TRANSHIATAL OESOPHAGECTOMY

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ABSTRACT

Objective: *To assess the early out come of Transhiatal oesophagectomy for carcinoma of the middle and lower third oesophagus.*

Material and Methods: *This observational study was carried out in Cardiothoracic surgery unit, Lady Reading Hospital, Peshawar, from January 2006 to December 2007.50 patients of either gender and any age with a diagnosis of oesophageal carcinoma, willing to participate, were included in the study. Patients with serious co-morbidity, cervical and upper thoracic oesophageal tumors, locally advanced irresectable and metastatic disease were excluded from the study. All the cases were assessed and operated upon by an experienced surgeon using transhiatal approach. The demographic data, clinical features, radiologic, pathologic and operative findings, out come of the procedure in terms of postoperative complications, 30 day mortality and duration of ICU and hospital stay were recorded on a proforma. The data was entered and processed on the SPSS 10 version.*

Results: *Study included 28 males and 22 females. Male to female ratio was 1.27:1. Mean age was 57 years, with a range of 27 to 75 years. Mean operative time was 125 minutes with mean blood loss of 600 ml. Uncontrollable per-operative hemorrhage necessitating thoracotomy occurred in 2% (n=1). Anastomotic leak occurred in 8% cases, aspiration pneumonia in 4% and transient hoarseness in 4% patients. One patient (2%) died postoperatively from aspiration pneumonia. Mean ICU stay was 2 days; mean postoperative hospital stay was 9 days.*

Conclusion: *Transhiatal oesophagectomy is a safe approach for carcinoma of the middle and lower third oesophagus. It has acceptable early postoperative morbidity and mortality.*

Key words: *Oesophageal Carcinoma, Transhiatal Oesophagectomy.*

INTRODUCTION

Oesophageal carcinoma is the eighth most common malignancy around the world[1] and shows vast geographical, racial and socioeconomic variations in incidence.[2] It is 20 – 30 times more common in Northern China and Northern Iran, where the incidence approaches 100/100,000 population per year.[3,4] In Pakistan, oesophageal carcinoma is the fifth commonest tumor in females and ninth in males.[5] It is relatively uncommon in the west, with an incidence of 10-20/100,000 population per annum.[6] Incidence of the carcinoma is on the rise for the last 3 decades.[1]

Over the last few decades, major shift in the histologic type of tumor has occurred.[6] Although the predominant histologic type throughout the world is squamous but adenocarcinoma of lower oesophagus and gastroesophageal junction is also on the rise especially in the western countries.[7, 8] This might be related to high incidence of obesity and obesity associated gastroesophageal reflux disease and Barrett's metaplasia.[9] Oesophageal carcinoma is the disease of the elderly but occurs at younger age in endemic areas.[5]

Surgical resection offers the best chance of cure and is regarded as the primary treatment modality.[10] Several surgical options are available, such as: Lewis-Tanner approach, Mc keown, left thoracolaparotomy, transhiatal oesophagectomy and minimally invasive oesophagectomy.[11-14] Each

CLINICO-PATHOLOGIC FEATURES n = 50

S.No	Features	Number of Cases	Total No. of Patients	Percentage %
01	Progressive dysphagia	40	50	80
02	Weight loss	42	50	84
03	Anorexia	29	50	58
04	Regurgitation	25	50	50
05	Adenocarcinoma	32	50	64
06	Squamous cell carcinoma	18	50	36

Table 1

approach has its own merits and demerits. Transthoracic approach allows direct visualization of the tumor, dissection of more peri-oesophageal nodal tissue; it may be associated with increased early postoperative morbidity and mortality with no significant long-term survival benefit.[11-13] Minimally invasive esophagectomy, while of value in high risk patients,[14] is expensive, not widely available and still in developing phase.[15]

Recently there has been a growing trend towards transhiatal approach for oesophagectomy (THO).[5,11,13] The possibility of THO was first proposed by Denk in 1913,[16] first performed by a British surgeon Turner,[17] and popularized by Orringer and Sloan in 1978.[18]

The purpose of this study was to assess the early postoperative out come of THO in patients with carcinoma of the middle and lower oesophagus at Lady Reading Hospital.

MATERIAL AND METHODS

This prospective, observational study was conducted in Cardiothoracic surgery unit at Lady Reading Hospital, Peshawar from Jan 2006 to Dec 2007.

The study included 50 patients of either gender and any age group, with a diagnosis of oesophageal carcinoma. Non-probability purposive sampling technique was used. Informed consent was taken from all the patients before including them in the study. Patients with serious medical co-morbidity, tumors in the cervical and upper thoracic oesophagus, locally advanced irresectable tumor and metastatic disease, on preoperative assessment, were excluded from the study.

A detailed history and thorough physical examination were done. Investigations included blood complete, serum creatinine, urea, electrolytes, glucose, liver function test and serum albumin, electrocardiography, chest radiograph, pulmonary function test, barium swallow and meal, upper gastrointestinal endoscopy with biopsy. thoracic and upper abdominal intravenous and oral contrast enhanced computed tomography.

Preoperative management included intravenous fluids in case of dehydration, blood transfusion if hemoglobin was less than 9 gm/dl, deep venous thrombosis prophylaxis, low molecular weight heparin, 40 units subcutaneously was given to all patients preoperatively and continued for 5 days post-operatively.

All the cases were assessed and operated upon by a senior surgeon. The patients were placed in supine position with head tilted to right, supported on a head ring. Skin was prepared from mandible to symphysis pubis and to mid-axillary lines bilaterally. An upper midline laparotomy incision was used; resectability of the tumor assessed. Right gastroepiploic vessels were identified. The lesser sac was entered through an avascular area 2 cm distal to the right gastroepiploic vessels. Greater omentum was divided till the right gastroepiploic vessels. Short gastric vessels were ligated, divided individually. Left gastric artery was doubly ligated and divided. Duodenum was kocherized. Celiac lymph nodes were excised. Peritoneum overlying oesophagus was incised; distal oesophagus was mobilized through the hiatus. Dissection of oesophagus was done first posteriorly, then on lateral sides and then anteriorly. Lateral vascular attachments were divided under vision. 14 G jejunostomy feeding tube was inserted in all the patients using Witzel's technique.

A left cervicotomy was made along the anterior margin of sternomastoid.

Sternomastoid and carotid sheath were retracted laterally; trachea and thyroid were retracted medially using finger only. The middle thyroid vein and inferior thyroid artery were ligated and divided. Recurrent laryngeal nerve was identified and preserved. Dissection of oesophagus was carried out up to carina. Hemostsasis was assessed and oesophagus was retracted upwards and divided at the intended level of anastamosis with knife. Oesophagus with the tumor was delivered through the hiatus. In the operation

PERIOPERATIVE COMPLICATIONS n = 50

S.No	Complications	Number of Cases	Percentage %
01	Hemorrhage needing thoracotomy	1	2
02	Tracheal injury	1	2
03	Aspiration pneumonia	2	4
04	Anastomotic leak	4	8
05	Hoarseness of voice	2	4
06	Superficial wound infection	2	4
07	Postoperative mortality	1	2

Table 2

theatre, blood loss was measured by weighing the swabs after use and subtracting the dry weight. The resulting total obtained (1g = 1ml) was added to the volume of blood collected in the suction or drainage bottles.

Stomach was used as a conduit in all patients. Stomach tube was made with double layer Vicryl 2/0 sutures. It was then manually manipulated through the hiatus and mediastinum. No traction drain or sutures were used for that purpose. In the neck, it was grasped with Babcock forceps and single layer anastomosis with interrupted 2/0 Vicryl suture was made. Nasogastric tube was secured in place. Prophylactic bilateral chest intubation was done in all patients.

Postoperatively patients were kept in ICU and shifted to general ward when stable. Jejunostomy feeding was started after 48 hours; nasogastric tube was removed on 3rd postoperative day. Oral fluids were allowed on 5th postoperative day. Gastrograffin swallow study was performed on 7th postoperative day. Patients were discharged after they remained stable for few days. Skin stitches were removed on 10th post operative day. Patients were referred to the oncologist for chemo-radiotherapy after 2 weeks. Follow up for early postoperative complications was for 30 days.

All the data was entered on a pre designed proforma. The proforma included: Demographic details, clinical features, radiologic and pathologic findings, operative findings, operating time, operative and postoperative complications, 30-day mortality, duration of ICU and postoperative hospital stay. Postoperative hospital stay was defined as the number of days from the day of operation to discharge.

The data was entered and processed on the SPSS 10 version. Frequencies and percentages were calculated for categorical data, where as mean ± Standard Deviation (SD) were calculated for numeric data.

RESULTS

During the study period, a total of 50 patients underwent THO. The patients included 28 males (56%) and 22 females (44%). Male to female ratio was 1.27:1. Age range was from 27 years to 75 years, with a mean age of 57 years.

Common presenting features were progressive dysphagia and weight loss. Detail of clinical presentations is given in table I.

Endoscopic biopsy revealed adenocarcinoma in 64% patients. Detail is given in table 1 72% (n=36) tumors were located in the lower third of esophagus, 28% (n=14) were in the middle third.

Mean operative time was 125 minutes with a range of 105 - 230 minutes. Mean blood loss was 600ml. A thoracotomy to control major per-operative mediastinal bleeding was performed in one patient (2%).

Main postoperative complications were anastomotic leak, aspiration pneumonia and transient hoarseness of voice which resolved in 2-4 weeks. Anastomotic leak settled with conservative management. Mechanical ventilation was required in 2 patients for aspiration pneumonia. Detail of postoperative complications is given in table II.

No per-operative deaths occurred. Postoperatively one patient died on fifth postoperative day from aspiration pneumonia; the same patient had uncontrollable bleeding per-operatively for which thoracotomy was performed.

All the patients were admitted in the ICU for a mean of 2 days, range 1-6 days. Mean postoperative hospital stay was for 9 days with a range of 7-18 days.

DISCUSSION

Oesophageal carcinoma is a serious condition with dismal prognosis.[19] The diagnosis is often delayed and more than 50% patients present

with locally advanced or metastatic disease.[19, 20]

Although recent advances in the preoperative care, operative and anesthesia techniques and perioperative management have improved the short term outcome; 5 year survival rates after surgical treatment of squamous and adenocarcinoma are still 10-20% and 16-32% respectively.[10, 12]

Considerable controversy exists regarding the optimal management of oesophageal carcinoma. Controversial issues include the use of chemo-radiotherapy, surgical approach and extent of resection.[21,22] Management should however be individualized, based on the patient's condition, co morbidity, site, stage and most importantly surgeon's experience.[21]

Many authors have recommended THO.[11,15,20,23,24] Critics however, argue that it cannot eradicate the disease completely and is associated with lower long term survival. Hulscher has reported a prospective randomized controlled trial that compared transthoracic enbloc to THO. It showed a trend towards better survival with enbloc resection but the results were statistically not significant.[25] Many other studies have reported that long term survival rate after THO is comparable to that seen after other approaches.[10,11,13,26,27] Moreover, according to Lin J et al, most important determinants of survival are the biologic behavior and the stage at the time of resection rather than the surgical approach.[27]

Although, THO is mostly used for tumors of distal oesophagus, this technique is applicable to virtually any part of the oesophagus, whether benign or malignant.[5,11,13,28] Many studies have reported shorter operative time, less blood loss, fewer transfusion requirements, shortened ICU and hospital stay with THO.[11,13,20,25] Mean postoperative ICU and hospital stay in this study were for 2 days and 9 days respectively. These figures are similar to that of other reports.[11,15,20,25]According to Orringer et al, major intrathoracic hemorrhage requiring thoracotomy should occur in less than 1 %;[11] in this study only one patient (2%) had uncontrollable per-operative hemorrhage which required thoracotomy. Studies have reported fewer pulmonary complications, less chylous leak and a shorter duration of mechanical ventilation with THO.[5,11,15,20,25]

THO is also considered a cost effective procedure due to sparing of various sutures which are used in case of thoracotomy. Secondly post-operative analgesic demand of patients is also less compared to that of Transthoracic oesophagectomy. Lastly overall hospital stay of patients with THO was less than that of Transthoracic oesophagectomy. Although no local study has been done on the cost benefit of THO, an international study has reported reduced over all cost with THO compared to that of transthoracic oesophagectomy[25], where the authors concluded that increased cost was related to higher early perioperative morbidity and longer hospital stay after transthoracic oesophagectomy.[25]

Anastomotic leak is a serious complication of oesophagectomy especially when it occurs in the chest.[11,28,29] Cervical Oesophagogastric anastomosis tends to run a more benign course[20,27,29] and can easily be managed by opening the neck wound, irrigating and packing the wound until fistula closes. However, up to 50% of cervical leaks later result in anastomotic stricture.[30] In this study, anastomotic leak occurred in 8% patients. This figure is consistent with that reported in other studies.[5,11,15,23, and 28]

Recurrent laryngeal nerve injury is another complication and is usually due to technical problem.[19] It also depends upon the hospital volume.[11] In this study transient hoarseness occurred in 4% cases. This is similar to that of other reports.[11,31] It is less than the results of some studies.[5,20,25] The risk can be reduced by careful mobilization of oesophagus and gentle retraction of trachea and thyroid using finger only instead of a metal retractor.[11] Some studies have reported that THO is associated with higher frequency of recurrent laryngeal nerve injury and anastomotic leak than the transthoracic approach.[12,19,20,32]

Although many authors recommend some form of gastric drainage procedure.[11,15,33] No drainage procedure was performed in this study. Rationale behind that was as the anastomosis is high in the neck, gastric drainage is mostly dependent on gravity, at the same time it reduces the risk of bile reflux.[34]

The operative mortality has been falling over the last three decades.[20] It ranges from 4-10%.[19,26,35]According to a prospective study, the risk factors for operative mortality include serum albumin < 3.5 g/dl, age > 65 years and more than 4 units of blood transfusion.[26] ASA class III or higher is also an important risk factor.[36] In this study mortality was 2%, this is similar to that reported in other studies.[11, 21, 25, 28] Mortality rate after THO is comparable to that reported after transthoracic approach.[5,20,26] Probably of more importance than the approach used is the hospital volume and surgeon's experience.[35,37] Many studies have reported that high volume centers and high volume surgeons have significantly lower morbidity and mortality rates compared to low volume centers and surgeons.[35, 37]

In this study, the samples were selected on the basis of surgeon's criteria, moreover the samples size was small; much larger series is required to confirm the advantages of this approach. Longer follow up is also needed to assess the long term outcome of this procedure.

CONCLUSION

Transhiatal oesophagectomy is a safe approach for carcinoma of the middle and lower end of oesophagus. It has acceptable early postoperative morbidity and mortality. It should be carried out more frequently in selected patients with oesophageal carcinoma.

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