

# Postoperative Gastrointestinal Complaints After Laparoscopic Nissen Fundoplication

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## ABSTRACT

**Objectives:** Approximately 80% of patients complain of various symptoms immediately after laparoscopic Nissen fundoplication. These symptoms typically are treated medically without an extensive evaluation to identify the cause. We reviewed our experience of laparoscopic Nissen fundoplication to determine the course of postoperative symptomatology in our patient population, and present a rational approach to this problem.

**Methods:** Over a 10-year period, 628 patients underwent primary laparoscopic Nissen fundoplication for gastroesophageal reflux disease; patients were evaluated with a standard set of questions for postoperative gastrointestinal complaints. Three- and 6-month follow-up data were compared by using the chi square test.

**Results:** One-year follow-up data were available for 615 patients (98%). All of these patients had symptoms during the first 3 postoperative months. Early satiety (88%), bloating/flatulence (64%), and dysphagia (34%) were the most common; however, 94% of patients had resolution of their symptoms by the 1-year follow-up visit, and most had resolved after 3 months. Patients with persistent reflux or dysphagia after 3 months typically had an anatomic failure of the operation.

**Conclusions:** Most patients who have undergone laparoscopic Nissen fundoplication for gastroesophageal re-

flux disease will have gastrointestinal complaints during the initial 3 postoperative months. Nearly all of these patients will have resolved their symptomatology after 3 months. Those with persistent symptoms after 3 months warrant evaluation for operative failure.

**Key Words:** Gastroesophageal reflux disease, Minimally invasive surgery, Laparoscopic Nissen fundoplication, Dysphagia, Postoperative symptoms.

## INTRODUCTION

A popular option for the surgical management of gastroesophageal reflux disease is minimally invasive Nissen fundoplication. Similar to that of other “nonamputative” procedures, the successful outcome of a Nissen fundoplication is dependent on a technically precise operation in a well-selected patient. Currently, the technical modification of Donahue et al (ie, “floppy” fundoplication)<sup>1</sup> to the Nissen procedure is in common use, although precise statistics are not available. The floppy Nissen fundoplication is favored for the treatment of gastroesophageal reflux disease because this procedure maximizes reflux control while minimizing dysphagia. Minimally invasive Nissen fundoplication was first described in 1991.<sup>2</sup> Subsequently, the indications, preoperative evaluation, technical aspects, and outcome for minimally invasive Nissen fundoplication have been well described.<sup>1,3–7</sup>

One observation we have made in our own series of minimally invasive Nissen procedures is the routine occurrence of temporary postoperative gastrointestinal complaints (this observation also has been made by others<sup>8–10</sup>). We also have observed that many patients are treated by their referring physicians for these temporary postoperative gastrointestinal symptoms, perhaps too aggressively, as noted by others.<sup>11</sup> We therefore wanted to identify the incidence, severity, and duration of these symptoms in our patient population to provide prospective patients with quantitative data on this issue. We found that the vast majority of postoperative gastrointestinal complaints after minimally invasive Nissen fundoplication are temporary, and do not require prolonged (if any) medical treatment.

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## METHODS

Over a 10-year period, 628 patients underwent laparoscopic Nissen fundoplication under the supervision of the first author (CTF). The typical indication for fundoplication in this series was gastroesophageal reflux disease; this diagnosis required objective evidence that usually was in the form of esophagitis on endoscopy or a positive ambulatory pH study, or both.<sup>12</sup> The technique of "floppy" Nissen fundoplication has been described.<sup>1,13,14</sup> The components of this procedure that we believe to be critical include<sup>1</sup> circumferential esophageal mobilization resulting in an adequate length (3 cm to 5 cm) of intraabdominal esophagus<sup>2</sup>; closure of the diaphragmatic crura with posterior (and occasionally anterior) cruroplasty over a large (56 F to 60 F) bougie<sup>3</sup>; fundal mobilization with division of the short gastric vessels<sup>4</sup>; a short (about 2 cm), floppy 360° wrap that utilizes the fundus only (not the gastric body); and<sup>5</sup> fixation of the wrap to the anterior crural arch (but not to the esophagus itself). In addition, we used prosthetic reinforcement of the cruroplasty when faced with a large hiatal defect; this practice reduced hiatal hernia recurrence in a randomized trial.<sup>15</sup>

Postoperative follow-up was performed in the office of the supervising surgeon at 1 week, then at 1, 3, and 6 months, and then yearly. Postfundoplication dietary restrictions included avoidance of carbonated beverages and gas-producing food for 3 months, and eliminating meat for 1 month after surgery. In general, the patients had no dietary restrictions after 3 months. At each follow-up visit, each patient was queried regarding early satiety, dysphagia, odynophagia, hiccups, diarrhea, nausea, bloating/flatulence, and constipation (**Table 1**). The incidence of each symptom during different postoperative periods was compared with the Fischer exact or chi square test; the level of significance was  $P < 0.05$ .

## RESULTS

Twelve-month follow-up data were available in 615/628 patients (98%). Recurrent reflux (ie, a failed procedure) occurred in 16 patients (2.5%); in 14 of these, the failure of the procedure was evident by the 6-month follow-up visit. Exclusion of the above 16 patients (ie, those with reflux recurrent at  $\geq 3$  months postoperatively) left 599 patients for analysis. During the first 3 postoperative months, 100% of these patients had at least 1 gastrointestinal complaint; early satiety (88%), bloating/flatulence (64%), and dysphagia (34%) were the most common symptoms (**Table 2**). The vast majority of these symptoms were resolved within the first 4 weeks to 6 weeks after the procedure

**Table 1.**

Questions Administered at Each Follow-up Visit<sup>12</sup>

1. Do you have difficulty swallowing? If so, does the difficulty seem to be in the upper or lower chest? Is the difficulty with solids or liquids or both?
2. Do you experience heartburn? How often?
3. Do you experience pain with swallowing?
4. Do you experience chest pain when swallowing?
5. Do you vomit? How often?
6. Do you experience nausea?
7. Do you have dry heaves, hiccups, or both?
8. Do you regurgitate liquids, solids, or both?
9. Do you have a morning cough?
10. Do you have difficulty breathing or asthma?
11. Do you have voice hoarseness?
12. Do you have bloating, or flatulence (gas from below), or both?
13. Do you get full with small portions of food?
14. Do you have diarrhea? How often?
15. Do you have constipation?
16. Do you have indigestion? How often?

**Table 2.**

Gastrointestinal Symptoms 0 to 3 and 3 to 12 Months After Minimally Invasive Nissen Fundoplication\*

Symptom	Number of Patients With Symptom During Indicated Postoperative Period		P Value
	0-3 months (%)	3-12 months (%)	
Early satiety	527 (88%)	0	<0.01
Bloating/flatulence	385 (64%)	21 (4%)	<0.01
Dysphagia	201 (34%)	5 (0.8%)	<0.01
Constipation	44 (7%)	0	<0.01
Diarrhea	52 (9%)	7 (1%)	<0.01
Odynophagia	18 (3%)	0	<0.01
Nausea	29 (5%)	0	<0.01
Hiccups	27 (4%)	0	<0.01

\*Comparison of the incidence between the 2 periods was performed with either the Fisher exact or chi square test.

(data on the precise time of symptom resolution are not available). In the 3-month to 12-month postoperative interval, the incidence of gastrointestinal complaints in the

599 patients decreased markedly; specifically, 94% of these patients did not report symptoms during this period (**Table 2**).

The symptoms of bloating and flatulence (n = 21), dysphagia,<sup>5</sup> and diarrhea<sup>7</sup> were persistent in 33 patients beyond the third postoperative month (**Table 2**). Of note, 5 patients with persistent flatulence or diarrhea carried a preoperative diagnosis of irritable bowel syndrome. Upper endoscopy and barium radiography were performed in the 5 patients with persistent postoperative dysphagia; the associated causes included a slipped fundoplication (n=2), and a tight cruroplasty, a tight wrap, and no identifiable cause (n=1 each). Eleven patients with bloating and flatulence and 4 patients with diarrhea were evaluated with upper endoscopy, colonoscopy, and *Clostridium difficile* testing; none of this evaluation identified causative pathology.

## DISCUSSION

Up to 62% of patients who have undergone an antireflux procedure may be treated chronically with antireflux medication in the postoperative period<sup>16</sup>; such postoperative antireflux treatment is given in some cases without documentation of reflux.<sup>17</sup> We have documented a high incidence (100% of our series) of temporary postoperative gastrointestinal complaints after laparoscopic Nissen fundoplication. Other authors also have observed similar rates of temporary complaints after an antireflux procedure.<sup>6,18</sup> It has been our experience that these postoperative gastrointestinal complaints resolve by 3 months in over 90% of the patients. Interestingly, it has been shown that the accuracy of postoperative symptoms in predicting objective reflux (as measured by 24-hr pH monitoring) is poor, and that some asymptomatic patients actually may have subclinical reflux after a "successful" fundoplication.<sup>11</sup> We would argue that the more relevant observation is that laparoscopic antireflux surgery, when performed by experienced surgeons, results in a long-term clinical success rate of 90%.<sup>4,5</sup>

Postoperative symptoms like bloating, flatulence, and dysphagia can be minimized with the avoidance of carbonated beverages, gas-producing foods (eg, beans), and coarse substances (eg, red meat). Patients may still have the sensation of heartburn after a successful antireflux procedure. This is not necessarily indicative of recurrent reflux, but possibly due to irritation of the esophageal mucosa secondary to drinking a relatively caustic beverage, such as citrus juice or alcohol. These beverages also should be avoided for several months so that the patient's

esophagitis has a chance to resolve. If gastrointestinal symptoms occur during the first 3 months after fundoplication, our evidence suggests that the symptoms resolve in the vast majority of patients. Chronic medication is not required. The only treatment needed at this point is patient education and reassurance. If a patient has symptoms that persist beyond the 3 months postoperatively, however, an endoscopic and contrast fluoroscopic evaluation should be undertaken.

Other than recurrent reflux, the most common persistent symptom requiring intervention in our series was dysphagia, which happened in 1% of our patients. The cause of postoperative dysphagia is multifactorial,<sup>10</sup> including factors such as an undiagnosed motility disorder (eg, achalasia), a wrap failure (eg, slippage, overly tight wrap or cruroplasty, or corpus wrap), retroperitoneal hematoma, or peptic stricture. Treatment for dysphagia is specific to its cause, such as revisional surgery for wrap failure.<sup>19-22</sup> Persistent bloating/flatulence may be treated with simethicone and dietary modification; further treatment can consist of speech therapy to retrain/control swallowing frequency.<sup>23</sup> The cause of persistent diarrhea often is not clear; vagal injury often is implicated.<sup>24</sup> The treatment of persistent diarrhea includes antidiarrheals; further evaluation of the lower gastrointestinal tract (for irritable bowel syndrome, pseudomembranous colitis, etc) might be considered.

## CONCLUSION

Since 1995 laparoscopic Nissen fundoplication has been shown to be safe and effective therapy for gastroesophageal reflux disease. Although many patients will have gastrointestinal complaints during the first 3 months after laparoscopic Nissen fundoplication, the vast majority of these symptoms will resolve and do not require chronic treatment. We suggest patient education and reassurance for the complaints that come up during this initial period, and reserve further evaluation for symptoms that persist beyond 3 months.

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