IMPROVED SURVIVAL WITH MINIMALLY INVASIVE ESOPHAGECTOMY FOR LOCALLY ADVANCED (CLINICAL T3-4) ESOPHAGEAL CANCER: A NEW STANDARD OF CARE

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Background

The oncologic outcomes of minimally invasive esophagectomy (MIE) for locally advanced esophageal tumors remain controversial. MIE is technically demanding, and some surgeons elect an open approach to address locally advanced disease.
In this study, we aim to compare oncologic outcomes between Open (O) vs. Thoracoscopic (T) vs. Robotic (R) esophagectomy for patients with cT3-4N0-3M0 esophageal cancer.

Methods

Using the National Cancer Database (2010-2019) we identified all patients with clinical T3-T4 esophageal cancer who underwent curative-intent esophagectomy. After propensity score matching the 3 groups in a two-step process [1:1 R vs. T, then 1:1 (R+T) vs. O] to adjust for differences in age, sex, comorbidity, year of diagnosis, lymphovascular invasion, grade and clinical T and N stage, we compared perioperative outcomes and overall survival using the Kaplan-Meier method and Cox proportional hazards regression. In this study, overall survival (OS) was estimated from the time of surgery to last follow-up or death.

Results

A total of 11,326 patients were identified, of whom, 55.4% (N=6,273) underwent O, 30.8% (N=3,489) T and 13.8% (N=1,564) R **(Figure 1**). In the propensity-matched cohort 1,694 patients were included (847 O, 425 T, 422 R). The median age was 64 years (IQR 58-70), 85% (N=1,442) were male, and 93% (N=1,576) had CCI of <1.

Most patients were staged as clinical T3 (97.6%, N=1,654), and N1 (54%, N=914). All matched patients received induction chemotherapy or chemoradiotherapy.

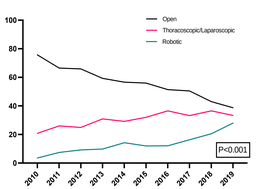


Figure 1. Trends over time

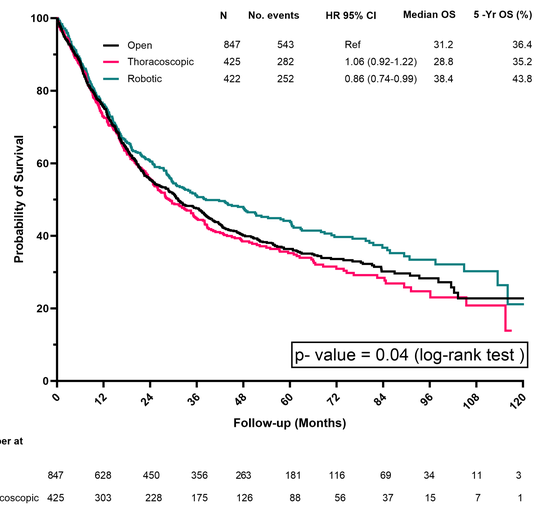
Patients in the O group were more likely to have a positive margin (8.1% O vs. 6.4% T vs. 4.5 R, p=0.048) and a longer length of stay (10 vs. 9 days, p<0.001), while those in the T group were more likely to undergo conversion to open surgery (8.5% T vs. 4.5% R, p=0.019) **(Table).** Patients in the matched cohort had a median follow-up of 29.5 months (IQR 11.5-57.4). Median overall survival was significantly longer for the R group [38.4 months (IQR 26.7-50.1)] than in the T [28.75 months (IQR 23.5- 34)] and O [31.2 months (IQR 26.3- 36.1) groups (log-rank p=0.04).

The hazard ratio for death from all causes was 0.86 (95%CI 0.74 -0.99) comparing R with O, and 1.06 (95%CI 0.92-1.22) comparing T with O. Five-year OS was 36.4% 35.2% and 43.8% in the O, T and R groups, respectively **(Figure 2).**

Table. Perioperative outcomes on the propensity-matched cohorts.

		Open N=847	Thoracoscopic N=425	Robotic N=422	P-value
No nodes examined, N (%)		16 (1.9)	17 (4.0)	10 (2.4)	0.076
Nodes examined (Median, IQR)		15 (10-21)	16 (10-22)	15 (10-22)	0.648
T-stage down-staged, N (%) (N=1,627)		439 (54.3)	212 (52)	220 (53.7)	0.747
Pathologic N+, N (%) (N=1,651)		362 (43.6)	183 (44.9)	177 (43.0)	0.853
Pathologic N-Stage, N (%) (N=1,651)					
	pN0	469 (56.4)	225 (55.1)	235 (57.0)	0.737
	pN1	200 (24.1)	109 (26.7)	111 (26.9)	
	pN2	106 (12.8)	51 (12.5)	45 (10.9)	
	pN3	56 (6.7)	23 (5.6)	21 (5.1)	
Positive margin, N (%)		69 (8.1)	27 (6.4)	19 (4.5)	0.048
30-day Readmission, N (%)		50 (5.9)	24 (5.6)	31 (7.3)	0.521
30-day Mortality, N (%)		24 (2.8)	14 (3.3)	7 (1.7)	0.302
90-day Mortality, N (%)		59 (7.0)	26 (6.1)	21 (5.0)	0.383
LOS (Median, IQR)		10 (8-14)	9 (7-14)	9 (7-11)	<0.001
Conversion to open, N (%)		-	36 (8.5)	19 (4.5)	0.019

Figure 2. Survival analysis comparing overall survival among the matched groups.



Conclusions

Patients who underwent robotic assisted esophagectomy for locally advanced esophageal cancer had improved OS. Given the benefits of MIE, further study is warranted to ensure equitable delivery of this approach to patients with locally advanced esophageal cancer.