

OUTCOMES OF MINIMALLY INVASIVE ESOPHAGECTOMY VERSUS OPEN ESOPHAGECTOMY FOR ESOPHAGEAL CANCER? A SINGLE-CENTER CASE-CONTROL STUDY

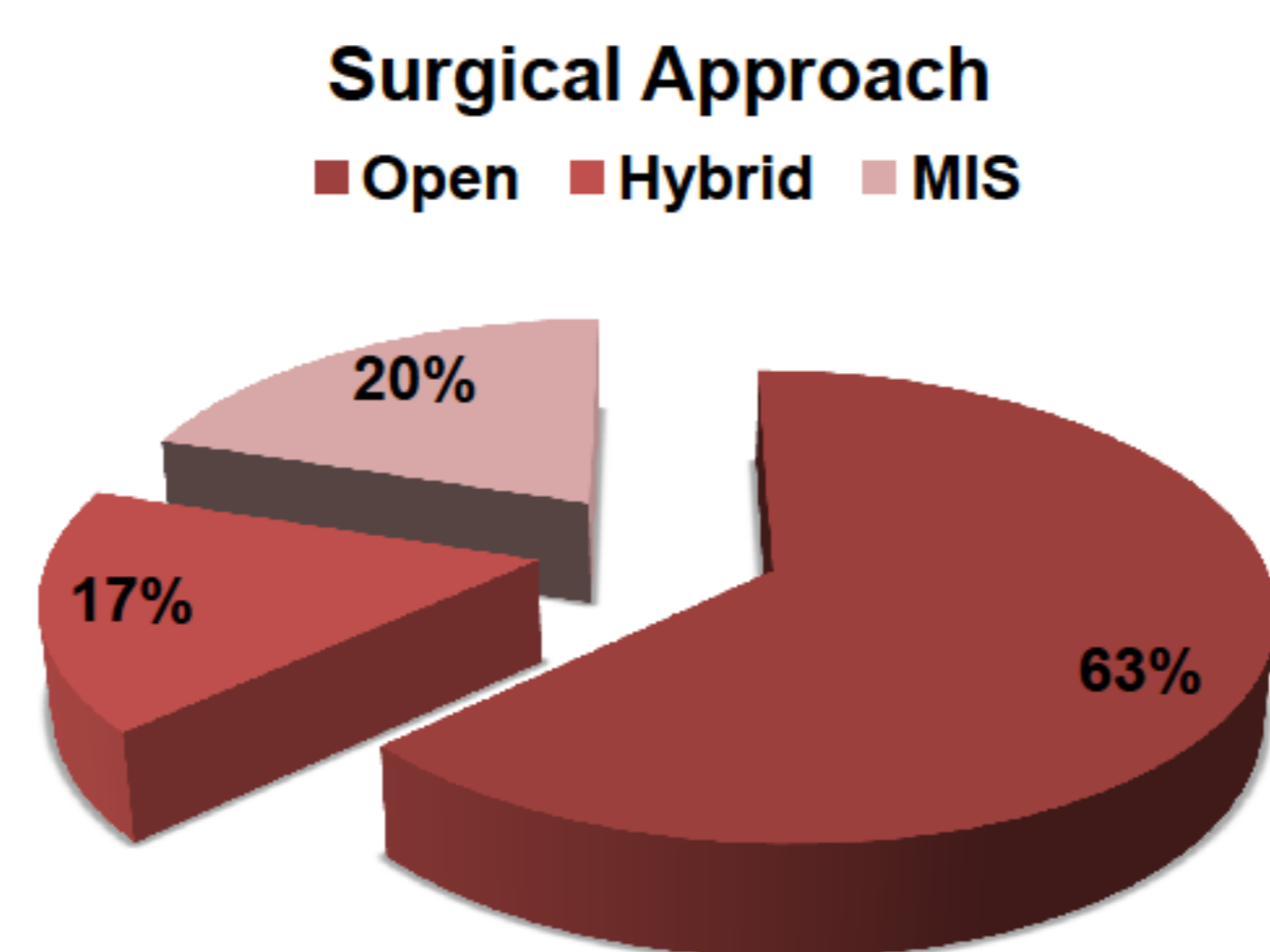
SANTOS-SOUSA, HUGO; ARAL, MARISA; MESQUITA, MÁRCIO; COSTA-MAIA, GENERAL SURGERY DEPARTMENT, CENTRO HOSPITALAR DE SÃO JOÃO, UNIVERSITY OF PORTO MEDICAL SCHOOL, PORTO, PORTUGAL.



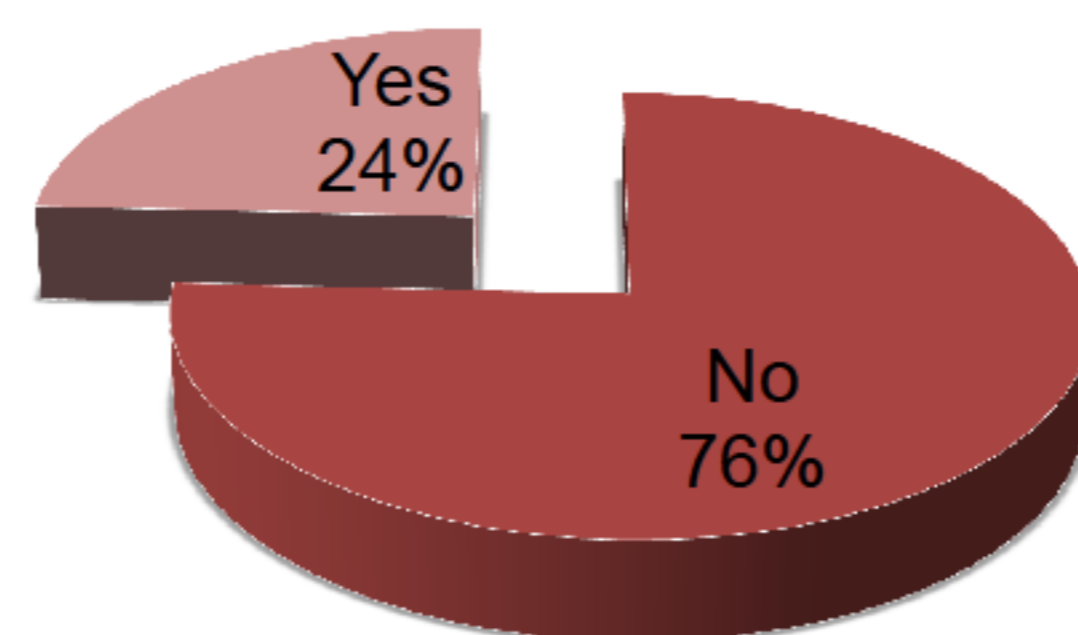
Introduction: Esophagectomy is a major surgery associated with significant morbidity and mortality. There is growing evidence in literature that the minimally invasive approach in esophagectomy (MIE) may decrease morbidity. The aim of this study was the comparative analysis of the outcomes between MIE and open esophagectomy (OE) for esophageal cancer.

Methods: We performed a case-control study with 65 patients submitted to curative intent surgery, between May 2006 and October 2014. All surgeries were performed by surgeons of a specialized gastro-esophageal surgical unit at Centro Hospitalar de São João - University of Porto Medical School. Follow-up (range 0-97, median 9 months) was completed for the entire study population in October 2014. Institutional review board approval was obtained for this study (CES 295-14). The following clinicopathological parameters were evaluated according to the classification of the cases: age, gender, tumor location and size, type of esophagectomy, type of surgery conversion, timing and reason for surgery conversion.

	OE n (%)	MIE/ Hybrid n (%)	Total n (%)	p
Gender (n=65)				
Female	9 (75)	3 (25)	12 (18,5)	0,511
Male	32 (60,4)	21 (39,6)	53 (81,5)	
Comorbidities (n=65)				
Yes	28 (63,6)	16 (36,4)	44 (67,7)	1,000
No	13 (61,9)	8 (38,1)	21 (32,3)	
Resection Margin(n=62)				
R0	34 (59,6)	23 (40,4)	57 (91,9)	0,603
R1	3 (75)	1 (25)	4 (6,5)	
R2	1 (100)	0 (0)	1 (1,6)	
Age (n=65)				
Mean SD (years)	61,37 10,9	61 9		0,890
BMI (n=65)				
Median (kg) (max-min)	21,1 (17,1-30,4)	23,7 (16,5-30,4)		0,215
Type of Resection (n=65)				
Ivor-Lewis	31 (63,3)	18 (36,7)	49 (75,4)	0,358
McKeown	6 (50)	6 (50)	12 (18,5)	
Trans-hiatal	2 (100)	0 (0)	2 (3,1)	
Akiyama	2 (100)	0 (0)	2 (3,1)	
Tumor Location (n=65)				
Superior 1/3	2 (66,7)	1 (33,3)	3 (4,6)	0,857
Middle 1/3	18 (66,7)	9 (33,3)	27 (41,5)	
Lower 1/3	21 (60)	14 (40)	35 (53,8)	
Neoadjuvant Treatment (n=65)				
Yes	29 (65,9)	15 (34,1)	44 (67,7)	0,586
No	12 (57,1)	9 (42,9)	21 (32,3)	
Histologic Type (n=65)				
Adeno-carcinoma	5 (50)	5 (50)	10 (15,4)	0,479
Squamous Cell	36 (65,5)	19 (34,5)	55 (84,6)	
TMN (7th edition, 2010) Classification (n=65)				
T1-2	12 (66,7)	6 (33,3)	18 (34)	0,565
T3-4	20 (57,1)	15 (42,9)	35 (66)	
Disease Recurrence (n=65)				
Yes	18 (56,3)	9 (37,5)	27 (48,2)	0,188
No	14 (43,8)	15 (62,5)	29 (51,8)	

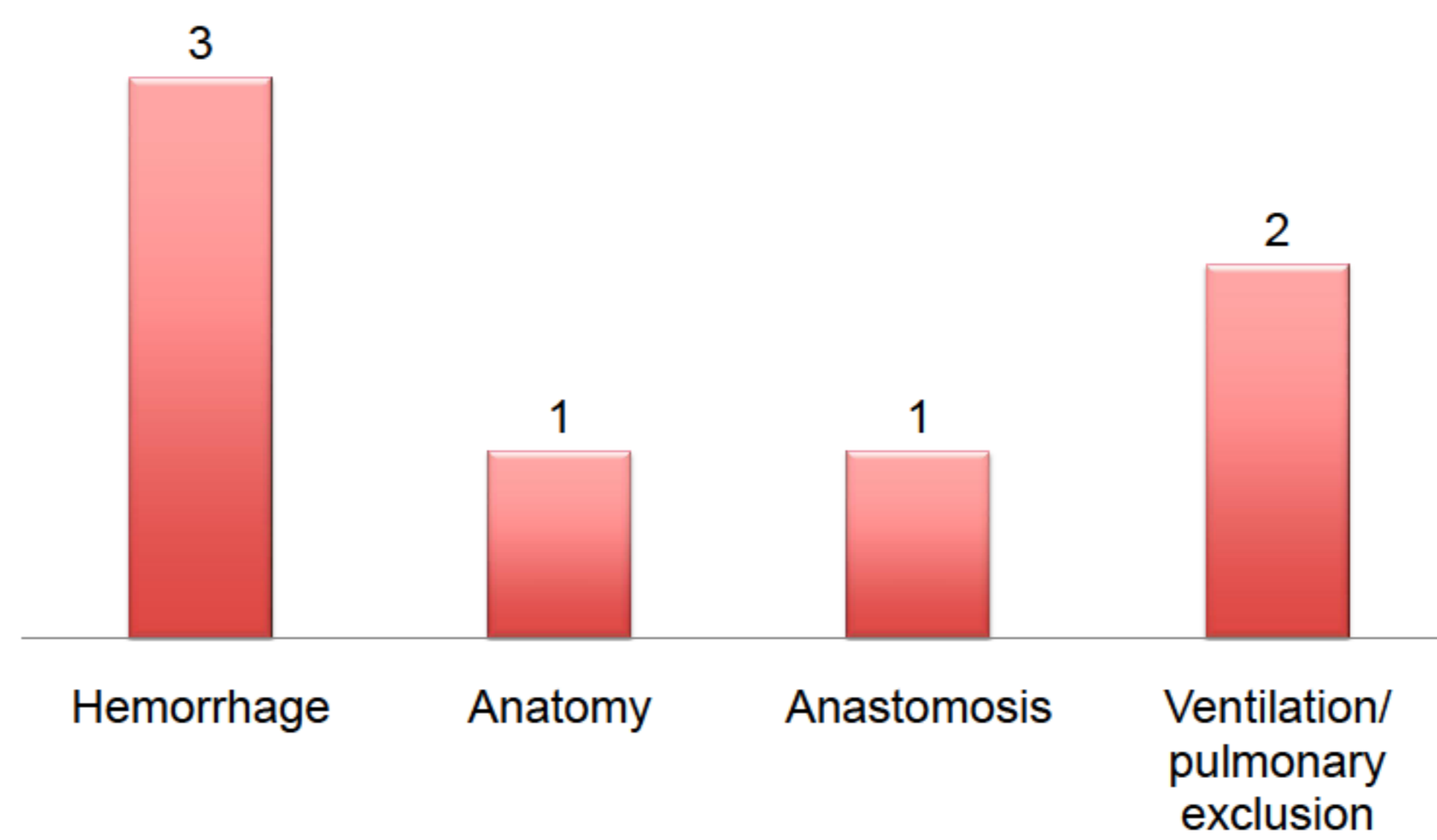


Surgery Conversion



Type of conversion	MI Approach		Total n
	Hybrid	MIE	
Laparotomy and thoracotomy	0	2	2
Thoracotomy	2	2	4
Laparotomy	1	0	1

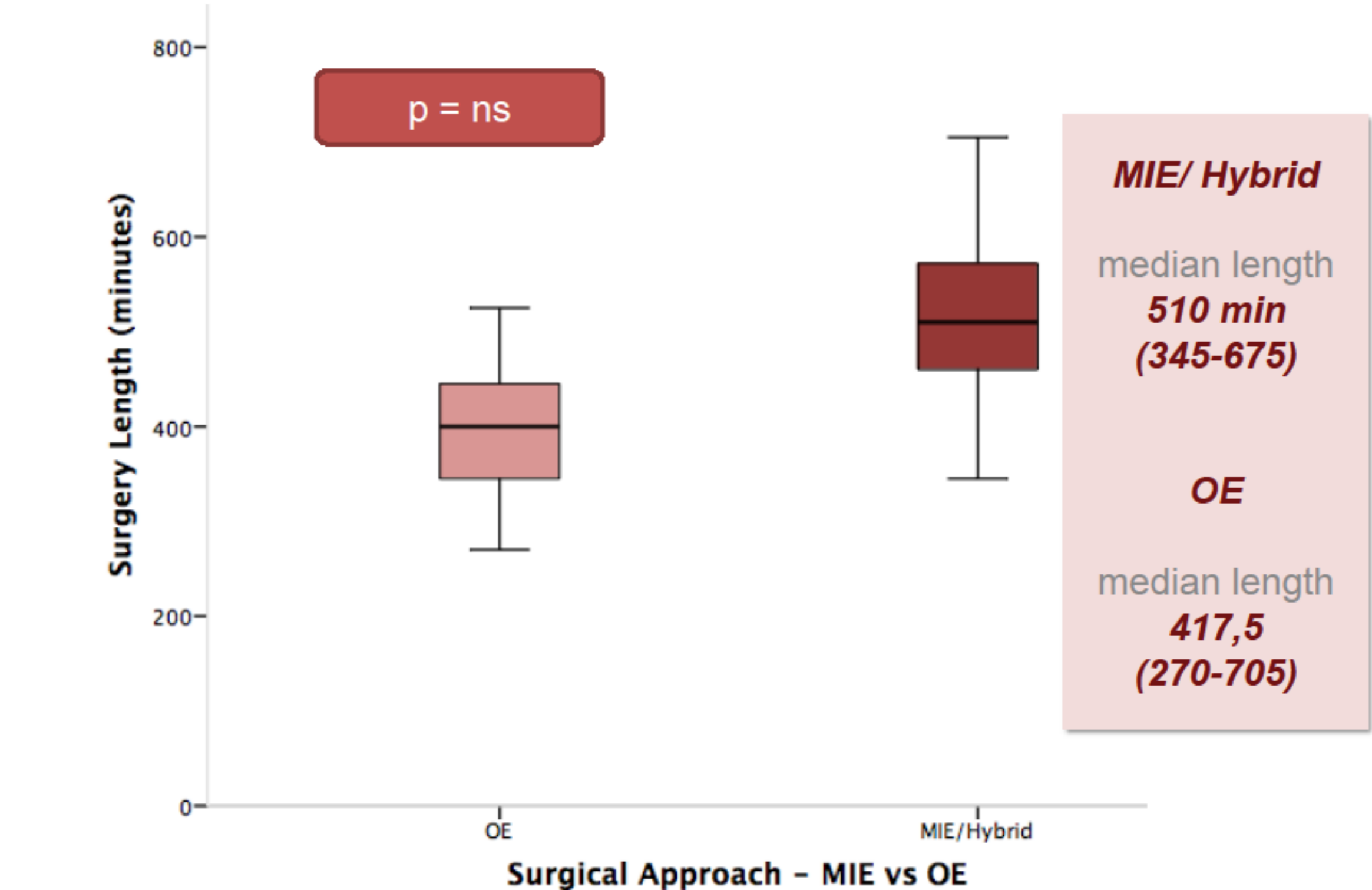
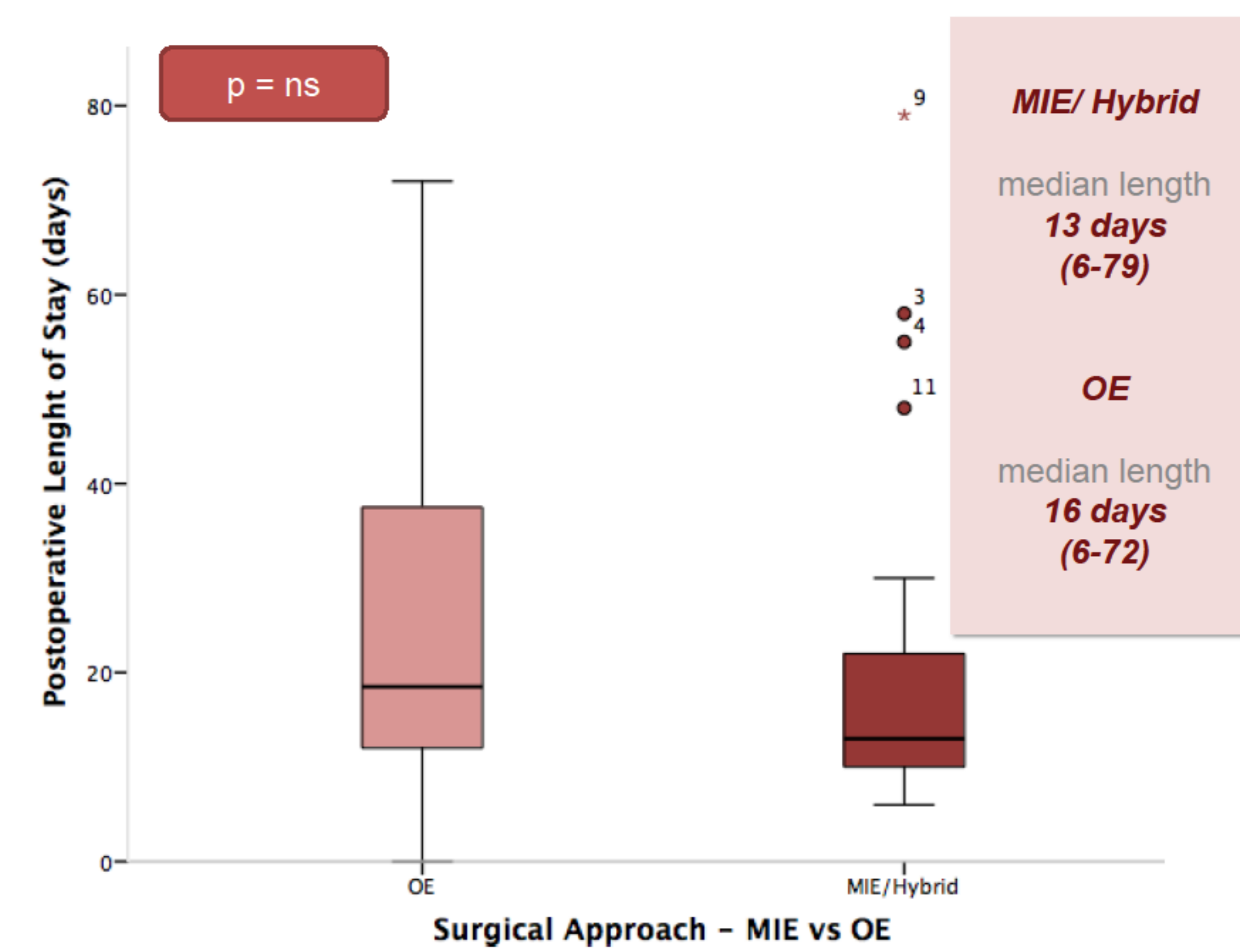
Conversion Reason



Reason for Conversion (n=7)	Timing of Conversion		Total n
	Beginning	Later	
Hemorrhage	0	3	3
Anatomy	1	0	1
Anastomosis	0	1	1
Ventilation/ pulmonary exclusion	2	0	2

	OE n (%)	MIE/ Hybrid n (%)	Total n (%)	p
Postoperative Complications (n=65)				
No	32 (57,1)	24 (42,9)	56 (86,2)	0,078
Yes	9 (100)	0 (0)	9 (13,8)	
Clavien Classification (n=65)				
I	1 (100)	0 (0)	1 (2,9)	0,018
II	9 (90)	1 (10)	10 (29,4)	
IIIa	4 (40)	6 (60)	10 (29,4)	
IIIb	0 (0)	1 (100)	1 (2,9)	
IVb	2 (66,7)	1 (33,3)	3 (8,8)	
V	9 (100)	0 (0)	9 (26,50)	

	OE n (%)	MIE/ Hybrid n (%)	Total n (%)	p
Postoperative Mortality (n=65)				
No	16 (51,6)	15 (48,4)	31 (47,7)	0,021
Yes	25 (73,5)	9 (26,5)	34 (52,3)	
Respiratory Complications (n=65)				
No	32 (61,5)	20 (38,5)	52 (80)	0,753
Yes	9 (69,2)	4 (30,8)	13 (20)	
Blood Transfusions (n=65)				
No	38 (65,5)	20 (34,5)	58 (89,2)	0,408
Yes	3 (42,9)	4 (57,1)	7 (10,8)	



Conclusions: The results of this case-control study provide further evidence for the feasibility and possible improvements in the postoperative morbidity and mortality of MIE, when performed in differentiated centers.

Bibliography:

- Palazzo F, Rosato EL, Chaudhary A, Evans NR, Sendecki JA, Keith S, et al. Minimally invasive esophagectomy provides significant survival advantage compared with open or hybrid esophagectomy for patients with cancers of the esophagus and gastroesophageal junction. *J Am Coll Surg.* 2015 Apr;220(4):672-9.
- Singh RK, Pham TH, Diggs BS, Perkins S, Hunter JG. Minimally invasive esophagectomy provides equivalent oncologic outcomes to open esophagectomy for locally advanced (stage II or III) esophageal carcinoma. *Arch Surg. American Medical Association;* 2011 Jun;146(6):711-4.
- Zhang J, Wang R, Liu S, Luketich JD, Chen S, Chen H, et al. Refinement of Minimally Invasive Esophagectomy Techniques After 15 Years of Experience. *J Gastrointest Surg.* Springer-Verlag; 2012 Jul 10;16(9):1768-74.
- Luketich JD, Pennathur A, Awais O, Levy RM, Keeley S, Shende M, et al. Outcomes after minimally invasive esophagectomy: review of over 1000 patients. *Annals of Surgery.* 2012 Jul;256(1):95-103.
- Dantoc MM, Cox MR, Eslick GD. Does minimally invasive esophagectomy (MIE) provide for comparable oncologic outcomes to open techniques? A systematic review. *J Gastrointest Surg.* 2012 Mar;16(3):486-94.
- Schoppmann SF, Prager G, Langer FB, Riegler FM, Kabon B, Fleischmann E, et al. Open versus minimally invasive esophagectomy: a single-center case controlled study. *Surg Endosc.* 2010 Dec;24(12):3044-53.