

## Original Research Article

# Transhiatal oesophagectomy: a single unit study

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### ABSTRACT

**Background:** Oesophageal cancer is a common gastrointestinal malignancy in our country and transhiatal oesophagectomy is popular choice of surgery for lower oesophageal cancers. This study aims at identifying the feasibility and effectiveness of this surgery in our setting.

**Methods:** This prospective study was performed in Department of Surgery, SDM College of Medical Sciences and Hospital, Dharwad, India. It included a total of 10 cases operated during the study period. Various pre-operative, intra-operative and post-operative parameters were observed and results tabulated.

**Results:** In our study dysphagia (90%) was the most common presenting complaint and tobacco, either smoked (40%) or chewed (40%) formed a common risk factor. Lower oesophageal growths (80%) were more common than mid oesophageal (20%). The preferred incision was midline (80%) and average duration of surgery was 351min and average blood loss was estimated to be 521 ml. There was one mortality and a R0 resection in 90% of the cases with 10% positive for local lymphodal malignant spread.

**Conclusions:** Our statistics are not very different to the studies compared, and we believe they will only improve. We propose transhiatal oesophagectomy to be a practical and affective tool in a surgeon's armamentarium, which certainly can be a formidable treatment modality in sub-carinal oesophageal cancer.

**Keywords:** Transhiatal oesophagectomy, Oesophageal cancer, Orringer's surgery, Complications

### INTRODUCTION

An estimated 450,000 cases of oesophageal cancer were diagnosed in 2020 according to the International Agency for Research on Cancer (IARC), of which 88% were squamous cell carcinoma and 12% were adenocarcinoma oesophagus.<sup>1,2</sup> There is gross variation in geographical incidence of oesophageal carcinoma, with central and east Asia being the most affected. Variations of incidence inside a particular country is also noted.<sup>3</sup> Due to increased incidence of gastroesophageal reflux disease (GERD) and Barrett's oesophagus, adenocarcinoma of lower oesophagus is on the rise. In USA there has been a 400% rise in incidence adenocarcinoma of oesophagus in the past 25 years.<sup>4</sup> Oesophageal carcinoma is relatively common in India as compared to global statistics, it is the fourth most common cause of cancer related deaths in

India while it is the sixth most common around the world.<sup>1</sup>

Multiple risk factors like tobacco, betel nut, alcohol, pickled foods, hot food, irradiation, achalasia cardia and Fanconi's anemia have been proven to be causative for oesophageal cancers.<sup>5</sup> Upper GI endoscopy is a swift and reliable method of diagnosing oesophageal carcinomas in patients presenting with dysphagia. Once diagnosed contrast CT is warranted to ascertain spread of the tumour and its resectability.

Surgery predominates other modalities in the treatment of oesophageal cancers. A complete resection with adequate lymphadenectomy is the goal of surgery, this can be achieved by multiple techniques. Ivor-Lewis' oesophagectomy done via a thoracic approach and

Orringer's (transhiatal) oesophagectomy which utilises laparotomy and dissection is done through the hiatus. Both require construction of a oesophago-gastric anastomosis, which is located in mediastinum and the neck in Ivor-Lewis and transhiatal respectively.

## METHODS

This prospective study was performed in the 3<sup>rd</sup> surgical unit of SDM college of medical sciences and hospital, Dharwar, India from December 2015 to November 2018. A total of 10 patients who underwent transhiatal oesophagectomy during that period were included in the study after duly undertaking an informed written consent for participation in the study.

### Inclusion criteria

Age more than 18 years, endoscopic biopsy proven carcinoma oesophagus, computed tomography proven resectability and fitness to undergo procedure were included.

### Exclusion criteria

Unresectable tumour, tumour above the level of carina, metastatic disease and unwilling patient were excluded.

All patients presenting to outpatient clinic complaining of dysphagia were subjected to upper GI endoscopy, among them those who had a growth in the oesophagus underwent endoscopic biopsy. Those diagnosed to have biopsy proven carcinoma oesophagus were admitted and a detailed history and physical examination was performed, after which relevant investigations for metastatic workup as well as for determination of fitness for surgery were performed. Every patient underwent a contrast CT scan of the chest and abdomen to know resectability and metastasis. All patients received preoperative anticoagulation in the form of subcutaneous enoxaparin based on their body weight, intraoperative compression bandages were used but not pneumatic compression devices. Intraoperatively data was collected with regards to multiple aspects of surgery, such as choice of incision, duration, blood loss etc. Postoperatively the patients were shifted to surgical ICU and effective pain control and pulmonary toiletting was performed. Post operative jejunostomy feeds were started after 48 hrs through feeding jejunostomies placed intraoperatively and oral diet was resumed after gastrografin swallow performed on post operative day 10, depending on absence of leak from the anastomosis. Enoxaparin was restarted 24 hours after surgery and was continued till the patient was ambulatory. Early ambulation was encouraged in all patients postoperative complications were documented and entered in an exhaustive proforma. In case of mortality the cause of death was noted. At the end of the study period the data was tabulated and analysed.

## RESULTS

In this study a total of 10 patients underwent transhiatal oesophagectomy for oesophageal cancer. Dysphagia was the major presenting complaint in 9 (90%) of these. Survey of risk factors determined that 4 (40%) of the patients were smokers and an equal number of them used to chew tobacco, betel nut chewing was observed in 2 (20%) of the patients. In this study none of the patients had a positive family history of cancer. Co-morbidities included diabetes (50%), hypertension (60%), ischemic heart disease (IHD) (10%) and chronic obstructive pulmonary disease (COPD) (20%). The average preoperative hemoglobin in the study population was found to be 13.09 g/dl (9.8-16.9 g/dl) and preoperative albumin was 3.26 g/dl (1.6-4.0 g/dl). Growth was noted in the mid oesophagus in 2 (20%) and in the lower oesophagus in 8 (80%). Contrast enhanced CT scan showed maintained fat planes between the oesophagus and the mediastinal structures in all. Suspicious lymphadenopathy was observed in 1 (10%), that too in lower mediastinum (Table 1).

**Table 1: Pre-operative details.**

Preoperative details	N (%)
Dysphagia	9 (90)
Smoking	4 (40)
Tobacco chewing	4 (40)
Betel nut chewing	2 (20)
Alcohol	3 (30)
Family history of cancer	0
DM	5 (50)
Hypertension	6 (60)
IHD	1 (10)
COPD	2 (20)
Haemoglobin (avg)	13.09 g/dl
Albumin (avg)	3.26 g/dl
Growth in mid oesophagus	2 (20)
Growth in lower oesophagus	8 (80)
CT scan plane breach (aorta & trachea)	0
CT scan lymph node enlargement	1 (10)

Intraoperatively the incision of choice was midline (80%) and chevron was used in 2 (20%). Average blood loss was found to be 521 ml (300-1000 ml) and average duration of surgery was 351 min (300-480 min). Intraoperative complications included pleural breach (90%), a case of left internal jugular vein injury and an inferior venacaval puncture during Kocherisation, both were managed effectively by compression and repair with polypropylene 5-0 sutures (Table 2).

Postoperative pneumonia was seen in 9 (90%) cases. Serial chest radiographs, sputum or endotracheal culture based antibiotics, incentive spirometry and chest physiotherapy were used to effectively control it. Wound infection, arrhythmias, anastomotic leak and incisional

hernia were seen in a patient each. Wound infection was treated by laying open a few sutures to adequately drain the pus, culture sensitivity of the same was done and appropriate antibiotic was initiated. Supra ventricular tachyarrhythmias were observed in 1 case which was dealt with a cardiac consultation and initiation of antiarrhythmic therapy. Anastomotic leak from the cervical oesophago-gastric anastomosis was suspected in one case based on persistently high volume in the cervical drain, later on it was confirmed by gastrograftin swallow. Wound toileting and continued jejunostomy feeds for 25 more days while keeping the patient nil orally successfully treated the leak and patient was resumed on oral diet. An incisional hernia was noted in a patient who was a chronic smoker with COPD and had persistent cough in the postoperative period, it was diagnosed at 1 year follow up visit and was repaired using polypropylene mesh. There was one death secondary to suspected pulmonary embolism in an otherwise uneventful recovery, no post mortem was performed (Table 3).

**Table 2: Intra-operative findings.**

Intraoperative findings	N (%)
<b>Incision</b>	
Chevron	2 (20)
Midline	8 (80)
Sustained arrhythmias	0
Blood loss (avg)	521 ml
Duration (avg. in minutes)	351 (5 hrs 51 min)
<b>Pleural breach</b>	
Unilateral	2 (20)
Bilateral	7 (20)
None	1 (10)
<b>Other complications</b>	
Internal jugular vein injury	1 (10)
Inferior vena cava injury	1 (10)

**Table 3: Post-operative complications.**

Postoperative complications	N (%)
<b>Pneumonia</b>	9 (90)
<b>Wound infection</b>	1 (10)
<b>Incisional hernia</b>	1 (10)
<b>Anastomotic leak</b>	1 (10)
<b>Arrhythmias</b>	1 (10)
<b>Death</b>	1 (10)
<b>Reoperation</b>	0
<b>Recurrence of disease</b>	0

On histopathological examination it was found that 8 (80%) had a T3 tumour, and 1 (10%) each of T2 and T4. The average lymph node harvest was 15 (10-20), of which 90% had node negative disease and only one tested positive for lymph node metastasis. Grade wise majority (70%) were moderately differentiated squamous cell carcinoma, 20% had well differentiated cancers and one

case had signet cell cancer. There was no residual microscopic disease in 9 (90%) and in one the resection was classified as R1 (Table 4).

**Table 4: Pathological examination.**

Pathological examination	N (%)
<b>'T' staging</b>	
T2	1 (10)
T3	8 (80)
T4	1 (10)
<b>Nodal involvement</b>	
All nodes negative	9 (90)
Positive nodes	1 (10)
<b>Histological grading</b>	
Well differentiated SCC	2 (20)
Moderately differentiated SCC	7 (70)
Signet cell Ca	1 (10)
Avg. LN harvest	15 (10-20)
<b>Resections</b>	
R0	9 (90)
R1	1 (10)

**DISCUSSION**

This study is peculiar in that it aims to study a single team of surgeons for a fairly rare surgery so that we can compare ourselves to the rest of the world and correct ourselves wherever required. Transhiatal surgery has gained popularity because it avoids thoracotomy and hence minimises thoracic complications, and also because it places the anastomosis in the neck, where a leak can be managed much more effectively with less chance of developing mediastinitis.<sup>6,7</sup> Tobacco when smoked or chewed has been considered as a strong risk factor for oesophageal squamous cell cancer, though differences in attributable and relative risk exist in developing and developed countries.<sup>8,9</sup> Similar risk is attributed to alcohol consumption, but when abused together tobacco and alcohol have an additive effect. Similar results were seen our study too.<sup>10,11</sup>

Pre-existing respiratory diseases have a large bearing in postoperative outcome, so do cardiac and renal comorbidities.<sup>12</sup> In our study the pneumonia was almost a certainty in the postoperative period and those who were smokers and had previous COPD had much worse postoperative pneumonia. In particular a middle-aged male, who was a heavy smoker with emphysema developed severe pneumonia post operatively and later on developed anastomotic leak and a year later incisional hernia, this substantiates the deleterious effects that smoking and lung disorders can have on postoperative outcome.

A growth situated in the lower third of oesophagus is better suited for transhiatal oesophagectomy than the ones in the middle third, as the dissection and margin around the growth can be obtained much easily because

of direct visualisation. Large mid oesophageal growths and upper oesophageal growths were considered contraindications to transhiatal surgery in our study. The blind nature of mediastinal dissection is considered the biggest flaw of this procedure, but western literature has proven little significance of mediastinal extensive node dissection with regards to survival and just reflects a mere stage migration.<sup>13,14</sup>

We employed a bilateral subcostal incision in the initial couple of cases, but soon it was replaced by the midline incision, in favour of much reduced pain and the ease of closure. Exposure in either was not much different. We did improve in the duration of each case and the blood loss over a period of time with experience. The blind mediastinal dissection with experience can be performed precisely with experience with proper case selection. We did not encounter any major thoracic or mediastinal bleeding, however pleural tear was seen all cases except the last one. A pleural breach mandated an intercostal drain on the affected side and was usually removed in 48 hrs.

None of our cases received preoperative chemotherapy or radiation, though they did receive postoperative adjuvant therapy as per their disease stages.

We compared multiple studies with our results and we found that our numbers were comparable to them in terms of complications, duration of surgery and blood loss.<sup>15-18</sup> Though our data is very limited in the number of cases, we believe we are on the right path.

## CONCLUSION

We set up this study as preliminary venture to analyse our results and compare ourselves to global norms and improve accordingly. There is enough scope for us in a developing country like ours with relatively high incidence of oesophageal cancers to gain expertise in managing technically challenging surgical procedure like transhiatal oesophagectomy. Our statistics are not very different to the studies compared, and we believe they will only improve. We propose transhiatal oesophagectomy to be a practical and affective tool in a surgeons armamentarium, which certainly can be a formidable treatment modality in sub-carinal oesophageal cancer.

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