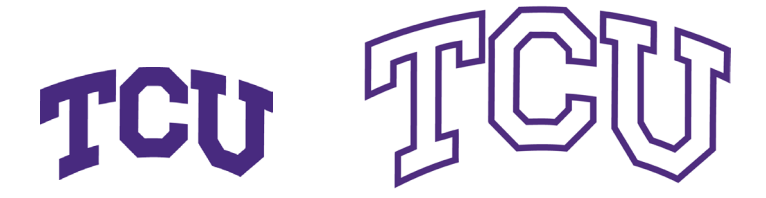


# Risk Factors Related to Anastomotic Leak and Incidence of Atrial Fibrillation in Minimally Invasive Transhiatal Esophagectomy

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## Abstract/Question

- What are the pre-operative risk factors connected with increased incidence of anastomotic leak in minimally invasive transhiatal esophagectomy, and are these risk factors also associated with increased morbidity and mortality?



## Introduction

- The amount and number of esophagectomies performed for the treatment of adenocarcinoma and squamous cell carcinoma of the esophagus has grown substantially largely due to the improvement in modern therapy regimens and surgical operative techniques. Post-operative outcomes in patients with an esophageal cancer diagnosis is pertinent to the process of disease progression as well as related to the outcomes of the surgery itself. Approximately 40% of postoperative mortality after esophagectomy is related to anastomotic leak (leak) and this is a significant source of post-operative mortality and morbidity. Additionally, atrial fibrillation (AF) has been associated with leak in the current literature. The purpose of the present study at our institution was to determine possible risk factors associated with the incidence of post-operative leak after transhiatal esophagectomy (THE).

## Materials & Methods

This retrospective study was approved by the institution's IRB at Methodist Richardson Medical Center. A retrospective detailed chart review was performed between the years of 2012 and 2020. All patients who underwent robotic-assisted transhiatal esophagectomy with perioperative course detailed in the available electronic medical record were included in the detailed retrospective chart review. Patient comorbidities, demographics, operative times, and perioperative outcomes such as anastomotic leak development and atrial fibrillation were confirmed through either computed tomography (CT) or upper gastrointestinal series (UGI). A detailed univariate analysis was then completed between study groups to initially identify possible factors associated with anastomotic leak. Following the univariate analysis a multivariate logistic regression was then undertaken.

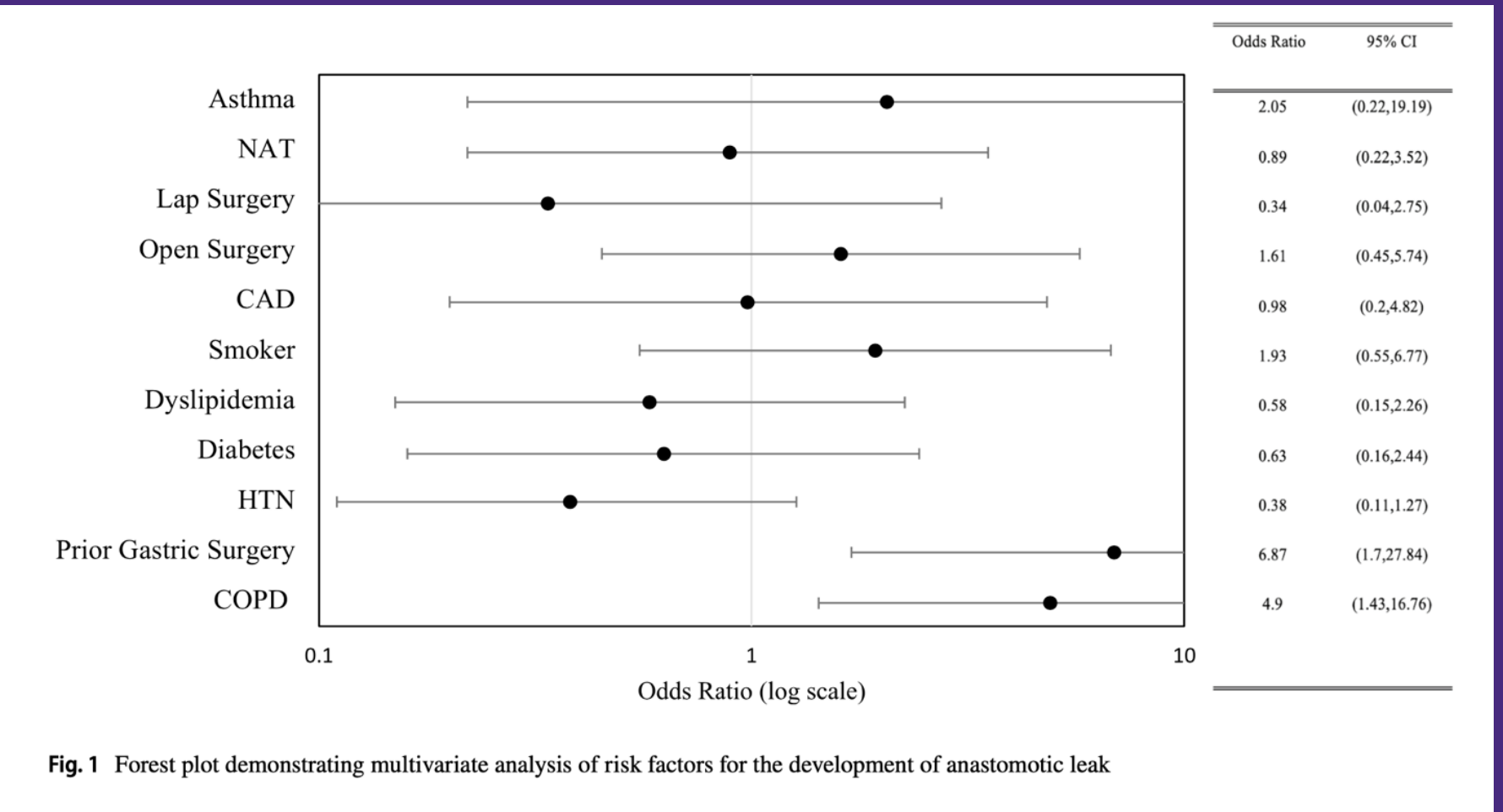
**Table 1** Characteristics of patients undergoing transhiatal esophagectomy

Characteristics of patients (n = 130)	No anastomotic leak (n = 118)	Anastomotic leak (n = 12)	
<i>Variables</i>			
Gender			
Female	19 (16.1%)	0 (0.0%)	<i>p</i> = 0.133
Male	99 (83.9%)	12 (100.0%)	
Age (mean)	64.1 ± 9.9	62.7 ± 8.6	<i>p</i> = 0.634
Tobacco use			
Absent	58 (49.2%)	4 (33.3%)	<i>p</i> = 0.296
Present	60 (50.8%)	8 (66.7%)	
Hypertension			
Absent	41 (34.7%)	7 (58.3%)	<i>p</i> = 0.107
Present	77 (65.3%)	5 (41.7%)	
Diabetes			
Absent	77 (65.3%)	9 (75.0%)	<i>p</i> = 0.497
Present	41 (34.7%)	3 (25.0%)	
Hyperlipidemia			
Absent	75 (63.6%)	9 (75.0%)	<i>p</i> = 0.430
Present	43 (36.4%)	3 (25.0%)	
CHF			
Absent	110 (93.2%)	12 (100.0%)	<i>p</i> = 0.352
Present	8 (6.8%)	0 (0.0%)	
COPD			
Absent	98 (83.1%)	6 (50.0%)	<i>p</i> = 0.006
Present	20 (16.9%)	6 (50.0%)	
Asthma			
Absent	113 (95.8%)	11 (91.7%)	<i>p</i> = 0.519
Present	5 (4.2%)	1 (8.3%)	
CAD			
Absent	98 (83.1%)	10 (83.3%)	<i>p</i> = 0.980
Present	20 (16.9%)	2 (16.7%)	
Prior gastric surgery			
Absent	110 (93.2%)	8 (66.7%)	<i>p</i> = 0.002
Present	8 (6.8%)	4 (33.3%)	
Neoadjuvant therapy			
No	27 (22.9%)	3 (25%)	<i>p</i> = 0.686
Yes	91 (77.1%)	9 (75%)	
Postoperative A fib			
Absent	90 (76.3%)	11 (91.7%)	<i>p</i> = 0.222
Present	28 (23.7%)	1 (8.3%)	
Hypothyroidism			
Absent	109 (92.4%)	11 (91.7%)	<i>p</i> = 0.930
Present	9 (7.6%)	1 (8.3%)	
Surgery type			
Open	28 (23.7%)	4 (33.33%)	<i>p</i> = 0.462
Minimally invasive	90 (76.3%)	8 (66.67%)	

A fib atrial fibrillation. Significant results of analysis are bolded

## Results

There was no difference of significance in patient demographics between those who developed a leak and those who did not upon initial analysis of univariate. The patients who did develop an anastomotic leak had a significantly higher rate of chronic obstructive pulmonary disease diagnosis (COPD) ( $p = 0.006$ ) as well as a history of prior gastric surgery ( $p = 0.002$ ). Additionally, prior gastric surgery (OR = 6.9,  $p = 0.005$ ) and COPD (OR = 4.9,  $p = 0.002$ ) continued to remain significantly correlated with development of a leak.



**Fig. 1** Forest plot demonstrating multivariate analysis of risk factors for the development of anastomotic leak

## Conclusion

Prior gastric surgery and COPD are significantly associated with higher rates of post-operative anastomotic leak development in esophageal cancer patients who undergo transhiatal esophagectomy. Subsequent work should aim to assess reasonable processes of preoperative risk reduction in patients with a history of prior gastric surgery and COPD diagnosis.

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