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Original Research Article

CLINICAL OUTCOMES, COMPLICATIONS, AND PATIENT SATISFACTION FOLLOWING LAPAROSCOPIC FUNDOPLICATION FOR GASTRO-OESOPHAGEAL REFLUX DISEASE: A SINGLE-CENTER EXPERIENCE

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ABSTRACT

Background: Gastro-oesophageal reflux disease (GERD) impairs quality of life, and a subset of patients remains refractory to optimal medical therapy. Laparoscopic fundoplication is an established operation, but outcome and satisfaction vary between centres. This study assessed clinical outcomes, complications, and patient satisfaction after laparoscopic fundoplication in a tertiary care centre.

Materials and Methods: A retrospective observational study included 40 consecutive patients aged 15–65 years who underwent laparoscopic fundoplication for GERD between March 2023 and March 2026. Every patient had preoperative oesophageal manometry. A complete 360° Nissen fundoplication was used in the majority. Patients older than 60 years underwent a posterior 270° Toupet fundoplication with cruroplasty. Satisfaction was assessed with a standardized questionnaire. Results are reported as counts, percentages, and Wilson 95% confidence intervals.

Results: The male-to-female ratio was approximately 60:40. Regurgitation and retrosternal burning were the predominant symptoms. Three patients (7.5%) presented mainly with cough and breathlessness. Satisfaction was achieved in 34 patients (85.0%; 95% CI 70.9–92.9). Persistent GERD symptoms occurred in 3 (7.5%; 95% CI 2.6–19.9) and intermittent bloating in 4 (10.0%; 95% CI 4.0–23.1). No patient developed postoperative dysphagia. One patient (2.5%) had early wrap migration and underwent re-laparoscopy with revision crural repair. One patient developed a paraoesophageal hernia at 6 months and underwent mesh repair. Two patients (5.0%; 95% CI 1.4–16.5) required reoperation.

Conclusion: Laparoscopic fundoplication was safe and effective in this consecutive series, with high satisfaction and no recorded postoperative dysphagia. Routine manometry and a tailored wrap are a coherent explanation for that swallowing result. A small number of patients had persistent symptoms or required revision of the hiatus, which supports careful selection and structured follow-up.

Keywords: Gastro-oesophageal reflux disease; Laparoscopic fundoplication; Nissen fundoplication; Toupet fundoplication; Surgical outcomes; Patient satisfaction; Complications.

INTRODUCTION

Gastro-oesophageal reflux disease is one of the commonest reasons for consultation in gastroenterology and upper gastrointestinal surgery. Prevalence depends on the definition used, and weekly symptoms are generally more frequent in Western than in East Asian populations.[1] Many patients are well controlled by lifestyle measures and acid suppression. Others have a chronic illness that disturbs sleep, work, and diet, and that can injure the oesophageal mucosa.

The symptom pattern extends beyond heartburn. Regurgitation, chest pain, and dysphagia are typical, while cough, laryngitis, and breathlessness are extra-oesophageal presentations. Persistent reflux is linked to oesophagitis, stricture, Barrett's metaplasia, and, rarely, adenocarcinoma.[2] A history dominated by cough or breathlessness needs objective support before fundoplication, because surgery will not correct a primary airway disease. Three patients in the present series had that extra-oesophageal picture.

A proton pump inhibitor remains first-line treatment and heals oesophagitis in most adherent patients. Surgery is reserved for objectively confirmed disease that persists despite optimized medical therapy, for intolerance of that therapy, or for a dominant anatomical problem such as a large hiatus hernia.[3] Failure of medication is a reason to revisit the diagnosis, not an automatic indication for a wrap.

The differential diagnosis of refractory reflux now includes reflux hypersensitivity, functional heartburn, eosinophilic oesophagitis, and rumination. The Lyon Consensus sets out how endoscopy and ambulatory reflux monitoring should be combined before GERD is treated as a surgical disease.[4] Fundoplication performed for a functional syndrome exchanges heartburn for dysphagia and bloating without curing the original complaint.

Manometry does not diagnose reflux. It excludes achalasia and describes peristaltic reserve so that the wrap can be matched to the oesophagus. The Chicago Classification is the standard language for that assessment.[5] In this series manometry was obtained in every patient and, with age, determined the choice between a complete and a partial wrap.

Guidelines support considering fundoplication rather than indefinite escalation of medication once chronic or refractory GERD is confirmed. The recommendation is conditional, because patients weigh freedom from tablets against dysphagia and bloating differently, and because either a partial or a complete fundoplication is acceptable.[6]

Laparoscopic Nissen fundoplication, first reported in 1991, made antireflux surgery acceptable as a short-stay operation.[7] The essential steps are restoration of intra-abdominal oesophageal length, repair of the hiatus, and construction of a fundic valve. Both reoperations in this series were failures of hiatal containment, which places the technical emphasis on the crural repair.

In the LOTUS trial, estimated 5-year remission was 85% after laparoscopic antireflux surgery and 92% with dose-adjusted esomeprazole among patients who had already responded to a proton pump inhibitor.[8] Surgery reduced regurgitation and increased dysphagia and gas-related symptoms. A randomized comparison of laparoscopic Nissen fundoplication with continued proton pump inhibition likewise supported surgery for selected patients with chronic reflux, while showing that new symptoms are part of the exchange.[9]

Randomized evidence also informs the choice of wrap. A meta-analysis found similar reflux control after Nissen and Toupet fundoplication, with more dysphagia after the total wrap (13.5% versus 8.6%; risk ratio 1.61, 95% confidence interval 1.06 to 2.44) and more dilatations.[10] Those data support a partial wrap in older patients, in whom age is a practical proxy for motility and tissue quality. The threshold of 60 years used here is a local rule, applied together with manometry.

Trials from high-volume units do not automatically describe consecutive tertiary practice that includes adolescents, adults up to 65 years, and patients with extra-oesophageal symptoms. This study therefore reports clinical outcomes, complications, and satisfaction after tailored laparoscopic fundoplication at one centre.

MATERIALS AND METHODS

Design and participants: This retrospective observational study included consecutive patients treated at a single tertiary care centre between March 2023 and March 2026. Patients aged 15 to 65 years who underwent laparoscopic fundoplication for GERD were eligible. Forty patients formed the study cohort. The series includes adolescents and adults. Reporting follows the principal items of the STROBE statement.

Preoperative assessment and operative policy: Every patient underwent oesophageal manometry to assess motility and to plan the operation. A tailored policy was used. Complete 360° Nissen fundoplication was performed in the majority of patients. Patients older than 60 years and those with reduced or absent oesophageal motility underwent posterior partial 270° Toupet fundoplication with cruroplasty. The operation restored an intra-abdominal length of oesophagus, repaired the hiatus, and constructed the selected fundic wrap.

Outcomes and analysis: The outcomes were demographic pattern, preoperative symptoms, wrap strategy, postoperative symptoms, complications, reoperation, and patient satisfaction. Satisfaction was measured with a standardized questionnaire and is reported as the proportion of patients classified as satisfied. Persistent GERD symptoms, intermittent bloating, and dysphagia were recorded as separate endpoints. Early wrap migration treated by re-laparoscopy and revision crural repair, and

paraoesophageal hernia at 6 months treated by mesh repair, were the two reoperations.

Analysis was descriptive. Counts are given with percentages. Wilson 95% confidence intervals were calculated for proportions with a denominator of 40. Satisfaction of 85% corresponds to 34 of 40 patients. The reoperation rate is the sum of the two hiatal revisions. Endpoints are not treated as mutually exclusive.

RESULTS

Cohort and symptoms: Forty patients underwent laparoscopic fundoplication. The male-to-female ratio was approximately 60:40. Regurgitation and retrosternal burning were the most common preoperative symptoms. Three patients (7.5%) presented predominantly with cough and breathlessness.

Table 1: Cohort and preoperative profile

Characteristic	Result
Patients	40
Period	March 2023 to March 2026
Age range, years	15–65
Sex ratio, male:female	Approximately 60:40
Setting	Single tertiary care centre
Preoperative manometry	40 (100%)
Predominant symptoms	Regurgitation and retrosternal burning
Extra-oesophageal presentation	3 (7.5%): cough and breathlessness

Operation: All 40 operations were laparoscopic fundoplications. Nissen fundoplication was the procedure used in the majority. Toupet fundoplication with cruroplasty was used in patients older than 60 years.

Table 2: Operative policy

Element	Practice in this series
Approach	Laparoscopic
Motility testing	Oesophageal manometry in every patient
Principal wrap	Complete 360° Nissen fundoplication
Wrap after the age of 60 years	Posterior 270° Toupet fundoplication
Hiatal repair with Toupet fundoplication	Cruroplasty
Early hiatal revision	Re-laparoscopy and revision crural repair
Delayed hiatal revision	Mesh repair of paraoesophageal hernia

Satisfaction and symptoms: Thirty-four patients (85.0%; 95% CI 70.9–92.9) were satisfied. Six patients (15.0%; 95% CI 7.1–29.1) were not classified as satisfied. Persistent GERD symptoms occurred in 3 patients (7.5%; 95% CI 2.6–19.9). Intermittent bloating occurred in 4 (10.0%; 95% CI 4.0–23.1). No patient had postoperative dysphagia (95% CI 0–8.8). Satisfaction and residual symptoms were separate endpoints: bloating did not by itself define an unsatisfied patient, and persistent reflux did not account for every patient outside the satisfied group. High satisfaction after laparoscopic Nissen fundoplication is the expected medium-term pattern in experienced series, although instruments differ.[11] Quality of life, including in non-erosive disease, is the outcome patients use to judge the operation.[12]

Table 3: Postoperative outcomes

Endpoint	n/N	%	95% CI
Satisfied	34/40	85.0	70.9–92.9
Not classified as satisfied	6/40	15.0	7.1–29.1
Persistent GERD symptoms	3/40	7.5	2.6–19.9
Intermittent bloating	4/40	10.0	4.0–23.1
Postoperative dysphagia	0/40	0	0–8.8
Reoperation	2/40	5.0	1.4–16.5

Wilson 95% confidence intervals. Satisfaction and symptom endpoints are not mutually exclusive. Reoperation is the sum of the two hiatal revisions.

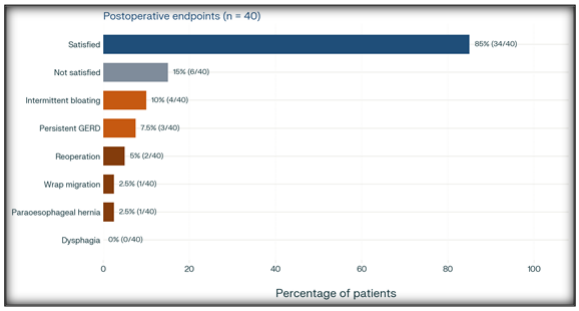


Figure 1: Postoperative endpoints after laparoscopic fundoplication.

Bars show the percentage of 40 patients. Satisfaction and residual symptoms were recorded as separate endpoints.

Complications: Two patients required further surgery (5.0%; 95% CI 1.4–16.5). One patient (2.5%; 95% CI 0.4–12.9) developed early wrap migration and was treated by re-laparoscopy with revision of the crural repair. One patient developed a paraoesophageal hernia at 6 months and was treated by mesh repair. The hiatal repair, rather than obstruction by the wrap, was the site of both failures.

Table 4: Complications requiring reoperation

Event	n	%	95% CI	Treatment	Timing
Wrap migration	1	2.5	0.4–12.9	Re-laparoscopy and revision crural repair	Early
Paraoesophageal hernia	1	2.5	0.4–12.9	Mesh repair	6 months
Any reoperation	2	5.0	1.4–16.5	Hiatal revision	Early and 6 months
Postoperative dysphagia	0	0	0–8.8	None required	—

Manometry was performed in every patient. Wrap type was tailored by age, with Nissen fundoplication in the majority and Toupet fundoplication with cruroplasty after 60 years.

Published context: Table 5 and Figure 3 place these counts beside published figures. The comparison is descriptive. Case mix, wrap type, follow-up, and definitions differ, so the figure is context rather than a claim of superiority.

Table 5: This series beside selected published rates

Outcome	This series	Published figure
Satisfaction or surgical remission	85.0% (34/40)	LOTUS surgical remission 85% at 5 years.[8]
Persistent reflux or recurrent heartburn	7.5% (3/40)	Recurrent heartburn 9.63% in a series of 301.[14]
Dysphagia	0/40	Nissen 13.5% and Toupet 8.6% in pooled trials,[10] 3.65% in 301 patients.[14]
Bloating or gas-related symptoms	10.0% (4/40)	More common after surgery than after esomeprazole in LOTUS.[8]
Wrap migration	2.5% (1/40)	0.66% (2/301).[14]
Reoperation	5.0% (2/40)	Both events in this series were hiatal revisions

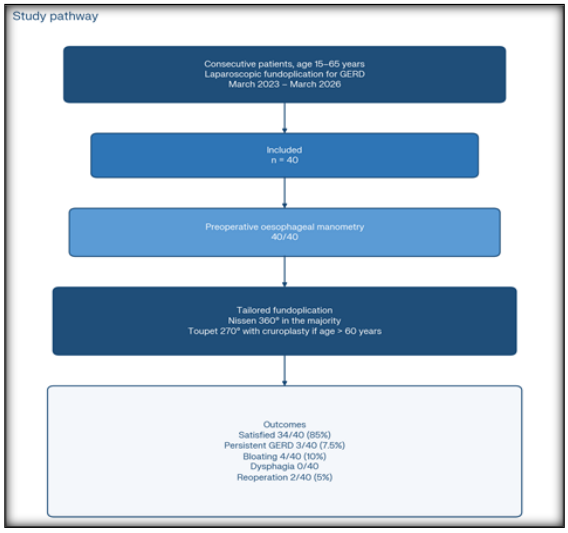


Figure 2: Pathway of the consecutive series.

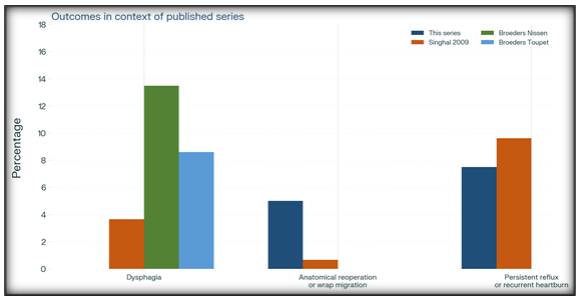


Figure 3: Selected rates beside published series.

Singhal rates come from 301 laparoscopic Nissen fundoplications. Broeders rates are pooled dysphagia from randomized comparisons of Nissen and Toupet fundoplication. Definitions are not identical.

DISCUSSION

In this consecutive series of 40 patients, laparoscopic fundoplication produced satisfaction in 85%, persistent reflux symptoms in 7.5%, intermittent bloating in 10%, and no postoperative dysphagia. Two patients required reoperation, both for failure of hiatal containment. Reflux control and satisfaction were high, obstructive symptoms were absent from the recorded outcomes, and the failures that occurred were mechanical.

The tailored policy agrees with comparative evidence. A network meta-analysis of 13 randomized trials, including 2063 patients, found similar long-term reflux control after Nissen, Toupet, and Dor fundoplication, with lower odds of dysphagia after Toupet than after Nissen fundoplication (odds ratio 0.285, 95% credible interval 0.060–0.958).[13] The present result is the outcome of a unit policy — manometry in every patient and a partial wrap after 60 years — delivered without a recorded dysphagia event. The upper confidence limit of 8.8% means the finding excludes a high rate of dysphagia and remains compatible with a modest rate.

Satisfaction of 85%, with persistent reflux in three patients, is the figure that matters for counselling. It matches the range of experienced laparoscopic series.[11] Six patients were outside the satisfied group, while only three had persistent GERD symptoms, so recurrent reflux does not explain every unsatisfied patient. Bloating, the later hernia, and extra-oesophageal symptoms are the other clinical explanations within the recorded data. The three patients who presented with cough and breathlessness need separate counselling: extra-oesophageal syndromes respond less predictably than heartburn and regurgitation, and the overall 85% is the result for the whole cohort.

The complication pattern is small and anatomically consistent. In a series of 301 laparoscopic Nissen fundoplications, wrap migration occurred in 2 patients (0.66%), postoperative dysphagia in 11 (3.65%), and recurrent heartburn in 9.63%.[14] A review of laparoscopic antireflux surgery describes

the expected technical and physiological complications, from pleural injury to migration, hiatal stenosis, and gas bloat.[15] The events captured here were migration, later paraoesophageal hernia, bloating, and the absence of dysphagia.

Anatomical failure is the dominant mode when laparoscopic fundoplication fails. Herniation, wrap disruption, and a crural repair that is too tight can each be corrected if the anatomy is defined before revision.[16] Both reoperations fit that description. Early wrap migration was treated by re-laparoscopy and revision of the crural repair. The paraoesophageal hernia at 6 months was treated with mesh. The sequence points to the hiatus as the priority for technical audit.

Radiological series distinguish small, often asymptomatic intrathoracic migration from larger migration that causes pain, dysphagia, or vomiting.[17] Early migration in this series was recognised and revised. Thoracic migration has been attributed to an excessively opened hiatus, a crural repair that does not hold, and early retching.[18] The corresponding technical safeguards are an adequate intra-abdominal oesophageal length, a secure posterior crural repair, and control of postoperative nausea.

Troublesome swallowing after laparoscopic antireflux surgery is often a problem of hiatal closure rather than of the wrap alone.[19] A tight or scarred cruroplasty causes dysphagia even when the fundus is floppy. A cruroplasty that fails causes the migrations seen here. The absence of dysphagia and the two hiatal revisions can therefore be read together: the wrap policy did not produce an obstructive complication, and the hiatus was the site of failure. Mesh was used for the recurrent hernia. Mesh at the hiatus can itself cause dysphagia or erosion, so its use at revision is a separate technical choice from the index wrap.

Satisfaction in the first years after surgery is not the same as durability at ten years. Long-term clinical follow-up shows that most patients remain improved, while a proportion develop recurrent symptoms or return to acid suppression.[20] The timed event in this series is a hernia at 6 months. Patients can be told that early satisfaction is high and that late recurrence remains part of the natural history of the disease and of the repair. A review at five years, using the same questionnaire, would test whether the present result is stable.

The series is consecutive and single-centre, which supports consistency of technique and limits generalisation. The age range includes adolescents and adults, and outcomes are reported for the cohort as a whole. Extra-oesophageal symptoms were the predominant picture in three patients. The confidence intervals around uncommon events are wide, as expected with 40 patients. Within those limits, the results are internally coherent: high satisfaction, infrequent persistent reflux, occasional bloating, no dysphagia, and two hiatal revisions.

For practice, a patient with confirmed GERD who remains dissatisfied with medication can be offered laparoscopic fundoplication at this centre with an expectation of satisfaction in about five of six, persistent reflux in fewer than one in ten, and reoperation in about one in twenty during the observed period. The offer should be more cautious when cough or breathlessness is the dominant symptom. Crural integrity is the technical point that both revisions identify.

CONCLUSION

Laparoscopic fundoplication for GERD, tailored by preoperative manometry and by age, was associated with 85% satisfaction, persistent reflux symptoms in 7.5%, intermittent bloating in 10%, and no postoperative dysphagia. Two patients required reoperation, one for early wrap migration and one for paraoesophageal hernia at 6 months. The results support continued use of this approach in selected patients, with explicit counselling about bloating, extra-oesophageal symptoms, and the possibility of later hiatal failure.

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