Evaluation of Anastomotic Technique in Patients Undergoing Transthoracic Esophagectomy

Kenneth Meredith MD, Jamie Huston MS, Ravi Shridhar MD-PhD

Florida State University College of Medicine, Sarasota, FL; Sarasota Memorial Research Institute, Sarasota, FL; Advent Health Cancer Institute, Orlando, FL

Background

- Post-operative complications are a significant concern after esophagectomy.
- Anastomotic leak is a major complication and associated with significant morbidity and mortality.
- Esophageal reconstructive technique varies significantly amongst surgeons.
- We sought to examine the impact of operative technique on anastomotic leak when esophagectomy is performed by experienced surgeons.

Methods

- A prospectively maintained database was queried for patients who underwent esophagectomy.
- Patients were stratified by operative approach and anastomotic technique:
  - Handsewn
  - EEA with sutured purse string
  - Orvil (EEA with trans oral anvil)
  - Linear stapled
- Patient demographics, operative outcomes and postoperative complications were compared.

Conclusion

- There was no difference in leaks among patients undergoing handsewn or stapled techniques.
- Patients undergoing minimally invasive esophagectomy and stapled anastomosis were less likely to experience a complication and had shorter lengths of hospitalization.

Results

Table 1: Patient characteristics

Variable	All N = 857	Handsewn N = 521	EEA N = 144	Orvil N = 178	Linear N = 14	*p* Value
Age, year	67 (28 – 91)	65 (28 – 86)	67 (30 – 84)	70 (42 – 91)	71 (58 – 82)	<0.001
Sex						
Male	719 (83.9)	452 (86.8)	113 (78.5)	146 (82)	8 (57.1)	0.003
Female	138 (16.1)	69 (13.2)	31 (21.5)	32 (18)	6 (42.9)	
Race						
White	825 (96.3)	504 (96.7)	136 (94.4)	171 (96.1)	14 (100)	0.04
Black	11 (1.3)	3 (0.6)	6 (4.2)	2 (1.1)	0	
Hispanic	13 (1.5)	7 (1.3)	1 (0.7)	5 (2.8)	0	
Other	8 (0.9)	7 (1.3)	1 (0.7)	0	0	
BMI, kg/m^2	27.8 ± 5.9	28.2 ± 5.5	28.1 ± 7.3	26.6 ± 5.6	24.2 ± 5.4	0.002
ASA score	2.6 ± 0.6	2.4 ± 0.5	2.7 ± 0.5	3.1 ± 0.6	3.1 ± 0.5	<0.001
Clinical T-stage						
T0-2	290 (33.8)	169 (32.4)	58 (40.3)	59 (33.1)	4 (28.6)	<0.001
T3-4	432 (50.4)	238 (45.7)	80 (55.6)	105 (59)	9 (64.3)	
Unknown	135 (15.8)	114 (21.9)	6 (4.2)	14 (7.9)	1 (7.1)	
Clinical N-stage						
N0	290 (33.8)	161 (30.9)	56 (38.9)	66 (37.1)	7 (50)	0.02
N+	406 (47.4)	242 (46.4)	72 (50)	86 (48.3)	6 (42.9)	
Unknown	161 (18.8)	118 (22.6)	16 (11.1)	26 (14.6)	1 (7.1)	
Histology						
Adenocarcinoma	719 (83.9)	443 (85)	122 (84.7)	140 (78.7)	14 (100)	0.14
Squamous	102 (11.9)	57 (10.9)	14 (9.7)	31 (17.4)	0	
Other	36 (4.2)	21 (4)	8 (5.6)	7 (3.9)	0	
Neoadjuvant therapy	567 (66.2)	302 (58)	113 (78.5)	140 (78.7)	12 (85.7)	<0.001

Table 2: Operative outcomes

Variable	All N = 857	Handsewn N = 521	EEA N = 144	Orvil N = 178	Linear N = 14	*p* Value
Margin status						
Negative	827 (96.5)	492 (94.4)	144 (100)	177 (99.4)	14 (100)	<0.001
Positive	30 (3.5)	29 (5.6)	0	1 (0.6)	0	
Operative time, min	285 (240 – 350)	253 (225 – 300)	394 (349 – 479)	289 (259 – 339)	271 (245 – 282)	<0.001
Estimated blood loss, mL	150 (75 – 250)	200 (100 – 350)	150 (100 – 200)	100 (50 – 100)	50 (50 – 75)	<0.001
LN Removed	13 (7 – 18)	9 (6 – 14)	19 (14 – 25)	18 (14 – 22)	20 (17 – 23)	<0.001
LN Positive	1.1 ± 2.5	1.3 ± 2.7	0.5 ± 1.1	1.2 ± 2.6	1.7 ± 3.7	0.006
Length of stay, day	10 (8 – 12)	10 (9 – 13)	10 (8 – 13)	8 (7 – 10)	9 (8 – 10)	0.007
Reoperation	10 (1.2)	6 (1.2)	2 (1.4)	2 (1.1)	0	0.20
Conversion	-----	----	1 (0.7)	0	0	0.51

Table 3: Postoperative complications

Complication	All N = 857	Handsewn N = 521	EEA N = 144	Orvil N = 178	Linear N = 14	*p* Value
Any complication†	400 (46.7)	299 (57.4)	36 (25)	62 (34.8)	3 (21.4)	<0.001
Anastomotic leak	48 (5.6)	28 (5.4)	4 (2.8)	15 (8.4)	1 (7.1)	<0.001
Anastomotic stricture	78 (9.1)	50 (9.6)	11 (7.6)	17 (9.6)	0	<0.001
30-Day mortality	21 (2.5)	13 (2.5)	1 (0.7)	7 (3.9)	0	0.006
90-Day mortality	39 (4.6)	23 (4.4)	2 (1.4)	14 (7.9)	0	<0.001

†Defined as the presence of one or more complication(s) in a single patient