LONG-TERM SAFETY AND FUNCTIONAL OUTCOMES OF MAGNETIC SPHINCTER AUGMENTATION COMPARED WITH FUNDOPLICATION: A SYSTEMATIC REVIEW AND META-ANALYSIS

K Chávez, Y. I. Rivas-Torres, H. Rodríguez-Herrera, G.G. Jimenez-Jacinto, L.F.Tandayamo-Sisalima, G.Y. Romero-Zuluaga, L.C. Choque-Ayala, J, Leiva, MD.
Houston Methodist Willowbrook Hospital

BACKGROUND

Gastroesophageal reflux disease (GERD) is a prevalent foregut disorder for which laparoscopic fundoplication (LF) has been the standard surgical treatment. However, LF is associated with adverse effects including gas bloat, dysphagia, and impaired ability to belch or vomit. Magnetic sphincter augmentation (MSA) emerges as a less invasive alternative designed to reinforce the lower esophageal sphincter while preserving physiological function. Its long-term safety and efficacy compared with LF remain unclear.

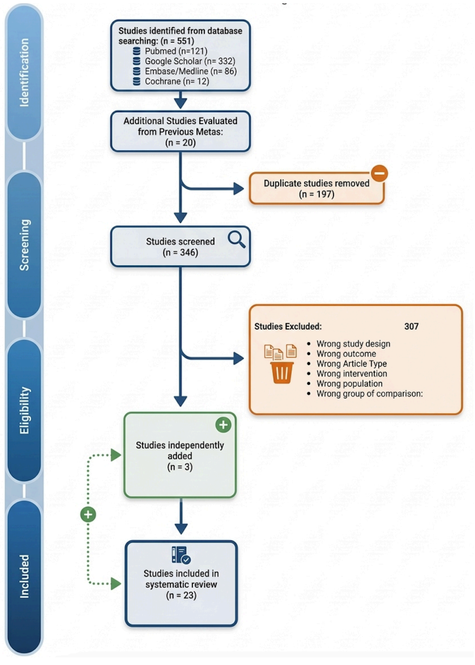
AIM

This meta-analysis evaluates perioperative and postoperative safety, reoperation rates, dysphagia, quality of life outcomes, and device explantation.

METHODS

A systematic review and meta-analysis was conducted in accordance with PRISMA guidelines. PubMed, Embase, and Cochrane databases were searched through August 14, 2025. Eligible studies included randomized trials, prospective and retrospective cohorts, and propensity-matched analyses directly comparing MSA with Nissen or Toupet fundoplication. Case reports, single-arm series, and reviews were excluded. Pooled risk ratios (R), odds ratios (OR), and mean differences (MD) with 95% confidence intervals (CI) were calculated using random-effects models, and heterogeneity was assessed with the I2 statistic.

REFERENCES



Outcome	MSA vs. LF And Effect	p-value	(I^2)	Notes / Interpretation
Hernia Recurrence	**Favors MSA: OR 0.10 (0.02–0.53)**	**0.007**	0%	Significant reduction in recurrence with MSA. n=303 (3 studies)
Intraoperative Complications	Comparable: OR 0.25 (0.05–1.14)	0.07	0%	No significant difference between groups. n=1,408 (8 studies)
Preservation of Vomiting	**Favors MSA: RR 1.06 (1.01–1.11)**	**0.02**	High (89%)	Significant advantage for MSA, but interpret with caution due to heterogeneity. n=930 (4 studies)
Overall Dysphagia	Comparable: RR 1.12 (0.89–1.42)	0.32	48%	No significant difference in rates of dysphagia. n=2,412 (12 studies)
Endoscopic Dilation	Comparable: RR 1.23 (0.74–2.05)	0.42	28%	No significant difference in requirement for dilation. n=1,567 (9 studies)
Reoperation Rates	Comparable: RR 0.99 (0.49–2.01)	0.99	0%	Rare event with equivalent rates between procedures. n=2,035 (10 studies)
MSA Explantation	Mean 8.3%: (Range: <10%)	N/A	N/A	Low rate of device explantation in long-term follow-up. n=1,890 (11 studies)
Patient-Reported Dysphagia	**Favors Nissen short term: MD 0.16-0.18 (1-2 yrs)** Comparable, Long-term: MD 0.11 (3-5 yrs)	**<0.05** 0.22	N/A	Better dysphagia scores for Nissen at 1-2 years; outcomes converge by 3-5 years. n=1,224 (6 studies)

RESULTS

Twenty-three studies comprising 3,587 patients (MSA: 1,890; LF: 1,697) were included. MSA significantly reduced 30-day complications compared with fundoplication (OR 0.28; 95% CI 0.14-0.55; p=0.0002; I2=59%) and lowered the risk of hernia recurrence (OR 0.10; 95% CI 0.02-0.53; p=0.007; I2=0%). Gas bloat was more frequent after fundoplication (RR 1.74; 95% CI 1.17-2.57; p=0.01; I2=60%), while preservation of vomiting favored MSA (RR 1.06; 95% CI 1.01-1.11; p=0.02; I2=89%). Overall postoperative dysphagia rates were comparable (RR 1.12; 95% CI 0.89-1.42; p=0.32; I2=48%), as were rates of endoscopic dilation (RR 1.23; 95% CI 0.74-2.05; p=0.42; I2=28%) and reoperation (RR 0.99; 95% CI 0.49-2.01; p=0.99; I2=0%). Patient-reported dysphagia scores slightly favored fundoplication at 1-2 years (MD 0.16-0.18; p<0.05), but differences disappeared at 3-5 years (MD 0.11; p=0.22). MSA explanation rates were low (mean 8.3%), with most large series below 10%.

CONCLUSIONS

MSA offers benefits in reducing hernia recurrence and preserving the ability to vomit, while fundoplication is linked to slightly lower short to mid-term dysphagia scores. Both procedures demonstrate similar safety, reoperation rates, and long-term dysphagia outcomes. Explanation rates with MSA are generally low, though variability across cohorts highlights the need for longer-term follow-up. Limitations include predominance of retrospective studies, heterogeneity in outcomes, and few long-term randomized trials, which should be considered when interpreting results.