

Postoperative outcomes of Minimally invasive Surgery for Esophageal cancer in a small single center

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Background

The aim of this study is to evaluate the safety and feasibility of minimally invasive esophagealsurgery for esophageal cancer in a small volume center.

Patients

• Study Period: June 2017 to December 2020

; Inclusion criteria

- ✓ ; Patients who underwent VATS esophagectomy as well as Laparoscopic gastric mobilization
- ✓ ; Squamous cell carcinoma
- ✓ ; Using gastric conduit

; Exclusion criteria

- ✓ ; Patients who used colons for substitutes
- ✓ ; Surgeries with open thoracotomy or laparotomy
- ✓ ; Pathologic diagnosis other then sqcc.

Methods

; Retrospective review of medical records who underwent surgical treatment for their esophageal cancer

- ✓ Analysis of patients characteristics including age, gender, body mass indices, smoking/alcohol behaviour and comorbidities
- ✓ Analysis of perioperative findings including laboratory results, Intensive care unit stay duration, chest tube/Levin tube indwelling duration.
- ✓ Postoperative complication rates (more than grade II according to the Modified Clavien-Dindo classification) were analyzed
- ✓ Risk factors assessment by comparison patients who with complication and who did not

Results

Patients

- A total of 45 patients were included
 - ✓ 41 men, 4 women
- Mean follow-up periods
 - ✓ 19.2±12.77 (95% Confidential interval; 15.4-23.0)
- Mean age at the time of treatment
 - ✓ 65.1±7.92 (95% Confidential interval; 62.8-67.5)
- Diagnosed as esophageal squamous cell carcinoma
- Three patients underwent cervical lymph node dissection simultaneously
- Neoadjuvant CCRT
 - ✓ Chemotherapy alone; 4
 - ✓ Combined chemo and radiation therapy ; 11
 - ✓ Radiation alone; 0
- Patients classification
 - ✓ Patients with complication ≥ Grade II ; 9 patients (20%)
 - ✓ Patients without complication or with complication grade I; 36 patients (80%)
- Age and pulmonary arterial Pressure showed significant differences between those two groups.
- Other characteristics including comorbidities and smoking alcohol behavior, preoperative pulmonary function tests showed no significant differences

Perioperative findings

- Hospital stay was significantly longer than in patients with complications (p=0.006)
- Preoperative WBC and Neutrophil counts were significantly lower than in patients with complication (p=0.013 and p=0.012, respectively)
- Patiently who underwent cervical LND showed significantly higher complication rates (0.036)
- Other laboratory findings as well as pathologic results showed no statistical significances between those two groups
- In hospital mortality; 2

Complications

Grade	Number of patients (%)	Diagnosis	Treatment	Results
I	6 (13.3%)	2	Gastric regurgitation	Conservative management
		1	Anastomotic leak	Conservative management
		2	Diarrhea	Conservative management
		1	Upper respiratory infection	Conservative management
II	2 (4.4%)	1	Pneumonia	Antibiotic administration
		1	Lt. vocal cord palsy	Injection laryngoplasty
III	5 (11.1%)			
		2		
IIIa	2	1	L-tube kinking	Intervention with gastrofibroscopy
		1	Rt. Pleural effusion	Pigtail catheter insertion
		3		
IIIb	3	1	Empyema	VATS decortication
		2	Postop bleeding	Exploration; bleeding control
IV/V	2 (4.4%)	Pneumonia needed ICU care	ICU care with ventilator application	Inhospital death

Variables	Complication (+) (N=9) mean±sd. (95% Confidential interval)	Complication (-) (N=36) mean±sd. (95% Confidential interval)	Total (N=45) mean±sd. (95% Confidential interval)	p-value
Preoperative laboratory findings				
WBC	5111.1±751.94 (4533.1-5689.1)	7028±2570.22 (6158.9-7898.2)	6645.1±2441.16 (5911.7-737835)	0.013
Neutrophils	2750.3±653.6 (2247.9-3252.8)	4491.3±2469.38 (3655.8-5326.8)	4143.1±2328.99 (3443.4-4842.8)	0.012
Neutrophils(%)	54.3±12.69 (44.6-64.1)	59.9±11.93 (55.8-63.9)	58.77±12.15 (55.1-62.4)	0.775
Hb.	13.2±1.15 (12.3-14.0)	12.7±2.08 (11.9-13.4)	12.8±1.93 (12.2-13.3)	0.856
ESR	25.7±13.64 (15.2-36.2)	27.2±20.04 (20.2-34.2)	26.9±18.75 (21.1-32.6)	0.758
CRP	4.3±7.62 (1.7-6.9)	3.7±4.89 (0.10-7.41)	4.1±7.10 (2.0-6.3)	0.753
ICU stay	1.1±0.33 (0.9-1.4)	1.2±0.66 (1.0-1.4)	1.6±0.60 (1.0-1.3)	0.944
Chest tube indwelling duration	18.8±15.16 (7.1-30.4)	13.9±4.12 (12.5-15.3)	7.7±7.69 (12.6 -17.2)	0.813
Levin tube indwelling duration	20.2±10.79 (11.9-28.5)	17.7±4.15 (16.3-19.1)	18.2±5.99 (16.4-20.0)	0.944
Hospital stay	29.2±12.48 (19.6-38.8)	18.1±5.26 (16.3-20.0)	20.3±8.40 (17.8-22.9)	0.006
Compined with cervical lymphnode d issection	2 (22.2%)	1 (2.8%)	3 (6.7%)	0.036
Operation time				
Abdominal phase	98.3±17.14 (85.2-111.5)	115.4±34.49 (103.7-127.0)	112.0±32.36 (102.2-121.7)	0.160
Thoracic phase	199.4±53.24 (158.5-240.4)	206.9±62.82 (185.7-228.2)	205.4±60.53 (187.3-223.6)	0.476
Anesthesia time	403.3±55.68 (360.5-446.1)	417.6±74.39 (392.5-442.8)	414.8±70.70 (393.5-436.0)	0.606
Tumor size	4.6±1.51 (3.4-5.7)	3.8±2.03 (3.1-4.5)	4.0±1.94 (3.4-4.6)	0.243
Tumor Resection margin				
Proximal	3.3±2.40 (1.5-5.2)	2.6±2.49 (1.7-3.4)	2.7±2.46 (2.0-3.5)	0.306
Distal	6.1±3.33 (3.5-8.7)	8.2±4.09 (6.8-9.6)	7.8±4.00 96.6-9.0)	0.163
Adjuvant Therapy				
Chemotherapy	4 (44.4%)	20 (55.6%)	24 (53.3%)	0.713
Radiation therapy	3 (33.3%)	7 (19.4%)	10 (22.2%)	0.370

Conclusion

Minimally invasive esophageal surgery for esophageal cancer could be feasibly performed even in advanced cases. Postoperative pneumonia should be carefully managed to prevent postoperative mortality.