Review Article ISSN 2835-6276

American Journal of Medical and Clinical Research & Reviews

Surgical Treatment of Gastro-Oesophageal Reflux Disease (GERD): A Brief Review

Lara Beatriz Dallaqua Bitiati[1*], Ian Caldeira Ruppen[1], Fernando de Oliveira Dutra[2], Jordana Luiza Ferreira de Campo[1] André Cesar Leandro[1], Larissa da Rosa Piccoli[1], Tauane Cano Barreto[1], Emily Eduarda Hellmann[1], Ana Paula Mendes[1], Priscila De Oliveira Barros[1], Camilla Antunes Zanini[3], Sarila Hali Kloster Lopes[1], Ana Carolina Langendyk Rodrigues[1], Maria Clara Costa Calvo[1]

1. Centro Universitário Ingá – Uningá, Maringá, PR, Brazil.
2. Hospital Memorial Uningá - HMU, Maringá, PR, Brazil.
3. Faculdade Morgana Potrich, Mineiros, GO, Brazil.

[*]***Correspondence:*** *Ian Caldeira Ruppen*

Received:**25 May 2025;** ***Accepted:*****05 June 2025;** ***Published:*****10June 2025**

Citation: Ian Caldeira Ruppen.Surgical Treatment of Gastro-Oesophageal Reflux Disease (GERD): A Brief Review. AJMCRR. 2025; 4(6): 1-4.

Abstract

Gastro-oesophageal reflux disease (GERD) affects up to 20 % of the Western population, causing heartburn, acid regurgitation and complications such as erosive oesophagitis and Barrett's oesophagus. Although proton-pump inhibitors (PPIs) control symptoms in most patients, about 30 % remain symptomatic or develop complications, making surgery indispensable in selected cases. Laparoscopic fundoplication total (Nissen) or partial (Toupet, Dor) is the gold standard, with high clinical success, normalisation of oesophageal pH and a marked improvement in quality of life. Compared with the open approach, laparoscopy reduces postoperative pain, length of stay and morbidity, but demands careful assessment of oesophageal motility and hiatal hernia. Complications such as transient dysphagia, gas-bloat syndrome and reflux recurrence occur in up to 15 % of cases and are minimised by experienced teams and well-established protocols. Cost-effectiveness analyses show long-term savings owing to reduced lifelong PPI use and fewer admissions. Robotic surgery has produced promising results in precision and ergonomics, although its widespread adoption is limited by high costs and restricted availability. Properly indicated and executed by a multidisciplinary team, surgical treatment provides durable symptom relief, prevents severe complications and improves quality of life in GERD.

Keywords: gastro-oesophageal reflux disease; surgical treatment; fundoplication; laparoscopy; complications.

Introduction:

Gastro-oesophageal reflux disease (GERD) is the retrograde flow of gastric contents into the oesophagus, leading to typical symptoms (heartburn and regurgitation) and oesophageal injuries such

as erosions, strictures and Barrett's metaplasia the latter a precursor of oesophageal adenocarcinoma. The prevalence in Western countries is estimated at 10–20 %, producing a negative impact on quality of life and placing a heavy burden on health-care systems. Clinical management relies on lifestyle modifications (diet, head-of-bed elevation) and PPIs, achieving symptom control in up to 70 % of patients. However, those with refractory symptoms, high-dose PPI dependence or complications should be considered for surgery.

Since Nissen first described fundoplication in the 1950s, the procedure has evolved with laparoscopy and, more recently, robotics. Total (360°) fundoplication reinforces the antireflux barrier, whereas partial wraps (180–270°) aim to reduce dysphagia in patients with impaired motility. Introduced in the early 1990s, laparoscopy yields less surgical trauma, a shorter hospital stay (≈ 2–3 days) and quicker functional recovery than the open technique. Proper patient selection is multifactorial: endoscopy to grade oesophagitis and rule out neoplasia; 24-hour pH monitoring to quantify acid exposure; oesophageal manometry to assess motility and avoid persistent dysphagia; and contrast imaging to identify hiatal hernia and distal oesophageal anatomy.

Absolute indications include severe oesophagitis, peptic stricture or aspiration, and PPI dependence without relief; relative indications comprise atypical symptoms and reflux-related bronchopulmonary disease. Despite robust favourable data, early (vascular injury, pneumoperitoneum) and late complications (transient dysphagia, gas-bloat, recurrence) occur in 5–15 % of cases and depend on surgeon experience and peri-operative protocols. Cost-effectiveness analyses show medium- and long-term savings through reduced PPI consumption and fewer reflux -related admissions, justifying investments in training and specialised equipment.

Objectives:

To review scientific evidence on the surgical treatment of GERD, emphasising accurate diagnosis, appropriate choice of fundoplication type and structured follow-up.

Materials And Methods:

A narrative review was conducted in PubMed, ScienceDirect and SciELO databases. Relevant articles on surgical management of GERD were selected and critically analysed.

Discussion:

Meta-analyses report > 85 % long-term symptomatic success for laparoscopic fundoplication in refractory GERD. In head-to-head comparison, Nissen fundoplication achieves 90 % remission of heartburn and regurgitation but carries up to 10 % persistent dysphagia; partial techniques (Toupet or Dor) provide nearly equivalent relief (> 80 %) with a lower incidence of chronic dysphagia. Post-operative pH monitoring confirms normalisation of acid exposure in 75–95 % of patients, irrespective of total or partial wrap, provided pre-operative motility is considered [4] [8]. High-resolution manometry personalises wrap choice by identifying weak peristalsis that benefits from partial rotation.

Versus the open route, laparoscopy offers 40 % less postoperative pain, ≈ 1.5 days shorter hospital stay and faster return to work, besides superior cosmetic results; however, a learning curve of 20–30 cases is required [6][9]. Both approaches have comparable

iatrogenic injury rates, but laparoscopy lowers wound infection and port-site hernia incidence. Robotic fundoplication provides wider instrument range, three-dimensional vision and ergonomic comfort; nevertheless, 20–30 % higher costs per procedure and the need for dedicated training hinder widespread adoption. Early studies show operative times and functional results similar to laparoscopy, but robust cost-effectiveness and long -term data are lacking. Economic projections reveal up to 25 % cost reduction in PPI use and hospital admissions five years after successful surgery, especially in younger patients or those with pulmonary complications.

Conclusion:

Laparoscopic fundoplication offers a durable solution for patients with medically refractory GERD or severe complications. Total (Nissen) and partial (Toupet, Dor) wraps should be selected according to pre-operative motility to balance antireflux efficacy with bolus propulsion. Compared with open surgery, laparoscopy decreases pain, length of stay and morbidity, and accelerates recovery, although it requires a learning curve and infrastructure investment. Oesophageal pH normalises in up to 95 % of cases, with sustained symptom control and markedly reduced PPI dependence.

Complications such as transient dysphagia, gas-bloat and recurrence are mitigated by meticulous candidate selection and protocolled follow-up. Technological advances, notably robotics, may enhance surgical precision but still lack large-scale cost-effectiveness confirmation . Economic analyses support initial investment, demonstrating cost savings after five years, particularly in patients with aspiration-related pulmonary disease. Referral to specialist centres that routinely perform endoscopy, pH monitoring and manometry and adopt a multidisciplinary approach is recommended. Future research should include multicentre trials with diverse populations and long -term follow-up to standardise techniques, evaluate robotics and refine selection and surveillance protocols. In summary, laparoscopic fundoplication has become an effective, safe and economically sound strategy for refractory GERD, underscoring the importance of personalised care and ongoing technological and protocol evolution.

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