

# The Utility of Postoperative Esophageal Manometry in Patients with Zenker's Diverticula

## INTRODUCTION

Zenker's diverticula (ZD) recur at rates as high as 39% after surgical repair for reasons that are incompletely understood.<sup>1,2</sup> It has been theorized that ZD form as sequelae of primary esophageal motility disorders and that abnormal peristalsis may increase intraluminal pressure between the cricopharyngeus (CP) and inferior pharyngeal constrictor muscles, leading to recurrence of ZD. Since the gold standard for diagnosing esophageal motility disorders is esophageal manometry, we outline a case for postoperative use of manometry to assess for concurrent esophageal motility disorders.<sup>3,4</sup>

## METHODS

- A retrospective chart review was performed at the University of Kansas Medical Center between 2009-2017.
- Adult patients who underwent surgical repair of ZD were included. 47 patients met inclusion criteria.
- Patients were subdivided into two groups: those that underwent postoperative esophageal manometry and those that did not. Demographics, operative details, and outcomes data were collected.
- Manometry results were reviewed. Manometry was considered abnormal if any parameters were out of normal ranges.
- SPSS software was used for all statistical analyses (version 24; IBM Corp).

## RESULTS

- Demographic, operative, and outcomes data are summarized in Table 1 with comparisons between groups.
- The recurrence rate in our entire cohort was 12.8% with a median time to recurrence of 3.5 years (IQR=6.25).
- Subgroup analysis was performed on the eight patients that underwent postoperative manometry.
  - Manometry results are detailed in Table 2 including normal ranges.
  - Five patients (62.5%) had abnormal manometry results.
  - Two patients (40%) with abnormal manometry results had recurrence, whereas no patients with normal manometry results experienced recurrence (p=0.464).
  - Four patients (80%) with abnormal manometry results had at least one symptom, while all patients with normal manometry results were symptom-free at their most recent visit (p=0.143).

Table 2. Manometry results and patient outcomes. Patients with abnormal results are shaded.

	Manometry Findings								
	LES Basal Pressure	LES Residual Pressure	UES Basal Pressure	UES Residual Pressure	Peristaltic Swallows	Abnormal Swallows (Total)	Hiatal Hernia	Recurrence	Symptomatic At Follow-Up
Normal Range	10-45mmHg	<13 mmHg	30-120 mmHg	<12 mmHg	≥90%	<10%			
Patient 1	6.4	-4.2	23.3	0	18	81	Yes	Yes	Yes
Patient 2	10.7	0.9	0.9	-4.2	100	0	No	No	No
Patient 3	55.2	10.1	16.2	3.4	10	90	Yes	Yes	Yes
Patient 4	15.4	6.4	12.4	0	100	0	No	No	No
Patient 5	11	4.2	30.1	7.6	60	40	No	No	No
Patient 6	23.6	4.9	28.4	-2.1	60	40	No	No	Yes
Patient 7	31.3	11.1	19.2	-1.8	100	0	No	No	No
Patient 8	20.5	3.7	24.4	-1	90	10	Yes	No	Yes

Table 1. Demographics, operative details and outcomes of study cohort with comparison based on manometry status. Statistically significant comparisons denoted by asterisks\*.

	Manometry		P-Value
	Yes (n=8)	No (n=39)	
Age At Surgery - Years (±SD)	68.0 (8.1)	74.8 (11.3)	0.059
Gender (%)			
Male	6 (75.0)	22 (56.4)	0.286
Female	2 (25.0)	17 (43.6)	
Race (%)			
White	8 (100)	36 (92.3)	0.457
Black	0 (0.0)	1 (2.6)	
Other	0 (0.0)	2 (5.1)	
Symptom Duration - Years (IQR)	1.0 (0.8)	3.0 (4.5)	0.021*
Symptom (%)			
Dysphagia	8 (100)	37 (94.9)	0.685
Halitosis	0 (0.0)	3 (7.7)	0.564
Globus	1 (12.5)	5 (12.8)	0.733
Regurgitation	4 (50.0)	17 (43.6)	0.519
Odynophagia	1 (12.5)	1 (2.6)	0.315
Choking	4 (50.0)	12 (30.8)	0.258
Dysphonia	0 (0.0)	5 (12.8)	0.375
Surgical Technique (%)			
Open	3 (37.5)	0 (0.0)	<0.001*
Endoscopic Laser	5 (62.5)	13 (33.3)	
Endoscopic Staple	0 (0.0)	26 (66.7)	
Diverticulum Size - cm (IQR)	2.5 (1.5)	3.0 (2.0)	0.139
Recurrences (%)	2 (25.0)	4 (10.3)	0.267
Time to Recurrence - Years (IQR)	3.5 (6.8)	4 (3.0)	1.000
Prior Intervention			
Diverticulotomy	5 (62.5%)	9 (23.1%)	0.040*
Dilation	1 (12.5%)	6 (15.4%)	0.660
Follow-up Time - Years (IQR)	2.8 (2.8)	0.7 (1.6)	0.590

## DISCUSSION

- 5 out of 8 patients (62.5%) had abnormal esophageal manometry results postoperatively. This suggests a link between esophageal motility disorders and the formation of ZD.
- Manometry is not routinely performed preoperatively in patients with ZD, so underlying esophageal motility disorders may largely go undiagnosed preoperatively.
- Manometry is relatively inexpensive, low risk, and has been shown to decrease procedural time by up to 50%, further reducing cost.<sup>5</sup>
- In the absence of any further knowledge of a patient's esophageal function, physicians are unable to counsel patients effectively about whether their diverticulum can be treated as a purely surgical disease, or whether further medical management is necessary.
- Numerous treatment options exist for problems identified by esophageal manometry. For each problem identified in patients in our study, medical, surgical, or dietary therapies are available.
- While most studies focus on outcomes after surgical intervention, they fail to identify risk factors or further elucidate the pathophysiology of ZD. This is a necessary area of research to lower recurrence rates, reduce patient symptomatology, and better understand the pathophysiology of ZD.

## CONCLUSION

This study supports the adjuvant use of esophageal manometry after ZD repair. Patients with ZD were noted to have high rates of abnormal manometry, and those with abnormal manometry were more likely to have continued symptoms. Thus, esophageal manometry may be a low risk and cost-effective test that can effectively be used to counsel patients.

## REFERENCES

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