Magnetic Sphincter Augmentation vs Minimally Invasive Fundoplication: An ACS-NSQIP Review

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Objective

Magnetic Sphincter Augmentation (MSA) is an FDA-approved anti-reflux procedure with comparable outcomes to fundoplication. However, most data regarding its use are limited to single or small multicenter studies which may limit the generalizability of its efficacy. The purpose of this study is to evaluate the outcomes of patients undergoing MSA compared to minimally invasive fundoplication in a national database.

Methods

Patients undergoing Magnetic Sphincter Augmentation and Fundoplication between January 1, 2017 and December 31, 2020 at hospitals participating in the American College of Surgeons National Quality Improvement Program (ACS-NSQIP) were included in the initial population of eligible patients for this study. Patients undergoing concomitant parasophageal hernia repair, and emergency cases were excluded. Short-term outcomes measured within 30 days of surgery including length of stay, operative time, overall complications, reoperation, readmission, and mortality. A stepwise, multivariable logistic regression model was used to investigate the association of MSA with postoperative outcomes.

Results

Demographics and Co-morbidities Magnetic Sphincter Augmentation vs Fundoplication

	Fundoplication (n=7467)	MSA (n=623)	p
Age	57 (45-67)	51 (39-61)	<0.001
Female	4912(65.8%)	314(50.4%)	<0.001
BMI	29.7 (26.4-33.4)	29.5(26.0-32.6)	0.018
COPD	399(5.3%)	9(1.4%)	<0.001
Hypertension	2990(40%)	201(32.3%)	<0.001
Steroid Use	381(5.1%)	16(2.6%)	0.005
10% Weight loss	77(1.0%)	1(0.2%)	0.033

Perioperative Outcomes Magnetic Sphincter Augmentation vs Fundoplication

Outcomes	Fundoplication (n=7467)	MSA (n=623)	p
Operative Time(min)	119.8±63.7	81±36.1	<0.001
LOS(days)	1.78±4.6	0.41±4.2	<0.001
UTI	67(0.9%)	0(0.0%)	0.009
Pneumonia	79(1.1%)	1(0.2%)	0.020
Readmission	350(4.7%)	13(2.1%)	0.003
Complications	309(4.1%)	4(0.6%)	<0.001
Mortality	22(0.03%)	0(0.0%)	0.409

Multivariable Regression Examining the Association of Postoperative Results of Magnetic Sphincter Augmentation (MSA) vs Fundoplication

	Univariable				Multivariable			
	95% C.I.				95% C.I.			
	OR	Lower	Upper	p	OR	Lower	Upper	p
Pneumonia	0.15	0.21	1.082	0.06	-	-	-	-
Urinary Tract Infection	0.000	0.000	-	0.992	-	-	-	-
Readmission	0.433	0.248	0.758	0.003	0.506	0.288	0.889	0.018
Overall Complications	0.15	0.056	0.403	<0.001	0.209	0.077	0.565	0.002

Conclusion

This is the first known large database evaluation of the short-term efficacy and outcomes of magnetic sphincter augmentation compared to minimally invasive fundoplication. Preceding studies have utilized data from high-volume institutions, while NSQIP represents cases from more than 600 hospitals allowing for more generalizable data. This study demonstrates MSA was associated with reduced postoperative complications, fewer readmissions, and shorter hospital length of stay and operative time. MSA was independently associated with reduced odds of overall postoperative complications. Short term outcomes of MSA are safe compared to minimally invasive fundoplication. Future studies should focus on factors influencing reduced complications in anti-reflux management.