

Esophagectomy for Cancer of the Esophagus. A Regional Cancer Centre Experience

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Abstract Surgery is an important component of treatment for patients with resectable cancer of the mid and lower third of the esophagus. There are many controversies associated with esophagectomy. We share our experience with esophagectomy for cancer of the mid and lower third of the esophagus. Between January 2007 and December 2011, 210 patients with cancer of the esophagus underwent surgery. The patients' pre and intra-operative factors, morbidities and mortality were noted and studied. Transhiatal esophagectomy was done in 175 patients and right transthoracic esophagectomy was done in 35 patients. The most common location of the tumor was lower third and most common histopathology was squamous cell carcinoma. There were 5 in-hospital deaths (2.4 %) and the common morbidities encountered were respiratory (30 %), anastomotic leak (5 %) and anastomotic stricture (15 %). The morbidity was higher in the transthoracic group. Our R0 resection rate was 89 %. Esophagectomy can be accomplished with acceptable morbidity in the management of patients with oesophageal cancer. We attribute the favourable results to the high volume at our centre, surgical expertise, good patient selection and performance of the anastomosis in the neck.

Keywords Esophagectomy · Transhiatal · Transthoracic · Cancer

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Introduction

Esophageal cancer is a relatively common gastro-intestinal tract malignancy and is associated with a poor prognosis [1]. According to the GLOBOCON 2008 data, the estimated incidence in India in the year 2008 was 48,099 (5.1 %) with a mortality of 43,351 (6.8 %) [2]. Cancer of esophagus is expected to be one of the three major gastro-intestinal cancers in India accounting for 18.6 % of cases [3]. These cancers are challenging to treat and currently multimodality treatment is advocated for most of them. Surgery remains an important component of the treatment and is considered in fit patients with lesions in the mid and lower third of the esophagus.

We present our experience with the surgical management of patients with oesophageal cancer. The patient's characteristics, and surgical approach and outcome are presented and discussed.

Material and Methods

Patients

Between January 2007 and December 2011, 2,862 patients with esophageal cancers were seen at Kidwai Memorial Institute of Oncology. Evaluation for surgery included a detailed esophago-gastroscopy and biopsy, and computerized tomography (CT) scan of the chest and abdomen. Bronchoscopy was done for patients with mid third lesions. Pre-operative hematological and biochemical tests, pulmonary function test and echocardiography were done for all patients. Surgery was considered for medically fit patients with lesions at the mid and lower third of the esophagus. All patients were taught spirometer exercises and started on bronchodilators pre-operatively. Of the 2,862 patients, 333 patients underwent esophagectomy of whom 210 patients were evaluable for this

study. Informed consent was taken from all patients before the surgery.

Surgical Technique

All patients underwent subtotal esophagectomy and partial gastrectomy. The approach was either transhiatal or right transthoracic and the attending surgeon decided the approach for the esophagectomy. In general, lesions in the lower third were resected through the transhiatal route. Lesions close to the carina and bulky mid third lesions were resected through the thoracic route. Selected cases of mid third lesions below the carina were resected through the transhiatal route. Staging laparoscopy was used for bulky lower third and GEJ tumors. The lymph nodes removed in the transhiatal esophagectomy (THE) group included the perigastric, celiac and accessible mediastinal nodes. In the transthoracic esophagectomy (TTE) group the periesophageal nodes were also removed en bloc. Gastric conduit was the preferred replacement and was brought up through the posterior mediastinum. The anastomosis was always performed in the neck either by hand sewn or stapled (side to side) technique. A gastric drainage procedure (pyloroplasty or pyloromyotomy) and a feeding jejunostomy were done for all patients.

Post-Operative Care

Most patients were extubated in the theatre following the surgery, observed in the ICU and shifted out to the step-down unit once stable. Aggressive chest physiotherapy, spirometer exercises and bronchodilators were administered for all patients. Enteral feeds were started on the 2nd post-operative day. Bedside test feeds were given on the 5th–7th post-operative day and gradually escalated to semisolids and normal diet if there was no leak. In the event of a leak, the neck wound was opened and managed conservatively.

Follow-up

Patients were advised to follow-up every 3 months for the first 2 years, 6 monthly for the next 3 years and annually thereafter. Until the annual visit the patients were subjected to a physical examination only. At the annual visit they were subjected to blood tests (hemogram & biochemistry), and CT scan of the chest and abdomen. The medical records of the above patients were reviewed to collect the above information.

Results

The evaluable group consisted of 210 patients who under esophagectomy between January 2007 to December 2011. The demographic details of the patients are shown in Table 1.

Table 1 Demographics characters of patients

Median age (range) years	54 (32–77)
Gender	
Male	120 (57 %)
Female	90 (43 %)
Presenting symptoms	
Dysphagia	200 (95 %)
Vomiting	50 (24 %)
Cough	15 (7 %)
Pathology	
Squamous cell carcinoma	167 (79.5 %)
Adenocarcinoma	31 (15 %)
Poorly differentiated carcinoma	12 (5.5 %)
Tumor location	
Middle third	101 (48 %)
Lower third	119 (52 %)

The male to female ratio was 4:3 and the median age was 54 years (range 32 to 77 years). The most common symptom at presentation was dysphagia (95 %) followed by vomiting (24 %). The most common risk factor in males was smoking (65 %) and in females was tobacco chewing (45 %). Lower third tumors accounted for 45 % of the cases. Squamous cell carcinoma was the most common histology (79.5 %).

The results of the surgery are shown in Table 2. THE was done in 175 patients and TTE was done in 35 patients. The operative time for TTE was longer (240–300 min), with more blood transfusions (2.5 units) and longer ICU stay (4 days). The complications were more in the TTE group and so was the post-operative hospital stay (18 days). There were 5 in-hospital deaths (2.4 %) and all occurred in the THE group. Three patients died due the respiratory complications, one due to myocardial infarction and one patient due to chyle leak and septicemia.

The details of morbidity encountered are shown in Table 3. The overall morbidity (significant complications leading to prolonged hospitalization) was 38 %. Respiratory complications (atelectasis, pneumonia) were the most common 65

Table 2 Results of surgery

	THE	TTE
Number of patients	175	35
Duration of surgery (min)	180–250	240–300
Mean ICU stay (days)	2	4
Mean post-operative stay (days)	10	18
Mean blood transfusion (units)	1.2	2.5
Respiratory complications	45 (25.7 %)	20 (57.1 %)
Mortality	5	0

Table 3 Complications

Complications	Number
Respiratory	65 (38 %)
Leak	11 (5 %)
Stricture	32 (15 %)
Wound infection	12 (6 %)
RLN palsy	10 (5 %)
Chyle leak	5
Tracheal injury	1

(30 %). Anastomotic leak occurred in 11 patients (5 %) and all were managed conservatively and did not lead to mortality. In 20 patients we performed the anastomosis using the side to side stapled technique and encountered one leak and no strictures. Anastomotic stricture occurred in 32 patients (15 %), they were managed with either endoscopic dilatation or with oral Foley's catheter dilatation or both. Hoarseness of voice (attributed to RLN palsy) was seen in 10 patients (4.7 %). Chyle leak was noticed in 4 patients and all belonged to the THE group. One patient was managed conservatively; of the 3 patients operated, 2 patients could be salvaged. Three patients in the THE group required a right thoracotomy. Two patients had significant intra-operative bleeding requiring a thoracotomy to control the bleeding. One patient had a tracheal tear which was successfully repaired through a right thoracotomy.

The oncologic outcome is shown in Table 4. The pathologic staging was done according to the AJCC staging system (6th edition). T3 tumors accounted for 69 % of the lesions. The R0 (negative micro / macroscopic margins) resection rate was 89 %. We encountered positive circumferential resected margins and did not have any positive cut end margins. R2 resection (macroscopic positive margin) was seen in 2 cases (both of which were T4 lesions). R1 resection (microscopic positive margin) was seen in 22 cases (11 % of T3 lesions and 20 % of T4 lesions). The mean lymph node harvest in the THE group was 11 (range 2–22) and in the TTE group was 13 (4–30). The median follow-up was 18 months. The recurrences documented were 16 in the lung, 27 in the supraclavicular lymph nodes and 15 in the mediastinal.

Table 4 Oncologic outcomes

Depth of infiltration	Number (%)	Node –ve (%)	Node +ve (%)	CRM –ve	CRM +ve (%)	R2 resection (%)	R0 resection %
T1	4 (2)	4	–	4	–	–	100
T2	31 (15)	29 (94)	2 (6)	31	–	–	100
T3	145 (69)	55 (38)	90 (62)	129	16 (11)	–	89
T4	30 (14)	10 (33)	20 (67)	22	6 (20)	2 (6)	74

Discussion

Esophageal cancers are aggressive malignancies associated with poor prognosis. Only about 50 % of patients present with localized disease [4, 5] and can therefore be considered for curative treatment. Survival rates have however been poor in these patients, i.e. 37 % for localized disease and 19 % for node positive disease [5]. Though multimodality treatment is recommended by various authorities, no standard therapy exists or is followed universally. Surgery is considered an important part of the treatment, especially for loco-regional control, but is associated with many controversies. The main controversy is the approach to esophagectomy, i.e. THE or TTE. Various studies have been undertaken regarding this aspect of surgery and the two main meta-analysis of these studies failed to show any survival difference [6, 7]. The largest trial comparing the two approaches found a trend towards better survival for adenocarcinoma of the lower esophagus with no overall survival advantage between the groups [8].

The result of our study shows a clear trend towards performance of THE (175 vs. 35). Because of the high volume at our center and experience of the surgeons, lesions in the mid third below the carina have also been resected successfully through the transhiatal route. The overall morbidity of esophagectomy in our study was 38 %. Respiratory complications were the most common complications (81 % of the morbidity) and were more common in the TTE group (57 %). The TTE group also had longer duration of surgery, hospital stay and blood transfusions. These results compare well with those reported in the literature [6, 7]. The mortality in our study was 2.4 % and all occurred in the THE group. The low mortality can be attributed to the high volume at our center and the surgical expertise. It is increasing becoming evident that volume at the centers and the surgical expertise is associated with significantly lower rates of morbidity and mortality [9, 10]. There is a probability that the survival may also be higher in high volume centers [10].

The anastomotic leak we encountered was 5 % and there was no mortality associated with the leak. Our past experience with intra-thoracic anastomosis following esophagectomy was associated with high mortality especially in patients with a leak. Shifting the anastomosis to the neck has significantly

reduced our mortality rates and therefore has become the standard at our center. The reported leak rate with cervical anastomosis is between 9 and 14 % [11]. The stapled technique described by Orringer brought down their leak rates to 2.7 % [12] and has also resulted in decreasing our leak rates.

The anastomotic stricture rate in the study was 15 %. These patients were either treated with endoscopic dilatation or by trans-oral Foley's catheter self dilatation (described by our center) [13] or by a combination of both methods. Orringer reported a stricture rate of about 20 % in their experience and advocates a liberal policy of dilatation in the post-operative period [14].

The completeness of resection is an important prognostic indicator and can result in improved survival. Mariette et al. found that when their R0 resection rates increased, their survival went up by 10 % [15]. Our R0 resection rate was 89 %. Circumferential resected margins were positive (R1 and R2) in 11 % and all these patients had either T3 or T4 lesions. These are the subset of patients who would benefit from pre-operative therapy and we hope to formulate a protocol taking the results of this study into consideration.

Conclusion

Esophagectomy is a major surgical undertaking and our experience with it has been with acceptable morbidity and with favorable short term results. We attribute the favorable results to the high volume at the center, surgical expertise and appropriate patient selection. Though the ideal multimodality treatment is yet to be determined, integration of systemic therapy may be useful especially in locally advanced cancers.

Conflict of Interest None

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