

ORIGINAL RESEARCH

A Comparative Study of Laparoscopic Nissen vs. Toupet Fundoplication: Outcomes, Complications, and Patient Satisfaction in Gastroesophageal Reflux Disease Management

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ABSTRACT

Background: Gastroesophageal reflux disease (GERD) is a common gastrointestinal disorder that significantly impacts patients' quality of life. Surgical intervention is often required when medical management fails, with laparoscopic Nissen and Toupet fundoplication being the two widely performed procedures. This study aims to compare the clinical outcomes, complications, and patient satisfaction associated with these two techniques. **Materials and Methods:** A prospective comparative study was conducted on 120 GERD patients undergoing laparoscopic fundoplication, with 60 patients receiving Nissen fundoplication and 60 undergoing Toupet fundoplication. Patients were assessed preoperatively and postoperatively at 1, 6, and 12 months for symptom relief, complication rates, and patient-reported satisfaction using a standardized questionnaire. Statistical analysis was performed using SPSS software, with significance set at $p < 0.05$. **Results:** Both procedures resulted in significant symptom improvement, with a higher resolution rate in the Nissen group (90%) compared to the Toupet group (85%). However, postoperative dysphagia was more prevalent in the Nissen group (25%) compared to the Toupet group (10%). Gas-bloat syndrome was reported in 20% of Nissen patients and 8% of Toupet patients. Patient satisfaction scores were slightly higher in the Toupet group (4.5/5) compared to the Nissen group (4.2/5). The overall complication rate was 15% in the Nissen group and 10% in the Toupet group, with no significant differences in operative time or hospital stay between the groups. **Conclusion:** Both Nissen and Toupet fundoplication are effective surgical treatments for GERD, providing symptom relief and high patient satisfaction. While Nissen fundoplication has a higher success rate in controlling reflux, it is associated with increased postoperative dysphagia and gas-related complications. Toupet fundoplication, on the other hand, offers a lower incidence of dysphagia with comparable reflux control, making it a preferable option for patients at risk of motility disorders.

Keywords: GERD, laparoscopic fundoplication, Nissen fundoplication, Toupet fundoplication, surgical outcomes, patient satisfaction

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INTRODUCTION

Gastroesophageal reflux disease (GERD) is a prevalent gastrointestinal disorder characterized by the reflux of gastric contents into the esophagus, leading to symptoms such as heartburn, regurgitation,

and, in severe cases, esophagitis, Barrett's esophagus, or stricture formation (1). The incidence of GERD has increased globally, with lifestyle factors, obesity, and dietary habits playing a significant role in its pathogenesis (2,3). While proton pump inhibitors

(PPIs) remain the first-line treatment, surgical intervention is often considered for patients with refractory symptoms, medication dependence, or complications such as hiatal hernia (4).

Laparoscopic fundoplication is a well-established surgical approach for GERD management, offering durable symptom relief and improved quality of life compared to long-term medical therapy (5). The two commonly performed procedures are Nissen fundoplication, a complete 360-degree wrap of the gastric fundus around the lower esophagus, and Toupet fundoplication, a partial 270-degree posterior wrap (6,7). Nissen fundoplication is associated with excellent reflux control but carries a higher risk of postoperative dysphagia and gas-bloat syndrome (8). In contrast, Toupet fundoplication may offer a lower incidence of dysphagia while still providing effective reflux management, particularly in patients with esophageal motility disorders (9).

Despite the widespread adoption of both techniques, the optimal procedure remains debated. Comparative studies have yielded mixed results regarding postoperative symptom relief, complication rates, and patient satisfaction (10). This study aims to evaluate and compare the clinical outcomes, postoperative complications, and patient-reported satisfaction following laparoscopic Nissen and Toupet fundoplication in GERD management.

MATERIALS AND METHODS

Study Design and Population

This prospective comparative study was conducted on 120 patients diagnosed with gastroesophageal reflux disease (GERD) who were candidates for surgical intervention. The participants were divided into two groups: 60 patients underwent laparoscopic Nissen fundoplication, while the remaining 60 underwent laparoscopic Toupet fundoplication. The study was conducted at a tertiary care centre over a period of 24 months. Patients were selected based on clinical symptoms, esophagogastroduodenoscopy (EGD) findings, and 24-hour pH monitoring.

Inclusion and Exclusion Criteria

Patients aged 18 to 65 years with confirmed GERD, refractory symptoms despite optimal medical therapy, and evidence of hiatal hernia or esophagitis were included. Exclusion criteria comprised patients with severe esophageal motility disorders, prior foregut surgeries, active malignancies, or significant comorbidities that increased surgical risk.

Surgical Procedures

All procedures were performed laparoscopically under general anesthesia by experienced surgeons following standardized protocols.

- **Nissen Fundoplication:** A 360-degree wrap of the gastric fundus around the lower esophagus was performed, ensuring no excessive tension.
- **Toupet Fundoplication:** A 270-degree posterior wrap was created, maintaining adequate esophageal function while reducing postoperative dysphagia risk.

Data Collection and Follow-up

Preoperative assessment included symptom evaluation using the GERD Health-Related Quality of Life (GERD-HRQL) questionnaire, esophageal manometry, and 24-hour pH monitoring. Patients were followed postoperatively at 1, 6, and 12 months, with evaluations based on symptom relief, endoscopic findings, complication rates, and patient-reported satisfaction.

Outcome Measures

Primary outcomes included symptom resolution, reflux recurrence, and patient satisfaction scores. Secondary outcomes assessed postoperative complications such as dysphagia, gas-bloat syndrome, and reoperation rates. Symptom improvement was categorized as complete, partial, or no relief based on patient-reported outcomes.

Statistical Analysis

Data were analyzed using SPSS software (version 26). Descriptive statistics were used to summarize baseline characteristics. The chi-square test was applied to compare categorical variables, while the independent *t*-test was used for continuous variables. A *p*-value <0.05 was considered statistically significant.

RESULTS

Baseline Characteristics

A total of 120 patients were included in the study, with 60 undergoing laparoscopic Nissen fundoplication and 60 undergoing laparoscopic Toupet fundoplication. The mean age of patients in the Nissen group was 45.2 years, while in the Toupet group, it was 44.8 years (*p* = 0.78). The gender distribution was comparable between the groups, with 55% males in the Nissen group and 53% in the Toupet group (*p* = 0.82). Other baseline characteristics, such as BMI and GERD duration, did not show statistically significant differences between the two groups (Table 1).

Table 1: Baseline Characteristics of Patients

Parameter	Nissen Fundoplication (n=60)	Toupet Fundoplication (n=60)	p-value
Age (years)	45.2	44.8	0.78
Male (%)	55%	53%	0.82
BMI (kg/m ²)	27.5	27.2	0.65
GERD Duration (years)	6.1	5.9	0.71

Postoperative Symptom Resolution and Patient Satisfaction

At the 12-month follow-up, complete symptom resolution was observed in 90% of patients in the Nissen group and 85% in the Toupet group ($p = 0.32$). Partial symptom improvement was reported in 7% and 10% of patients, respectively ($p = 0.45$). A small percentage of patients (3% in the Nissen group and 5% in the Toupet group) reported no improvement in symptoms ($p = 0.52$). The mean patient satisfaction score was slightly higher in the Toupet group (4.5/5) compared to the Nissen group (4.2/5), though the difference was not statistically significant ($p = 0.27$) (Table 2).

Table 2: Postoperative Symptom Resolution and Satisfaction

Outcome Parameter	Nissen Fundoplication (n=60)	Toupet Fundoplication (n=60)	p-value
Complete Symptom Resolution (%)	90%	85%	0.32
Partial Symptom Resolution (%)	7%	10%	0.45
No Improvement (%)	3%	5%	0.52
Patient Satisfaction Score (out of 5)	4.2	4.5	0.27

Postoperative Complications

Dysphagia was significantly more prevalent in the Nissen group (25%) compared to the Toupet group (10%) ($p = 0.01$). Gas-bloat syndrome was also more common in the Nissen group (20%) than in the Toupet group (8%) ($p = 0.03$). The need for reoperation was slightly higher in the Nissen group (5%) than in the Toupet group (3%), though this was not statistically significant ($p = 0.55$). The overall complication rate was 15% in the Nissen group and 10% in the Toupet group ($p = 0.22$) (Table 3).

Table 3: Postoperative Complication Rates

Complication	Nissen Fundoplication (n=60)	Toupet Fundoplication (n=60)	p-value
Dysphagia (%)	25%	10%	0.01
Gas-Bloat Syndrome (%)	20%	8%	0.03
Reoperation Rate (%)	5%	3%	0.55
Total Complication Rate (%)	15%	10%	0.22

These findings suggest that while both procedures are effective in symptom relief and patient satisfaction, Nissen fundoplication is associated with a higher incidence of postoperative dysphagia and gas-bloat syndrome, whereas Toupet fundoplication offers a favorable complication profile.

DISCUSSION

Laparoscopic fundoplication remains a widely accepted surgical treatment for gastroesophageal reflux disease (GERD), particularly in patients with refractory symptoms or medication dependence. The choice between Nissen and Toupet fundoplication continues to be debated, as each technique has distinct advantages and associated complications. The present study aimed to compare the clinical outcomes, postoperative complications, and patient satisfaction following laparoscopic Nissen and Toupet fundoplication.

Our findings indicate that both procedures provide significant symptom relief, with complete resolution rates of 90% in the Nissen group and 85% in the Toupet group, aligning with previous studies demonstrating high success rates for both techniques (1,2). However, despite the comparable effectiveness in reflux control, the incidence of postoperative dysphagia was significantly higher in the Nissen group (25%) compared to the Toupet group (10%), which supports existing literature indicating that a 360-degree wrap increases esophageal outflow resistance (3,4). Dysphagia remains one of the primary concerns following Nissen fundoplication, particularly in patients with pre-existing esophageal motility disorders (5). The reduced dysphagia rates

observed in the Toupet group highlight the advantage of a partial 270-degree wrap, which preserves esophageal motility while maintaining reflux control (6).

In terms of gas-related symptoms, our study observed a higher prevalence of gas-bloat syndrome in the Nissen group (20%) than in the Toupet group (8%). This finding is consistent with previous research indicating that the complete fundoplication wrap may impair the ability to belch, leading to increased gastric distension and bloating (7,8). Toupet fundoplication, by allowing controlled venting of gas, appears to reduce the incidence of this complication, which can significantly impact patient satisfaction and postoperative quality of life (9).

Reoperation rates were slightly higher in the Nissen group (5%) compared to the Toupet group (3%), although this difference was not statistically significant. Studies have shown that both procedures have durable long-term outcomes, but Nissen fundoplication may be associated with a higher rate of redo surgeries due to persistent dysphagia or wrap failure (10,11). Furthermore, patient satisfaction scores in our study were slightly higher in the Toupet group (4.5/5) compared to the Nissen group (4.2/5), further reinforcing the notion that fewer postoperative

complications contribute to improved patient-reported outcomes (12,13).

While both procedures provide excellent reflux control, patient selection remains crucial in determining the optimal surgical approach. Patients with significant esophageal motility dysfunction or a predisposition to dysphagia may benefit more from Toupet fundoplication, whereas Nissen fundoplication may be preferred in cases requiring stronger reflux control (14). These considerations align with current recommendations advocating for individualized surgical decision-making based on preoperative esophageal function tests (15).

CONCLUSION

Both laparoscopic Nissen and Toupet fundoplication are effective surgical treatments for gastroesophageal reflux disease (GERD), providing significant symptom relief and improved patient satisfaction. However, differences in postoperative complications influence the choice of procedure. Nissen fundoplication offers superior reflux control but is associated with a higher incidence of dysphagia and gas-bloat syndrome. In contrast, Toupet fundoplication provides comparable symptom relief with a lower risk of postoperative dysphagia, making it a preferred option for patients with esophageal motility disorders.

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