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Original Research Article

Clinical outcomes following esophagectomy for benign esophageal diseases: a single center experience

Jeya Sudhahar Jesudason, Karpagavel Chandrabose*

Department of Surgery, Velammal Medical College and Hospital Madurai, Tamil Nadu, India

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***Correspondence:**
Dr. Karpagavel Chandrabose,
E-mail: drkarpagavel@gmail.com

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ABSTRACT

Background: Surgery is the treatment option for wide range of benign esophageal diseases. But there are very few studies on Indian population, documenting the profile and clinical outcome of esophageal disease treated by surgical intervention. Hence author undertook a study to determine the clinical outcomes following esophagectomy for benign esophageal diseases.
Methods: The current study was a prospective observational study, conducted in Velammal Medical College, Madurai. Data collection was done for 6 years from January 2012 to December 2017. Patients diagnosed with benign esophageal diseases were enrolled. The surgical procedures performed and outcomes were documented. Mean and standard deviation were used to summarize numeric variables, number and percentage were used to summarize categorical variables.
Results: A total of 20 cases were included, with 11 men and 9 women. The mean age was 42.6±8.3 years. Dysphagia (90%) was the most common presentation, followed by heart burn (58%), regurgitation (40%) and chest pain (25%). Boerhaave syndrome (25%) was the most common diagnosis followed by foreign body perforation in 2(10%) patients. Corrosive stricture, peptic stricture, perforation following pneumatic dilatation and end stage achalasia were present in 2(10%) patients each. Jejunostomy and pyloroplasty were the procedure done in all cases. Stomach was the conduit used in 90% of patients. The conduit placement was done in the posterior mediastinum. The duration of the hospital stay ranged from 10 to 35 days. Mortality rate was 10%. Pulmonary morbidity (40%) was the most common post-operative complication, followed by wound infection (20%). Anastomotic stricture occurred among 30% of subjects.
Conclusions: There is a high probability of occurrence complications following esophagectomy for benign disease. Clinicians must be aware of incidence of various complications, to be able to minimize and manage them effectively.

Keywords: Benign esophageal disease, Esophagectomy, Post-operative complications

INTRODUCTION

Benign and malignant diseases of the oesophagus are one of the commonly encountered conditions in surgical practice. Esophageal carcinoma is the 6th most common cause of mortality due to cancers worldwide.[1] Esophagectomy, usually performed for malignant esophageal diseases may be the treatment of choice for benign conditions refractory to medical treatment.[2] The refractory strictures, tracheoesophageal fistula, iatrogenic perforation or leak are the benign conditions of the esophageal disease for which surgery may be required.[3] Gastroesophageal reflux diseases and achalasia are the most frequent indications for benign esophageal surgery. The esophageal diverticula and benign tumors are the rare indications.[4] High complications and mortality rate is associated with esophagectomy.[5] The overall incidence of post-operative complications following esophagectomy

are reported to be ranging between 20-80%.[6,7] Anastomotic leakage is the most common surgical complication after esophagectomy while arrhythmia is the common medical complication associated with esophagectomy.[5] The most common serious morbidity following esophagectomy is the pulmonary complications.[5] The risk of pulmonary complications are high in patients with upper third tumor or those who performed cervical gastroesophageal anastomosis.[8] The pneumonia and myocardial infarction are the systemic post-operative complications following esophagectomy.[6] The complications can be influenced by various factors like, age of the patient, gender, severity and type of the disease for which surgery done and presence of various co-morbidities.

Understanding the incidence and types of various post-operative complications may aid in clinicians in effective prevention and management of the same. This in turn may have positive impact on post-operative outcomes. In this background, the present study was carried out to compare the demographics, spectrum of clinical presentation, indications for surgery, type of surgery, intra operative variables, perioperative complications and outcomes of surgery following esophagectomy for benign esophageal diseases.

METHODS

This is a retrospective observational study over a 6-year period from January 2012 to December 2017. The study was conducted in the Institute of Surgical Gastro-enterology, Velammal Medical College, Madurai from the data collected from author's institute database. All patients who were diagnosed, either pre or intra operatively, to have a spontaneous benign esophageal diseases were included in this study. Demographics including age, sex ratio, presenting complaints, duration of symptoms, associated comorbid illnesses, previous treatment undertaken were collected. Disease related factors including the type of disease, underlying etiology, associated complications were classified. Also, the imaging methods used to diagnose, the treatment given including medical, endotherapy or surgical intervention were recorded. All data were described and compared with the literature available.

Inclusion and exclusion criteria

The following benign esophageal conditions were included in the study.

- Motility disorders achalasia: End stage dilated oesophagus, failed Myotomy, Scleroderma and other motility disorders
- Esophageal perforation: either spontaneous or following trauma or corrosive intake
- Strictures: peptic or corrosive
- GERD: Failed fundoplication, Complications like bleeding, ulceration, perforation or fistulation
- Recurrent hiatus hernia
- Benign neoplasms
- Congenital disorders
- End stage esophageal disease as initial presentation

Patients with malignant esophageal diseases were excluded from the study

Evaluation and follow up

Patients were evaluated with upper GI endoscopy (OGD), barium swallow, Manometry, 24-hour esophageal pH study and contrast enhanced CT scan of the neck, chest and abdomen. Authors maintained a comprehensive patient database and follow-up information were got through reviews at outpatient departments and personal phone calls with the patients and their family members.

The key outcome variables were the procedure done, Intra operative blood loss, post-operative complications and mortality. Data was analysed by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. IBM SPSS statistical software version 21 was used for analysis.

RESULTS

A total of 20 participants were included in the final analysis. The mean age of the study participants was 42.6±8.3 years with ranging from 23 to 65 years. The male to female ratio was 11: 9. Dysphagia was the most common presentation (90%), followed by heart burn (58%) and chest pain (25%) (Table 1).

Table 1: Demographic and clinical features of the study participants.

Parameter	Results
Age (mean±SD)	42.6±8.3
Gender (Male: Female)	11: 9
Male	11 (55%)
Female	9 (45%)
Clinical presentation	
Dysphagia	18 (90%)
Heartburn	11.6 (58%)
Chest pain	5 (25%)
Vomiting	4 (20%)
Regurgitation	8 (40%)

The most common diagnosis was Boerhaave syndrome in 5 (25%) subjects, followed by foreign body perforation in 3 (15.15%). Corrosive stricture, peptic stricture, perforation following pneumatic dilatation and end stage achalasia each were present in 2(10%) patients each.

Failed myotomy, failed fundoplication, scleroderma and epiphrenic diverticulum were present in 1 (5%) subject each (Figure 1).

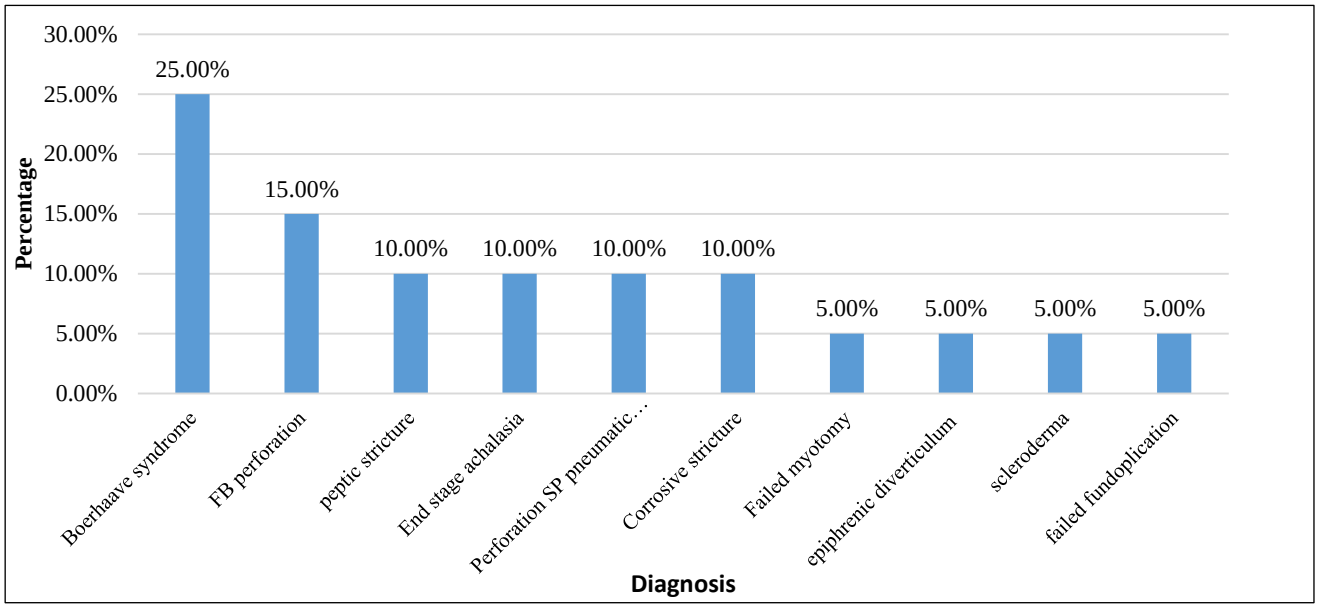

Figure 1: Diagnosed of benign esophageal disease.

All the study participants underwent, total esophagectomy with feed jejunostomy and pyloroplasty was done in all patients (100%). Stomach was the conduit used in 18 (90%) subjects. In 2 (10%) patients' stomach was also involved in acid injure, hence colon was used as the conduit. Conduit was placed in posterior mediastinum in all (100%) cases as this is the shortest route well protected by the surrounding structures. The reconstructive procedure started from 1 week after injury or symptom to 10 years after symptoms (end stage achalasia). Pleura were breached in all (100%) cases and unilateral or bilateral intercostal drainage were needed in all patients (Table 2).

Table 2: Details of the procedure done in the study population.

Procedure done	Results
Trans hiatal esophagectomy	**20 (100%)**
Feeding Jejunostomy	**20 (100%)**
Pyloroplasty	**2 (100%)**
Conduit used	
Stomach	18 (90%)
colon	2 (10%)
Conduit placement in posterior mediastinum	20 (100%)

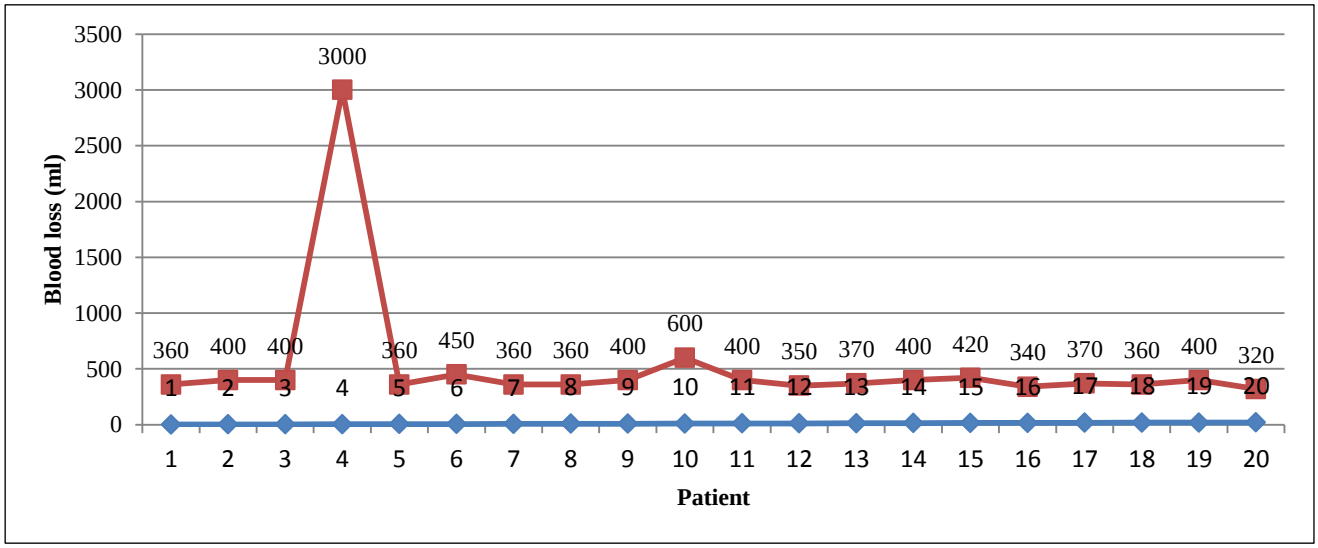

Figure 2: Intra operative blood loss among the study population.

The blood loss ranged from 320 ml to 450 ml in 19 cases with an average of 390 ml. In one patient due to bleeding from aortic branches to oesophagus, the patient had a blood loss of 3000 ml shifting the average to 520 ml.

That patient needed a left lateral thoracotomy with control of bleeding. In spite of that patient died of hemorrhagic shock (Figure 2).

The duration of the stay ranged from 10 to 35 days. 2 patients expired in their 0 and 10th post-operative day respectively. The long duration of stay was needed in some patients who had either wound sepsis or pulmonary morbidity. Pulmonary morbidity like atelectasis, consolidation and aspiration pneumonitis was reported in 8 (40%) patients. One patient needed urgent bronchoscopy for mucous plug removal for atelectasis. Out of 20 patients 4 (20%) patients had wound infection. Only in one patient secondary suture was needed. In 2 (10%) patients' emergency trans hiatal resection of the esophagus along with cervical esophagostomy and tube duodenostomy done. These 2 patients belong to FB perforation with mediastinitis.

Gastrografin study had identified 3 (15%) people with anastomotic leak. All of them were managed with conservative treatment. All patients had very good symptom relief except one patient who had a transient recurrent laryngeal nerve palsy which was managed conservatively and settled. In the study, 30% had excellent results, 35% reported good, 25% fair and 10% reported unsatisfactory results. Mortality was reported in 2 (10%) patients. One patient died of hemorrhagic shock due to bleeding from aortic branches supplying esophagus. One patient died of septic shock following mediastinitis. That patient had FB perforation for whom emergency esophagectomy with tube duodenostomy done. Out of 20 patients 6 (30%) patients had stricture. All these 6 patients responded to dilatations for at least 2 times to a maximum of 5 times (2 patients) (Table 3).

Table 3: Post-operative complications and the outcomes in study population.

Post-operative outcome	Results
Pulmonary morbidity	8 (40%)
Wound infection	4 (20%)
Delayed reconstruction	2 (10%)
Anastomotic leak	3 (15%)
Mortality	
Alive	18 (90%)
Dead	2 (10%)
Anastomotic stricture	6 (30%)
Final result	
Excellent	30%
Good	35%
Fair	25%
Unsatisfactory	10%

DISCUSSION

The present study was conducted to determine the clinical outcomes and complications after esophagectomy. It is necessary to identify the complications following esophagectomy in order to reduce the mortality rate. A total of 20 cases were included in the study. The minimum age of the study population was 23 years whereas the maximum age was 65 years with a mean age±SD of 42.6±8.3.Majority of the participants were male patients with 55% followed by female patients with 45%. The dysphagia was identified in 90% of study population followed by heart burn and chest pain with 58% and 25% respectively. In Watson et al, study conducted in a population size of 104 the dysphagia was presented in 80% of the patients.[9] The Boerhaave syndrome was diagnosed in 5 patients followed by foreign body perforation in 2 patients while corrosive stricture, peptic stricture, perforation following pneumatic dilatation and end stage achalasia each were present in 2 patients. In Orringer study published in 2001, 10 out of 285 cases motility disorders (achalasia and DES) constituted 33%, stricture belonged to 26% cases. The causes of strictures were peptic stricture, corrosive stricture and irradiation induced strictures mainly. Barrett's with HGD formed 19% as this is common in west. Recurrent gastro-esophageal reflux (7%), recurrent hiatus hernia (5%), acute perforation (10%) formed the remaining indications.

Transhiatal esophagectomy, jejunostomy and pyloro-plasty were the procedure performed in all subjects. Stomach was the conduit used in 18 (90%) subjects followed by patient's colon in 2 (10%) patients. The stomach was used as the esophageal substitute in 96% of study population and transhiatal esophagectomy was performed in 97% of subjects in the study presented by Orringer et al.[10]

The blood loss ranges from 320 to 450 in 19 cases with an average of 390 ml. A blood loss of 3000 ml shifting the average to 520 ml was caused due to bleeding from aortic branches to esophagus in one patient. The left lateral thoracotomy can be performed in that patient in order to reduce the bleeding. The average blood loss in the study performed by Orringer et al was 689 in which sample size was 283.[10]

The duration of the hospital stays ranges from 10 to 35 days. The long duration of stay was needed in some patients who had either wound sepsis or pulmonary morbidity. In the study conducted by Orringer et al, the length of hospital stay was 10-14 days.[11] The pulmonary morbidity was the most common post-operative complication in 8 of the 20 patients They were supported with nasal O_2 support, nebulisation with bronchodilators, chest physiotherapy, antibiotics and early mobilization. In or ringer study conducted in the year 200110 the pulmonary morbidity was seen in only 2% of their participants. In the Law et al study performed in a study population of 421 participants the most common complication was pulmonary morbidity and it accounts for 55% of mortality rate. Wound infection was observed in 20% of the patients. Regular wound wash along with antibiotics and dressings can reduce the chance of getting

wound infected. In the study performed by Orringer et al, 3% of patients was presented with the wound infection.[11] The delayed reconstruction was required in 10% of participants. In Orringer study 10 delayed reconstruction was needed only in 4 patients (1%).

In the present study, the anastomotic leak was found in 15% of the subjects. In this case the patients are reassured and feeding jejunostomy is continued. Vitals are monitored for any increase in heart rate to look for mediastinitis. Conservative treatment was performed in patients with anastomotic leak. This result was supported by the Orringer et al, study in which 14% of patients showed anastomotic leak.[11] In the present study, 30% had excellent results in post-operative symptom relief followed by 35% reported good, 25% fair and 10% reported unsatisfactory results. In Michigan study 11 29% reported excellent results (totally without symptoms), 39% reported good response (presence of mild symptoms only). Fair response was seen in 28% of the patients (symptoms requiring dilatation) and poor response (needs continuous treatment) was seen in 4%.

The mortality rate in the current study was 10%. In the study conducted by Orringer et al, 4% was the mortality rate in the study population.[11] Based on the study population the mortality rate varies between the studies. In the Schieman et al, study conducted in a population of 1522 patients the mortality rate was 3%.[12] The pulmonary complication and anastomotic complications are the major reasons leading to mortality. In the present study 30% of the participants had anastomotic stricture.

CONCLUSION

There is a high probability of occurrence complications following esophagectomy for benign disease. Clinicians must be aware of incidence of various complications, to be able to minimize and manage them effectively.

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