

## Laparoscopic magnetic sphincter augmentation versus fundoplication for gastroesophageal reflux disease: systematic review and pooled analysis

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**SUMMARY.** Magnetic sphincter augmentation (MSA) has been proposed as a less invasive, more appealing alternative intervention to fundoplication for the treatment of gastroesophageal reflux disease (GERD). The aim of this study was to evaluate clinical outcomes following MSA for GERD control in comparison with laparoscopic fundoplication. A systematic electronic search for articles was performed in Medline, Embase, Web of Science, and Cochrane Library for single-arm cohort studies or comparative studies (with fundoplication) evaluating the use of MSA. A random-effects meta-analysis for postoperative proton pump inhibitor (PPI) use, GERD-health-related quality of life (GERD-HRQOL), gas bloating, ability to belch, dysphagia, and reoperation was performed. The systematic review identified 6 comparative studies of MSA versus fundoplication and 13 single-cohort studies. Following MSA, only 13.2% required postoperative PPI therapy, 7.8% dilatation, 3.3% device removal or reoperation, and esophageal erosion was seen in 0.3%. There was no significant difference between the groups in requirement for postoperative PPI therapy (pooled odds ratio, POR = 1.08; 95%CI 0.40–2.95), GERD-HRQOL score (weighted mean difference, WMD = 0.34; 95%CI –0.70–1.37), dysphagia (POR = 0.94; 95%CI 0.57–1.55), and reoperation (POR = 1.23; 95%CI 0.26–5.8). However, when compared to fundoplication MSA was associated with significantly less gas bloating (POR = 0.34; 95%CI 0.16–0.71) and a greater ability to belch (POR = 12.34; 95%CI 6.43–23.7). In conclusion, magnetic sphincter augmentation achieves good GERD symptomatic control similar to that of fundoplication, with the benefit of less gas bloating. The safety of MSA also appears acceptable with only 3.3% of patients requiring device removal. There is an urgent need for randomized data directly comparing fundoplication with MSA for the treatment of GERD to truly evaluate the efficacy of this treatment approach.

**KEY WORDS:** fundoplication, gastroesophageal reflux disease, magnetic sphincter augmentation.

### INTRODUCTION

Gastroesophageal reflux disease (GERD) represents a significant burden on the Western health-care system, affecting up to 20% of adults, with the incidence on the increase.<sup>1,2</sup> Not only does this have a negative impact on a patient's health-related quality of life, but GERD has also been associated with a significant increase in risk of developing esophageal adenocarcinoma.<sup>3</sup> Traditional management of GERD incorporates lifestyle and dietary modification, followed

by antireflux medication (proton pump inhibitors, PPIs, or histamine antagonists) and culminates in surgery for incessant symptoms or pathological complications.<sup>4</sup> The REFLUX randomized clinical trial suggested that surgery offers the most effective symptom control at five years of follow-up, as well as being the most cost-effective treatment strategy.<sup>4–5</sup> Recent evidence has also emerged that suggests that the long-term use of antireflux medication may be associated with dementia, renal pathology, and fractures.<sup>6</sup>

Laparoscopic fundoplication is currently the gold standard of surgical treatment for managing GERD, which can be performed either as a 360° (Nissen) or a partial (Toupet or anterior) fundoplication. According to guidelines from the Society of American Gastrointestinal and Endoscopic Surgeons and the European Association of Endoscopic Surgery, there is no convincing evidence at present to suggest one surgical procedure is superior to the

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