

# Evaluating early results of minimally invasive esophagectomy in abdominal surgery department II at National K Hospital

Doan Trong Tu, Hoang Le Minh

National K Hospital

## Keyword:

Esophageal cancer, Squamous cell cancer, Minimally invasive esophagectomy.

## Contact:

Doan Trong Tu  
K Hospital  
43 Quan Su Street, Hang Bong  
Ward, Hoan Kiem District, Hanoi  
City  
Mobile: 0961 456 222  
Email: dr.leminh17@gmail.com

**Received: Sep, 30, 2020**

**Accepted: Oct, 12, 2020**

**Published: Oct, 23, 2020**

## Abstract

**Introduction:** To evaluate early results of minimally invasive esophagectomy for esophageal cancer in Abdominal Surgery Department II at National K Hospital.

**Materials and methods:** 130 patients with esophageal cancer underwent thoraco-laparoscopic esophagectomy - also was known as minimally invasive esophagectomy (MIE) - and gastric - tube reconstruction in Abdominal Surgery Department II at National K Hospital from 10/2017 to 7/2020. Descriptive study, patients were observed during hospitalization.

**Results:** Mean age  $56,8 \pm 6,77$  (min 35 - max 72), lymph node metastasis was 17,8%, T1 was 35,6%, T2 was 48,9% and T3 was 15,5%, squamous cell carcinoma accounted for 97,7%. Mean operative time was  $226 \pm 6$  minutes, mean hospital stay was  $15,2 \pm 4,6$  days, anastomosis leakage accounted for 6,1%, anastomosis stenosis was 15,3%, vocal cord palsy was 4,6% and pneumonia happened in 13,8%.

**Conclusions:** Esophagectomy is a major surgery procedure that could be perform by thoraco-laparoscopy with good result.

## Introduction

Esophageal cancer is one of the most common malignant diseases in Vietnam. The disease is more frequent in men and often associates with daily habit. Diagnosis is relatively simple, however is usually made in later stage. Therefore, it is very important to diagnose and manage the cancer in early stage [2].

Treatment of esophageal cancer is complicated and required multimodal therapy that involved different specialty. However, surgery still plays key role especially with early stage diagnosis.

Akiyamas esophagectomy with reconstruction of digestive tract using gastric tube has always been the choice of treatment in our department [1]. In the blooming area of endoscopic surgery, international and national authors have done researches on thoraco-laparoscopic esophagectomy with positive results, the

complications and mortality rates have been decreasing. Since 2017, Abdominal Surgery Department II of National K Hospital has been using endoscopic esophagectomy for esophageal cancer routinely and has initially had some favourable outcomes.

## Materials and methods

### Subject

All patients were diagnosed and underwent endoscopic esophagectomy for esophageal cancer in Abdominal Surgery Department II in National K Hospital from 10/2017 - 7/2020.

### Research method

Descriptive research with convenient sampling.

### Inclusion criteria

All of the patients that were indicated for thoraco-laparoscopic esophagectomy with pre - op esophagoscopy and biopsy, endoscopic esophageal

ultrasound and CT scan for staging.

Patients had completed medical record and agreed to participate in the research.

**Exclusion criteria**

Patients in debilitated condition, had metastatic/end stage cancer, or had severe underlying medical conditions.

Research duration: 10/2017 - 7/2020.

**Research index**

Clinical characteristics of esophageal cancer.

Surgical information: mean operative time, average length of hospital stay.

Intra-post operative complications.

**Data collection and analysis**

Data were collected according to our own research medical record samples, information was taken from patients records. Data was then analyzed with SPSS 20.0.



*Patient position*



*Isoperistaltic gastric tube creation*



*Esophageal specimen*

Fig 1. Intraoperation figures

**Results**

The total number of patients underwent endoscopic esophagectomy for esophageal cancer during 10/2017 and 7/2020 in Abdominal Surgery Department II of K Hospital was 130 patients. The results were demonstrated in the following part:

**Patients characteristics:**

Average age was 56,8 ± 6,77, min 35, max 72.

All 130 patients were male.

Clinical symptom: 100% has dysphagia

patients had both factors accounted for 77%.

Table 1. Risk factors

	N	%
Alcohol	15	11,5
Tobacco	15	11,5
Alcohol + Tobacco	100	77
Total	130	100

Comment: Alcohol and tobacco are the main risk factors for esophageal cancer, the number of

Table 2. Patients characteristics

	N	%
<b>Tumor location</b>	Upper 1/3	0
	Middle 1/3	75
	Lower 1/3	55
	<b>Total</b>	<b>130</b>
<b>T</b>	T1	47
	T2	63
	T3	20
	<b>Total</b>	<b>130</b>
<b>N</b>	N0	107
	N(+)	23
	<b>Total</b>	<b>130</b>
<b>Pathology result</b>	Squamous cell carcinoma	127
	Adenocarcinoma	3
	<b>Total</b>	<b>130</b>

Comment: Surgical indication was only for the middle (57,7%) and lower (42,3%) third tumor. T1 was 36,1%; T2 was 48,5%; T3 was 15,4%. Lymph node metastasis was 17,7%. Most of the cases had squamous cell carcinoma (97,7%).

### Surgical information:

- Mean operative time:  $226 \pm 6$  mins, the shortest was 170 mins, the longest was 360 mins.

- 99,3% of the patients had the alimentary tract reconstruction with gastric tube in the posterior mediastinum, while only 0,7% had reconstruction using colon.

- Average hospital stay was  $15,2 \pm 4,6$  days, min 10 days, max 27 days.

- Mean number of lymph nodes resected were  $13,12 \pm 1,9$ , min was 9 nodes, max was 17 nodes.

Table 3. Neoadjuvant therapy

	N	%
Pre-op radio-chemotherapy	19	14,6
None	111	85,4
<b>Total</b>	<b>130</b>	<b>100</b>

Comment: 14,6% of the patients had pre-op radio-chemotherapy.

Table 4. Patient position

	N	%
Left lateral	4	3
Prone	126	97
<b>Total</b>	<b>130</b>	<b>100</b>

Comment: 97% of the patients were in prone position.

Table 5. Number of pyloroplasty and jejunostomy

	Pyloroplasty		Jejunostomy	
	N	%	N	%
+	6	4,6	45	34,6
-	124	95,4	85	65,4
<b>Total</b>	<b>130</b>	<b>100</b>	<b>130</b>	<b>100</b>

Comment: 65,4% of the patients did not required jejunostomy but only gastric tube diet, 95,4% of the patients did not have pyloroplasty.

Table 6. Days resumed normal diet

	N	%
1 - 2 days	15	11,5
3 - 4 days	88	67,7
$\geq 4$ days	27	20,8
<b>Total</b>	<b>130</b>	<b>100</b>

Comment: Most patients returned to normal diet after 3 - 4 days (67,7%).

Table 7. Intra-post operative complications

	N	%
Thoracic duct injury	5	3,8
Tracheal damage	2	1,5
Gastric vessels injury	1	0,7
Post op thoracic duct leak	3	2,3
Recurrent laryngeal nerve injury	6	4,4
Anastomosis leak	8	6,1
Post op hemorrhage	0	0
Post op pneumonia	18	13,8
Anastomosis stenosis	20	15,4

Comment: Anastomotic leak accounted for 6,1% and thoracic duct leak was 2,3%.

### Discussions

We indicated to operate on patients had middle (57,7%) and lower (42,3%) third tumor, we decided not to operate on the upper third group since the role of radio-chemotherapy on tumor in this location was very significant, also, it would not be oncological safe if we chose to follow the reconstructive path. For TNM staging, operation was only reserved for early stage cancer (T1, T2 N0M0); with stage T3 and T4, the patient would need neoadjuvant radio-chemotherapy to reduce the tumors size. In our

research, most of the patients were in T1 (36,1%) and T2 (48,5%); there were 20 patients (15,4%) in stage T3, of which 19 had pre-op radio-chemotherapy and 1 was staged T2 pre-op but intraoperative assessment confirmed T3. The percentage of lymph node metastasis was 17,7%. Esophageal cancer is a progressive disease that quickly develops lymph node metastasis. Dubecz. A et al (2015) reported 6,9% of pT1a and 20% of pT1b had positive nodes.

Mean operative time was  $226 \pm 6$  mins, the shortest operation was 170 mins and the longest was 360 mins. The first few cases that were done on our own were the longest (max 360 mins) due to our lack of experiences and familiarity with the procedure, but after times of practising, we have managed to refine our skills hence reduced the time remarkably (min 170 mins). For other authors, operative time was  $327 \pm 57$  mins in Pham Duc Huan's research,  $358 \pm 56$  mins in Nguyen Minh Hai's research and in Trieu Trieu Duong's was 210 mins. Our mean time was shorter compared to some other authors, this could be because of our patients were in early stage and also we have learnt from previous researches [8], [9], [10]. Average length of hospital stay was  $15,2 \pm 4,6$  days (min 10 days) similar to other researches [9].

There were 14,6% of patients needed neoadjuvant radio-chemotherapy. For patients in T1, T2 stage confirmed by CT and endoscopic ultrasound, we decided to operate as soon as possible. But with the T3 and T4a groups, the surgical indication was delayed 6-8 weeks after neoadjuvant therapy to reduce the tumors size and volume. Recently, the number of surgical cases post neoadjuvant therapy has been increasing because of our improvement in techniques as well as complementary treatments. This shows the important role of multimodal regimen in treatment of esophageal cancer as well as cancer in general.

We used 2 types of position in this series, left lateral (3%) and prone (97%). By comparing pros and cons in the operations, we found that patients in the 30 degrees, right lateral prone position is the most suitable for this type of procedure since the lung and spine would move anteriorly, blood would not pool

up in the surgical site thus create a broad and clear field to facilitate control of bleeding, dissection of the esophageal and lymphadenectomy [6].

Pyloroplasty was done in 4,6% of cases, but for the later cases we decided not to do pyloroplasty. In the research of Nguyen NT (2010) on 140 cases of endoscopic esophagectomy, there were 31 patients had pyloroplasty (22,1%), the rest (77,9%) did not, follow up exam showed no differences in percentage of reflux or delayed gastric emptying [12].

Time of resumed normal diet was showed in Table 6. Recently we have a trend to put the patients back on normal diet early to help with recovery. Researches proved that early return to normal diet would not affect post op complications but also improve recovery time.

Intra-post operative complications: Endoscopic esophagectomy is a major surgery that has high rate of complications intra and post operative complications. However, we did not have any mortality in this research. 5 patients (3,8%) had thoracic duct injury happened during the esophageal mobilization and lymphadenectomy phases. Although all injuries were clipped intraoperatively, 3 still had post-op chyle leak; 1 was treated conservatively and was discharged after 1 month, the other 2 were indicated for thoracic duct embolization intervention with helps from Radiology Department. There were 2 cases (1,5%) of tracheal injury those were patients had middle third esophageal cancer underwent pre-op radiation which caused the the tracheal prone to injury. However, the lesions were sutured and patients did not have post - op air leak. 1 patient (0,7%) had right gastroepiploic artery damage during the gastric reconstruction phase, we then did the gastrectomy and reconstruct the alimentary tract with left colon. Patients condition was stable post-operatively. 6 patients (4,4%) had recurrent laryngeal nerve damage that had hoarseness but at 3 months follow up patients basically returned to normal. There were 8 patients (6,1%) had anastomosis leak that were treated medically. 13,3% of the patients [18] had pneumonia, 20 patients (15,4%) had anastomosis stenosis were dilated under

endoscopy, there was no sign of dysphagia after the procedure. In other researches, 3 - 11% experienced anastomosis leak. According to Luketich et al, the reason for this complication was hypoperfusion and necrosis of the upper part of the gastric tube. Lam Viet Trung et al recommended to take good care in the manipulation of the stomach to reduce the risk of vessel damage [5], [6]. In Lei Chen et al research (2017) on 51 patients underwent 3 stages endoscopic esophagectomy, the percentage of anastomotic leak was 7,8%, RLN injury was 5,9%, pneumonia was 15,7%, chyle leak was 1,9% [7]. Baofu Chen et al (2013) reported a series of 142 patients, of which 6,3% had anastomotic leak, 0,7% had tracheal injury, anastomotic stenosis in 7,7% cases, RLN injury in 5,6%, pneumonia in 9,2% and gastric vessel damage induced necrosis in 0,7% [2].

### Conclusions

Minimally invasive thoraco-laparoscopic esophagectomy is a major surgery that requires good anaesthesia and resuscitation, experienced surgeon performed in the advanced specialty center.

Our results show that the technique is safe and feasible.

### References

1. Akiyama H (1994): "Radical lymph Node Dissection for Cancer of the Thoracic Esophagus". *Annals of Surg*, 202:364-373.
2. Baofu Chen, Bo Zhang, Chengchu Zhu et al (2013): "Modified McKeown Minimally Invasive Esophagectomy for Esophageal Cancer: A 5-Year Retrospective Study of 142 Patients in a Single Institution". Published: December 20, 2013, <https://doi.org/10.1371/journal.pone.0082428>
3. Dubecz A, Kern M, Solymosi N, Schweigert M, Stein HJ (2015): "Predictors of Lymph Node Metastasis in Surgically Resected T1 Esophageal Cancer". *Ann Thorac Surg*. 2015 Jun;99(6):1879-85
4. Emanno ancona Volker Budach, Gemmagatta et al (2009): "Esophageal cancer". *Start Oncology in Europe*, 7<sup>th</sup> Edition, pp 1-2.
5. Lam Viet Trung, Nguyen Minh Hai, Vo Tan Long (2012): "Evaluated feasibility, safety and short-term outcome of laparoscopic surgery for esophageal cancer". *Vietnam journal of Endolaparoscopic surgery*, episode 2, No1, 48-52.
6. Lam Viet Trung, Doan Ngoc Giao, Tran Phung Dung Tien (2013): "Initial results of laparoscopic esophagectomy for esophageal cancer". *Journal of Medicine of Ho Chi Minh city*, No17, 227-281.
7. Lei Chen, Xi Liu, Rong Wang, Yuncang Wang et al (2017): "Minimally invasive esophagectomy for esophageal cancer according to the location of the tumor: Experience of 251 patients". *Ann Med Surg (Lond)*. 2017 May; 17: 54-60.
8. Pham Duc Huan, Do Duc Van (2000): "Esophagectomy for esophageal cancer: Experiences of 71 patients" *Journal of Surgery*, No3, 22-25.
9. Pham Duc Huan, Do Mai Lam, Nguyen Anh Tuan (2006). "Right thoracoscopic esophagectomy for esophageal cancer". *Vietnam journal of Medicine*, 319 (2). 149-160.
10. Tran Phung Dung Tien, Nguyen Minh Hai, Lam Viet Trung (2010): "Thoraco-laparoscopy for lower 2/3 esophageal cancer". *Journal of Medicine of Ho Chi Minh city*, No10, 86-91.
11. Trieu Trieu Duong (2008): "Research on laparoscopic surgery for esophageal cancer at 108 Hospital", *Journal of Medicine of Ho Chi Minh city* No12, 200-203.
12. Nguyen NT, Dholakia C, Nguyen XM, Reavis K (2010): "Outcomes of minimally invasive esophagectomy without pyloroplasty: analysis of 109 cases". *Am Surg*. 2010 Oct;76(10):1135-8.