with chronic proton pump inhibitor use.^{4,5} Additionally, chronic histamine-2 blockers have been associated with some cognitive dysfunction.⁶ Patients with severe chronic obstructive pulmonary disease are also more prone to exacerbations when accompanied by gastroesophageal reflux disease (GERD) symptoms.⁷

Although some debate remains regarding medical vs surgical correction of reflux disease, a 2010 Cochrane systematic review of randomized controlled trials demonstrated an improved outcome after laparoscopic Nissen fundoplication.⁸ In addition, a meta-analysis of almost 1700 patients demonstrated a decreased incidence of adenocarcinoma and increased regression of Barrett's esophagus, supporting the benefit of surgical correction of reflux disease.⁹

The long-term results after surgery have demonstrated high satisfaction for up to 97% of patients at 5 years.¹⁰⁻¹³ However, 2% to 17% of patients have some level of failure after surgery.¹⁴ These might be related to recurrent reflux disease, regurgitation, or dysphagia. Approximately 4% to 6% of patients have severe, persistent, and refractory symptoms that require reoperative therapy.

CAUSES OF FAILURE

The common causes of failure include recurrent hiatal hernia, a slipped or displaced wrap, too tight of a wrap, a misplaced wrap, disruption of the wrap, or a missed diagnosis.¹⁵ The hiatal hernia is the most common cause of failure. This results in migration of the wrap above the hiatus and can result in both reflux and dysphagia.^{16,17} It might be related to inadequate closure of the crural fibers after repair or an innate weakness within the fibers that predisposes it to dilation.¹⁷ Some have argued for the use of mesh repair in the case of large hiatal openings.¹⁸ A prospective randomized trial using a biologic prosthesis demonstrated a 60% reduction in hernias at 6 months.

Some of this could also be related to inadequate mobilization of the esophagus or a short esophagus.¹⁹ Although the existence of a true shortened esophagus has been debated, chronic damage from reflux and compression from a hiatal hernia can result in difficulty placing the gastroesophageal junction comfortably in the abdomen.^{20,21}

A slipped or displaced wrap can result when the body of the stomach slides above the wrap, resulting in an hourglass stomach. The portion of stomach above the wrap can cause severe reflux symptoms, because it serves as a reservoir. The wrap also becomes obstructive, causing severe dysphagia symptoms. A misplaced wrap can also result in a twisted or asymmetric wrap, leading to recurrent reflux. This usually occurs when the wrap is constructed using the body of the stomach as opposed to the fundus. Finally, physiologic factors such as obesity and straining also contribute to the recurrence of symptoms.^{15,17,22}

EVALUATION

Although a recurrence of symptoms such as heartburn can lead to a presumptive diagnosis of recurrence, symptoms alone have not correlated well with actual recurrence.²³ A University of California, San Francisco, study of 822 patients demonstrated that only 70% of patients with a GERD diagnosis had positive findings on a pH study.²⁴ Heartburn and regurgitation were as common in those with a confirmed study as in those without. Hence, symptoms alone are not enough to confirm recurrence. Postoperative monitoring of GERD will result in an abnormal pH in only 20% of patients.²⁵ An objective evaluation remains critical to the evaluation. This includes upper

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Abbreviation and Acronym

GERD = gastroesophageal reflux disease

gastrointestinal/barium swallow, pH monitoring, manometry, and upper endoscopy.

A barium contrast study and endoscopy are important in the evaluation of the anatomy of the wrap. It can illustrate the location of the wrap above or below the hiatus, as well as the geometry of the wrap. Some slipped and twisted wraps can be identified by inspection using endoscopy.²⁶ Manometry is also important to rule out a missed diagnosis such as achalasia.¹⁵

pH monitoring remains the reference standard, with sensitivity, specificity, and accuracy approaching 96%.²⁷ Combined impedance and pH monitoring can also detect both acid and nonacid reflux disease. Studies have demonstrated a high correlation with GERD with high reproducibility.²⁸ The determination of the bolus transit time can also be used as an evaluation of esophageal function.

SURGICAL GOALS

Reoperative surgery for reflux disease should start with reestablishing the normal anatomy. This involves taking down the adhesions surrounding the wrap and hiatus. The wrap should be fully mobilized. The normal gastric anatomy should be achieved by unfurling the wrap from the gastroesophageal junction. One must be careful to avoid injury to the vagus nerves in this process. Once a normal gastric anatomy has been achieved, the hiatus and esophagus can be fully examined to better identify the cause of failure. Additional mobilization of the esophagus can be achieved through the hiatus, separating it from the aorta and pericardium. Additionally, the esophageal length and the need for a Collis gastroplasty can be determined.¹⁹⁻²¹

Once the esophageal length has been addressed, the wrap should be reformed over a bougie.²⁹ Generally, a loose Nissen fundoplication is adequate for repair. This can be performed by using a large bougie to help size the wrap. Some patients in whom the initial complaint is dysphagia might benefit from a Toupet fundoplication, although studies have favored laparoscopic Nissen fundoplication for long-term treatment of reflux, with very little difference in dysphagia symptoms.³⁰⁻³³ Hiatal closure is then accomplished. If a hiatal hernia is the cause of failure, consideration should be made to place mesh support on the crura.¹⁸

OUTCOMES

A large meta-analysis of more than 4500 cases by Furnee and colleagues¹⁵ reported the largest review of reoperative fundoplication and included both open and laparoscopic series (Table 1). Mortality after reoperation was 1.3%,

TABLE 1. Recurrent symptoms and causes of failure

Variable	Incidence (n)
Common recurrent symptoms	4750
Recurrent reflux	1912 (41.7)
Dysphagia	760 (16.6)
Recurrent reflux and dysphagia	184 (4.0)
Anatomic abnormality	114 (2.5)
Gas bloat syndrome	31 (0.7)
Miscellaneous	148 (3.2)
Not reported	1435 (31.3)
Anatomic causes of failure	3175
Intrathoracic wrap migration	885 (27.9)
Wrap disruption	722 (22.7)
Telescoping	448 (14.1)
Paraesophageal hiatal herniation	195 (6.1)
Hiatal disruption	167 (5.3)
Tight wrap	168 (5.3)
Stricture	60 (1.9)

Data in parentheses are percentages. Data from Furnee et al.¹⁵

although none occurred in the laparoscopic group. Symptomatic success was seen in 81% of the laparoscopic patients; 78% of the patients had successful objective outcomes. Common complications included gastric or esophageal perforations, although most were recognized immediately and corrected laparoscopically. Khajanchee and colleagues³⁴ reported a laparoscopic series of 13 years that also demonstrated success in 75% of reoperative patients, with complete to near complete resolutions of symptoms. An additional 14% had improved symptoms.³⁴ Of these patients, 81% had wrap herniation seen on the upper gastrointestinal study. The findings from the quality of life evaluations after reoperative surgery also approached general population norms.^{35,36}

CONCLUSIONS

Reoperative laparoscopic surgery for recurrent reflux symptoms can be achieved with minimal mortality risk. A full evaluation is necessary to understand the cause of recurrent symptoms. Symptoms alone are often not enough and often do not correlate with actual recurrence. The surgical goals are to return the normal gastric anatomy and evaluate the entire hiatal complex before reforming the wrap. Objective and symptomatic success can be achieved in approximately 80% to 90% of patients and should be considered for persistent recurrent disease.

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