Research Article

INTERNATIONAL RESEARCH JOURNAL OF PHARMACY

www.irjponline.com

ISSN 2230-8407 [LINKING]

RESULTS, FEASIBILITY AND SAFETY IN LAPAROSCOPY ASSISTED TRANSHIATAL ESOPHAGECTOMY

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How to cite: Puranik MV. Results, feasibility and safety in laparoscopy assisted transhiatal esophagectomy. International Research Journal of Pharmacy. 2013; 5:8:347-352.

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ABSTRACT

Background: The whole laparoscopic method, which has not yet acquired widespread acceptance due to its complexity, is also used to treat esophageal cancer. Additionally, there is a dearth of data in the literature regarding LATE for esophageal cancer.

Aim: To evaluate the results, viability, and safety of LATE (laparoscopic-assisted transhiatal esophagectomy) in patients with esophageal cancer.

Methods: During the study period, a single surgical team performed LATE (laparoscopic-assisted transhiatal esophagectomy) on 52 patients with esophageal cancer. The study participants ranged in age from 33 to 70, with a mean age of 54.8±2.4 years.

Results: The average length of hospital stay, blood loss, and operating time were 11.3 days (7–26), 300 milliliters (100–500), and 300 minutes (160–650), respectively. Pulmonary problems were observed in 30.7% (n=16) and cervical anastomotic leak in 11.5% (n=6) of the individuals, respectively. In 3.84% (n=2), 11.5% (n=6), 38.46% (n=20), and 46.15% (n=24) of the individuals, the AJCC staging was IIA, IIB, IIIA, and IIIB.

Conclusion: The current study comes to the conclusion that LATE (laparoscopic-assisted transhiatal esophagectomy) is a safe and practical treatment option for the chosen individuals with lower thoracic esophageal cancer.

Keywords: Carcinoma, esophagus, esophagectomy, laparoscopy, transhiatal

INTRODUCTION

Esophageal cancer surgery is a complicated surgical operation that has been associated with considerable postoperative morbidity. The Orringer'a and Ivor-Lewis techniques have historically been utilized for esophagectomy in patients with esophageal cancer. With just minor adjustments to the minimally invasive esophagectomy (MIE), both techniques have been effectively applied to patients with esophageal cancer.[1]

The most popular and extensively utilized surgical procedure for treating esophageal cancer is the transhiatal esophagectomy (THE). It has been observed that THE is a technically simpler surgery for esophageal cancer than TTE (trans-thoracic esophagectomy), is oncologically sufficient, and is linked to fewer mediastinal problems. However, THE is associated with an increased risk of iatrogenic damage during transhiatal dissection and non-systematic lymphadenectomy.[2]

In patients with lower esophageal cancer, LATE (laparoscopic-assisted transhiatal esophagectomy) is a procedure adapted from Orringer's MIE approach. In 1995, DePaula et al. described LATE. Other retrospective studies have confirmed the LATE's safety and viability. Therefore, it is possible to safely and successfully remove esophageal cancer under direct vision. Compared to THE (transhiatal oesophagectomy), it may be advantageous.[3,4]

LATE (laparoscopic-assisted transhiatal esophagectomy) is a hybrid technique that is thought to improve lymphadenectomy, lower the risk of iatrogenic damage, and increase visibility and access to the infracarinal esophagus. There is little information about laparoscopic-assisted transhiatal esophagectomy in the literature, despite it being a sound technological procedure.[5]

Therefore, the purpose of the current clinical trial was to evaluate the results, viability, and safety of LATE (laparoscopic-assisted transhiatal esophagectomy) in patients with esophageal cancer.

MATERIALS AND METHODS

The goal of the current retrospective clinical study was to evaluate the results, viability, and safety of LATE (laparoscopic-assisted transhiatal esophagectomy) in patients with esophageal cancer. The Institute's Department of General Surgery provided the study participants. Prior to their involvement in the study, all participants provided written and verbal informed consent.

The study, which was scheduled for LATE during the study period, evaluated 52 participants of both genders who had cancer in the lower thoracic esophagus (infracarinal) or the gastroesophageal junction.

Participants who were willing to take part in the trial and were scheduled for LATE for esophageal cancer met the inclusion criteria. Subjects with locally advanced disease, those with metastases, those with any contraindication for surgery, and those who did not provide informed consent for study participation were all excluded from the trial.

A single group of skilled surgeons performed every surgical procedure. Following the final inclusion of study participants, CECT (contrast-enhanced computed tomography) of the neck, chest, and abdomen was used for preoperative surgical planning and staging following the endoscopic biopsy that verified the carcinoma diagnosis at the time of the procedure. Additionally, routine blood tests, chest X-rays, electrocardiograms, and pulmonary function tests were performed prior to surgery. The individuals were positioned in the French posture for the surgical operation. Hassan's technique was used to construct the pneumoperitoneum, and a total of four ports were used to complete the laparoscopic procedures. Hem-o-lock clips, ligaclips, ultrasonic shear, and a laparoscopic camera set were used to divide and dissect the vessels.

After determining the resectability, the stomach was mobilized. The left gastric artery was split between the clips after the right gastric artery was preserved. Direct vision was used to deploy the esophagus through a wider gap. To guarantee the preservation of all important structures and a sufficient lymphadenectomy, the mediastinal dissection was carefully performed. The lower portion of the left sternocleidomastoid muscle, which extended across the midline, was followed by a cervical incision once the laparoscopic portion dissection was finished.

In order to prevent recurrent laryngeal nerve injury, the esophagus was exposed by dissecting the muscle and deep fascia. In accordance with Orringer et al. (1999), a 5–6 cm diameter incision was then performed in the upper midline to complete transhiatal mobilization. The specimen was removed through the abdominal wound after the esophagus was separated around 4–5 cm distal to the crico-esophageal junction. The specimen was removed and a gastric conduit was made.

The CEGA (cervical-esophagus-gastric anastomosis) was completed with silk sutures after the gastric conduit was created to the neck via the orthotopic method. A feeding jejunostomy was created using Stamm's technique. Drains were inserted into the right pleural space and left sub-hepatic area before the abdominal wound was sealed. After an 18 FG suction drain was positioned close to the cervical-esophageal-gastric anastomosis, the cervical incision was sealed.

The SPSS software was used to statistically analyze the collected data. For both normally and non-normally distributed continuous variables, the data were reported as mean and standard deviation; for categorical variables, they were expressed as frequency and percentage. A p-value of less than 0.05 was maintained for statistical significance.

RESULTS

The goal of the current retrospective clinical study was to evaluate the results, viability, and safety of LATE (laparoscopic-assisted transhiatal esophagectomy) in patients with esophageal cancer. 52 patients with esophageal cancer who were scheduled for LATE (laparoscopic-assisted transhiatal esophagectomy) were evaluated in this study.

The study participants ranged in age from 33 to 70, with a mean age of 55.2±2.4 years. In the current study, there were 23.07% (n=12) females and 76.92% (n=40) males. Of the study participants, 65.38% (n=34) had a positive smoking history. The most common comorbidity was hypertension (15.38%, n = 8), followed by diabetes mellitus (11.5%, n = 6), heart disease (3.84%, n = 2), and COPD (11.5%, n = 6). The most prevalent symptom of the condition was progressive dysphagia, which was observed in 100% (n = 52) of the study participants. This was followed by weight loss in 65.38% (n = 34), reflux esophagitis

in 34.61% (n = 18), and hematemesis in 3.84% (n = 2) of the study participants. Table 1 displays the mean albumin and hemoglobin levels for preoperative laboratory results, which were 3.3 mg/dl and 12.83 mg/dl, respectively.

According to the study's findings, the average postoperative stay was 12 days (7-24) and the ICU stay duration was 3 days (1-4) for operative factors and complications in the study patients. Table 2 shows that 3.84% (n=2) of the study subjects had resurgery, 19.23% (n=10) had blood transfusions, 3.84% (n=2) had chylous leaks, 3.84% (n=2) had conduit necrosis, 11.53% (n=6) had anastomotic leaks, no study subjects had vocal cord paralysis, and 11.53% (n=6) had arrhythmias.

In terms of further complications, 11.53% (n=6) of research participants experienced cardiac issues, while 3.84% (n=2) experienced ARDS (acute respiratory distress syndrome). 7.69% (n=4) of the study participants had empyema. Ten participants, or 19.23% of the total, had pleural effusions. Of the individuals, 30.76% (n=16) had respiratory problems. According to Table 2, 19.23% (n=10) of the individuals had wound infections, and no study subjects had 30-day death.

Tumors were found at the GE junction in 7.69% (n = 4) of the study patients and in the lower third of the esophagus in 92.30% (n = 48) of the subjects. T1 and T4 were not observed in any individual for T staging. T2 and T3 were observed in 76.9% (n = 40) and 23.07% (n = 12) of the research participants, respectively. N0, N1, and N2 stages were observed in 46.15% (n=24), 46.15% (n=24), and 7.69% (n=4) of the research participants, respectively.

1 and 4 stagings were not observed in any patient during AJCC staging. 46.15% (n=24), 38.46% (n=20), 7.69% (n=4), and 3.84% (n=2) of the study participants had 2A, 2B, 3A, and 3B staging, respectively (Table 2).

The lymph node number was two, with a range of 0 to 5, and the total number of lymph nodes removed was twelve, with a range of 8 to 26 nodes. The lymph node status was positive. According to the histological categories, 88.46% (n=46) of the study participants had adenocarcinoma, and 11.53% (n=6) had squamous cell carcinoma. According to Table 3, the resection R0 was performed in 96.15% (n=50) study participants, R1 in 3.84% (n=2) study participants, and R2 in no study participant.

DISCUSSION

52 patients with esophageal cancer who were scheduled for LATE (laparoscopic-assisted transhiatal esophagectomy) were evaluated in this study. The study participants ranged in age from 33 to 70, with a mean age of 55.2±2.4 years. In the current study, there were 23.07% (n=12) females and 76.92% (n=40) males. Of the study participants, 65.38% (n=34) had a positive smoking history. The most common comorbidity was hypertension (15.38%, n = 8), followed by diabetes mellitus (11.5%, n = 6), heart disease (3.84%, n = 2), and COPD (11.5%, n = 6). Progressive dysphagia was the most prevalent symptom of the condition, occurring in 100% (n = 52) of the study participants. This was followed by weight loss in 65.38% (n = 34), reflux esophagitis in 34.61% (n = 18), and hematemesis in 3.84% (n = 2).

The preoperative laboratory results showed that the mean hemoglobin was 12.83 mg/dl and the mean albumin was 3.3 mg/dl. These results were comparable to those of Rizik N et al. (7) and Lerut T et al. (8), whose authors evaluated participants with demographic information similar to those of the current study.

The ICU stay duration was 3 days (1-4) for operating factors and complications in the study patients, while the mean postoperative stay was 12 days (7-24). 3.84% (n = 2) of the study participants had Resurgery, 19.23% (n = 10) had blood transfusions, 3.84% (n = 2) had chylous leaks, 3.84% (n = 2) had conduit necrosis, 11.53% (n = 6) had anastomotic leaks, 0 had vocal cord paralysis, and 11.53% (n = 6) had arrhythmias. These recordings were similar to those of Dunn DH et al and Parry K et al, whose operative factors and complications were similar to those of the current investigation.

According to the study's findings, 11.53% (n=6) of the participants experienced cardiac problems, while 3.84% (n=2) experienced acute respiratory distress syndrome. 7.69% (n=4) of the study participants had empyema. Ten research participants, or 19.23% of the total, had pleural effusions. 30.76% (n=16) of the research participants experienced respiratory issues. 19.23% (n=10) of the subjects had wound infections, while none of the trial participants had 30-day death. These findings were in line with research by Gurusamy KS et al and Wang J et al, whose authors observed comparable issues to the current study.

According to pathological findings, the tumor was found in the lower third of the esophagus in 92.30% (n=48) research patients and at the GE (gastro-esophageal) junction in 7.69% (n=4) study individuals. T1 and T4 were not observed in any individual for T staging. T2 and T3 were observed in 76.9% (n = 40) and 23.07% (n = 12) of the research participants, respectively. N0, N1, and N2 stages were observed in 46.15% (n=24), 46.15% (n=24), and 7.69% (n=4) of the research participants, respectively. 1 and 4 stagings were not observed in any patient during AJCC staging.

46.15% (n=24), 38.46% (n=20), 7.69% (n=4), and 3.84% (n=2) of the study participants had 2A, 2B, 3A, and 3B staging, respectively. These results were consistent with those of Li B et al and Lee Y et al, whose pathological findings were similar to those of the current investigation.

When the lymph node's status was determined to be positive, the total number of lymph nodes removed was 12, with a range of 8–26 nodes, and the lymph node number was 2, with a range of 0–5. According to the histological categories, 88.46% (n=46) of the study participants had adenocarcinoma, and 11.53% (n=6) had squamous cell carcinoma.

R0 was performed on 96.15% (n = 50) of the study individuals, R1 on 3.84% (n = 2), and R2 on none of the study subjects. These findings were consistent with those of Takeda FR et al. and Vageesh BG et al, who reported resection and lymph node status similar to the current study.

CONCLUSIONS

The current study shows that LATE (laparoscopic-assisted transhiatal esophagectomy) is a practical and safe approach for the treatment of the chosen participants with lower thoracic esophageal cancer, taking into account its limitations. To get a definitive conclusion, authors must conduct longitudinal research with high sample sizes and extended monitoring.

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S. No	Characteristics	Number (n)	Percentage (%)
1.	**Mean age (years)**	55.2±2.4	
2.	**Age range (years)**	33-70	
3.	**Gender**		
a)	Males	40	76.92
b)	Females	12	23.07
4.	**Smoking history**	34	65.38
5.	**Comorbidities**		
a)	COPD	6	11.5
b)	Cardiac diseases	2	3.84
c)	Diabetes mellitus	6	11.5
d)	Hypertension	8	15.38
6.	**Symptoms**		
a)	Reflux esophagitis	18	34.61
b)	Weight loss	34	65.38
c)	Hematemesis	2	3.84
d)	Progressive dysphagia	52	100
7.	**Preoperative laboratory findings**		
a)	Albumin (mg/dl)	3.3	
b)	Hemoglobin (mg/dl)	12.83	

Table 1: Demographic and disease data in study subjects

S. No	Operative variables	Number (n)	Percentage (%)
1.	**Operative blood loss (ml)**	300 (100-500)	
2.	**Operative time (min)**	311.4 (160-650)	
3.	**ICU stay**	3 (1-4)	
4.	**Postoperative stay**	12 (7-24)	
5.	**Re-surgery**	2	3.84
6.	**Blood transfusion**	10	19.23
7.	**Chylous leak**	2	3.84
8.	**Conduit necrosis**	2	3.84
9.	**Anastomotic leak**	6	11.53
10.	**Vocal cord paralysis**	0	0
11.	**Arrhythmias**	6	11.53
12.	**Cardiac complications**	6	11.53
13.	**ARDS**	2	3.84
14.	**Empyema**	4	7.69
15.	**Pleural effusion**	10	19.23
16.	**Respiratory complications**	16	30.76
17.	**Wound infection**	10	19.23
18.	**Mortality (30 days)**	0	0

Table 2: Operative variables and complications in the study subjects

S. No	Tumor-specific parameters	Number (n)	Percentage (%)
1.	**Location of the tumor**		
a)	GE junction	4	7.69
b)	Lower 1/3rd esophagus	48	92.30
2.	**T staging**		
a)	T1	0	0
b)	T2	40	76.9

c)	T3	12	23.07
d)	T4	0	0
3.	**N stage**		
a)	N0	24	46.15
b)	N1	24	46.15
c)	N2	4	7.69
4.	**AJCC staging**		
a)	1	0	0
b)	2A	24	46.15
c)	2B	20	38.46
d)	3A	4	7.69
e)	3B	2	3.84
f)	4	0	0
5.	**Lymph node status**		
a)	Positive lymph node number	2 (0-5)	
b)	Total lymph nodes resected	12 (8-26)	
6.	**Histological type**		
a)	Adenocarcinoma	46	88.46
b)	Squamous cell carcinoma	6	11.53
7.	**Resection**		
a)	R0	50	96.15
b)	R1	2	3.84
c)	R2	0	0

Table 3: Pathological findings in the study subjects