Does Surgical Technique Influence Recurrence After Paraesophageal Hernia Repair?

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INTRODUCTION

- Paraesophageal hernia (PEH) repair carries a higher rate of recurrence compared to most hernia operations.
- Multiple technical variations have been proposed, such as mesh reinforcement, pledget use, and others. [1]
- However, there is little data on the effect of such technique variations on recurrence risk.
- This study aimed to assess the impact of surgical technique variations on hernia recurrence.

METHODS

- Retrospective review across multiple hospitals at a high-volume academic institution
- Operations from June 2019 and June 2020
- Follow up: 24 months
- Primary Outcome: Recurrence as any evidence of stomach above the diaphragm radiographically, endoscopically, or intraoperatively

Exclusion Criteria

- <18 years old
- Open Procedures
- Operation for Recurrence
- Other types of diaphragmatic hernia
- Incidental finding of PEH Intraoperatively
- Magnetic sphincter augmentation device placements

RESULTS

- 325 participants were included in the final analysis
- The overall recurrence rate among the study population was 20% with a median time to recurrence of 15 months
- Of the patients who experienced recurrence, 20.8% required reoperation (median time to reoperation 7months)

Table 1. Univariate analysis of patient variables for association with recurrence after PEH Repair

	No Recurrence	Recurrence	p
Age (SD)	62.98(13.09)	61.48(14.1	0.415
Gender*			
Female	179(77.2)	53(22.8)	0.059
Male	58(87.9)	8(12.1)	
BMI (SD)	31.01(6.23)	31.16(5.65)	0.86
Median ASA (IQR)	3(1)	3(1)	0.346
Smoking	15(71.4)	6(28.6)	0.398
DM	31(75.6)	10(24.4)	0.533
CAD	21(80.8)	5(19.2)	1
COPD	26(78.8)	7(21.2)	1
OSA*	39(92.9)	3(7.1)	**0.022**
GERD	209(80.4)	51(19.6)	0.389
HTN	104(77)	31(23)	0.387
Anemia	64(78)	18(22)	0.748
Past Surgical History*	172(76.8)	52(23.2)	**0.046**
Type of Hernia *			
Type 1	79(77.5)	23(22.5)	0.347
Type 2	5(71.4)	2(28.6)	
Type 3	129(82.2)	28(17.8)	
Type 4	21(80.8)	5(19.2)	
Median Hernia Size (cm) (IQR)	5(4)	4(3.5)	0.694

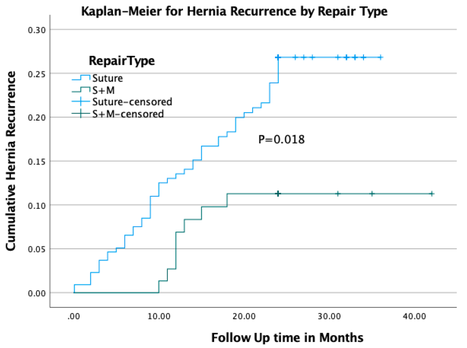
Table 2. Univariate analysis of surgery variables for association with recurrence after PEH Repair

	No Recurrence	Recurrence	p
Surgeon Volume*			
High (>20cases/year)	148(83.1)	30(16.9)	0.078
Low (<20 cases/year	89 (74.2)	31(25.8)	
Indications			
Elective	220(80.3)	54(19.7)	0.292
Emergent	17(70.8)	7(29.2)	
Technique			
Laparoscopic	210(79.2)	55(20.8)	0.823
Robotic	27(81.8)	6(18.2)	
Repair Type*			
Suture Repair Only	169(76.5)	52(23.5)	**0.019**
Mesh Reinforcement	67(89.3)	8(10.7)	
Mediastinal Dissection	171(80.3)	42(19.7)	0.635
Median intra-abdominal esophageal length (cm) (IQR)	4(0)	4(1)	0.254
Suture Repair Technique			
Interrupted	202(81.5)	46(18.5)	1
Continuous	25(83.3)	5(16.7)	
Mean Stitches used for Crura Closure (SD)	3(1)	3(0)	0.763
Bougie Use	83(74.1)	29(25.9)	0.052
Pledget Use*	110(84)	21(16)	0.112
Relaxing Incision*	14(93.3)	1(6.7)	0.321
Hernia Sac Reduction	179(79.6)	46(20.4)	1
Hernia Sac Excision	30(90.9)	3(9.1)	0.109
Gastropexy*	59(83.1)	12(16.9)	0.5
Fundoplication*	207(80.5)	50(19.5)	0.299
Fundoplication Type			
Nissen	101(75.9)	32(24.1)	0.188
Toupet	86(86)	14(14)	
Dor	15(83.3)	3(16.7)	
Hill	4(100)	0(0)	
Median size of Fundoplication (cm) (IQR)	2.5(0.5)	2.5(0.5)	0.155

Data are expressed as n (% within recurrence group) and mean (standard deviation) for normally distributed data, fisher's exact t-test is used for nominal variables and independent t-test for continuous variables. For nonparametric data, it is displayed as median (interquartile range), and the Mann-Witney test is used. * are variables used for multivariable regression analysis

Table 3. Multivariate Analysis of patient and operation variables for association with hernia recurrence

	OR	95% CI	p
Gender	0.59	(0.247-1.412)	0.236
OSA	0.148	(0.034-0.648)	**0.011**
Past Surgical History	1.975	(0.872-4.473)	0.103
PEH Size	1.033	(0.528-2.023)	0.923
Surgeon Case Volume	0.539	(0.281-1.036)	0.064
Relaxing Incision	0.439	(0.049-3.923)	0.461
Pledget Use	0.526	(0.271-1.02)	0.057
Gastropexy	0.942	(0.419-2.121)	0.886
Fundoplication	0.729	(0.27-1.967)	0.532
Mesh Reinforcement	0.274	(0.105-0.714)	**0.008**



CONCLUSION

- Our analysis revealed that mesh reinforcement was one of the significant factors in decreasing the recurrence rate of PEH after adjusting for confounding variables. It is also associated with a prolonged time free from recurrence.
- Our study findings align with the current literature demonstrating low early recurrence with mesh use[2].
- PEH recurrence remains a significant concern following surgical repair with a high proportion of patients requiring reoperation. Mesh use could be a promising strategy for reducing early recurrence, additional research is needed to better understand its potential long-term benefits.
- Larger prospective studies could also provide a more definitive understanding of how adjuncts, such as relaxing incisions and pledget use, impact recurrence rates.

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