

AN ANALYTICAL STUDY OF CARCINOMA OESOPHAGUS AND ITS SURGICAL MANAGEMENTYeganathan Rajappan¹, Ilavarasi Thangavel², Mahalakshmi Ashokkumar³, Manimaran Thangavelu⁴, Anandan Kanthan⁵¹Associate Professor, Department of General Surgery, KAPV Government Medical College, Trichy.²Postgraduate Student, Department of General Surgery, KAPV Government Medical College, Trichy.³Assistant Professor, Department of General Surgery, KAPV Government Medical College, Trichy.⁴Assistant Professor, Department of General Surgery, KAPV Government Medical College, Trichy.⁵Postgraduate Student, Department of General Surgery, KAPV Government Medical College, Trichy.**ABSTRACT****BACKGROUND**

Carcinoma oesophagus is the 6th most common cancer in the world. Overall, a 5-year survival rate with treated tumour is 5 to 20% only. But still most patients with carcinoma oesophagus could not be diagnosed earlier because of late presentation. The aim of this study is to know the regional incidence, common histological types, clinical features and investigations to aid diagnosis, to know the common site and to know operability of carcinoma oesophagus.

MATERIALS AND METHODS

This study was conducted in Mahatma Gandhi Memorial Government Hospital, Trichy between September 2013 and June 2015. This study included 88 patients of carcinoma oesophagus who were managed through Feeding Jejunostomy with Radiotherapy referral, Transhiatal Oesophagectomy, Thoracoscopic Oesophagectomy and were studied for their regional incidence, clinical features and investigations to aid diagnosis, to know the common site and to know operability of carcinoma oesophagus. The study design was descriptive.

RESULTS

The incidence of carcinoma oesophagus in Mahatma Gandhi Memorial Govt. Hospital, Trichy has been worked out to be 5.2%. Carcinoma oesophagus is commonly seen in 7th decade of life; 26% of cases falls in the age group of 61 to 70 years. Youngest patients were of 30 years of age and eldest 90 years. The Male-to-Female ratio is 1.4:1. Carcinoma oesophagus patients with alcohol intake is 27%. Most common complaint according to our study is Dysphagia (98%) followed by weight loss (62%). Mostly tumour affects the middle 1/3rd of oesophagus (48%) followed by lower 1/3rd with oesophagogastric junction (31%). Common histological pattern is squamous cell carcinoma (80%) in our study; 51% of patients has ulcerative growth, 43% have infiltrative growth. Out of 88 patients with carcinoma oesophagus, 54% of cases underwent Feeding Jejunostomy and referred to Radiotherapy; 46% of cases have curative surgery done like Transhiatal oesophagectomy (42%), Thoracoscopic Oesophagectomy (3%), Total Gastrectomy with oesophagectomy in 1.1%. Among the patients who underwent curative surgery, 39% have post-operative complications. Anastomotic leak is the highest post-operative complication with 14% incidence. Death in post-operative patients was 2%. During the followup period, 12% of patients were lost. Most of the followup occurred between 7 and 12 months of post-operative period (36%). Patients with recurrence referred to Radiotherapy.

CONCLUSION

Carcinoma oesophagus have increased the Male-to-Female ratio. It is most common in low socioeconomic group. Predominant histology is squamous cell carcinoma. Strong association exists between smoking, alcoholism and carcinoma oesophagus. Transhiatal oesophagectomy and thoracoscopic oesophagectomy have significant role in surgical management of carcinoma oesophagus of middle and lower 1/3rd. About 50% of patients were inoperable and feeding jejunostomy was done and referred to Radiotherapy.

KEYWORDS

Carcinoma Oesophagus, Transhiatal Oesophagectomy, Thoracoscopic Oesophagectomy, Feeding Jejunostomy.

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BACKGROUND

Carcinoma oesophagus is the 6th most common cancer in the world. Squamous cell carcinoma accounts for most of

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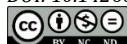
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oesophageal cancers.^{[1],[2]} The Male-to-Female ratio is 3:1 in SCC and 15:1 in Adenocarcinoma. Smoking and alcohol increase the risk of foregut cancers.^[3] Most of the patients could not be diagnosed earlier because of late presentation.^[4] Carcinoma oesophagus infiltrate locally, involve adjacent lymph node and metastasise widely by haematogenous spread; 0 - 5 year survival rate^[5] with treated tumour is 5 - 12%. Carcinoma oesophagus is treated through surgery, chemotherapy and radiotherapy.

Carcinoma oesophagus varies in geographical distribution with highest incidence in Henan province of china. In West adenocarcinoma is increasing with incidence of 5/100000 in USA and 26/100000 in France. SCC and Adenocarcinoma account for 98% of carcinoma oesophagus; rest of 2%

consists of neuroendocrine tumour, carcinosarcoma, melanoma and sarcoma. Clinical features vary with the stage of carcinoma oesophagus.^[6] In early stages the features mimic GERD, heart burns, regurgitation and indigestion. The features of advanced stage are dysphagia, weight loss, choking, coughing, aspiration, hoarseness of voice and jaundice. Among the investigations done, UGI scopy and CT thorax^[7] are important. Patients are managed through surgery/radiotherapy/chemotherapy. Among the surgical approaches Transhiatal oesophagectomy and Thoracoscopic oesophagectomy are done usually in our hospital.

MATERIALS AND METHODS

Study Place

Mahatma Gandhi Memorial Hospital and KAPV Govt. Medical College, Trichy.

Duration of Study

September 2013 to June 2015.

Study Design

Descriptive Study.

Ethical Committee

Institutional Ethical Committee, KAPV Govt. Medical College. Approved on April 2015.

Inclusion Criteria

Any age group. All sex group. Patients with radiologically and biopsy proven carcinoma oesophagus in middle and lower 1/3rd of oesophagus without previous treatment for carcinoma oesophagus.

Exclusion Criteria

Patients with carcinoma oesophagus involving upper 1/3rd of oesophagus. Patient with previous treatment for carcinoma oesophagus.

Data Collection and Methods

Among the 112 patients with carcinoma oesophagus admitted in KAPV Govt. Medical College, Trichy, 88 patients were included for study. Important information from patients was obtained through clinical examination and investigations necessary to aid diagnosis and resectability. All the information was entered in a specially designed proforma. While evaluating the patient's age, sex, geographical factors, socio-economic status, personal habits, symptoms and duration, pre-disposing factors were considered. Per abdominal examination, RS examination and P/R examination was done. Upper GI Endoscopy was done for the patients and biopsy was taken of the location, and type of growth and distance from incisor were noted. Patients with positive endoscopy and biopsy were subjected to USG abdomen to rule out metastasis. CT thorax was done to study the location of tumour, wall thickness, extent of tumour, mediastinal lymph nodes and direct invasion of adjacent structures. CT abdomen was done to find hepatic and adrenal secondaries. Bronchoscopic examination was done to rule out tracheobronchial involvement.

After obtaining necessary information from clinical examination and investigations, curative or palliative treatment was planned. The Curative treatment consists of transhiatal oesophagectomy and thoracoscopic oesophagectomy. Patients who did not fit for curative surgery were subjected to palliative feeding jejunostomy with followup radiotherapy and referred to Oncological Department. Of 88 patients who were diagnosed with carcinoma oesophagus, 41 underwent curative surgery and 47 underwent palliative feeding jejunostomy; 31 patients had transhiatal oesophagectomy, 3 had thoracoscopic oesophagectomy and 1 patient had total gastrectomy and oesophagectomy. Post-operative complications identified promptly and managed accordingly. Most of the patients who underwent surgery were reviewed in OPD. During followup complications like anastomotic leak, recurrence and distant metastasis were examined. Patients who had feeding jejunostomy done was referred to Radiotherapy.

Statistical Analysis

Descriptive statistics such as frequency and proportions were calculated. To compare the qualitative variables Chi-square test was used, a p-value of p less than or equal to 0.05 is considered significant.

RESULTS

The incidence of carcinoma oesophagus by this study in our Institution is 5.2% (112/2120).

Total number of cancer patients in our hospital during this study period were 2120.

Total number of carcinoma oesophagus were 112.

Age Group (Years)	No. of Cases	Percentage
≤ 30	4	5%
31 - 40	11	13%
41 - 50	19	22%
51 - 60	22	25%
61 - 70	24	26%
71 - 80	7	8%
> 80	1	1%
Total	88	100%

Table 1. Age Incidence

Carcinoma oesophagus is common in 7th decade of life [26%].

Age Group (Years)	Males	Percentage	Females	Percentage
≤ 30	2	2%	2	2%
31 - 40	4	5%	6	7%
41 - 50	11	13%	8	9%
51 - 60	17	19%	6	7%
61 - 70	16	18%	8	9%
71 - 80	6	7%	1	1%
> 80	0	0	1	1%
Total	56	64%	32	36%

Table 2. Sex Incidence

Carcinoma Oesophagus is Common among Males [64%]

The relation of carcinoma of oesophagus and personal habits has been well established in various studies.

Habits	No. of Patients	Percentage
Tobacco	8	9%
Betel Nut	17	19%
Smoking	27	30%
Alcohol	24	27%
2 or more habits	19	21%

Table 3

According to our study, smoking (30%) and alcohol (27%) users are prone to get carcinoma oesophagus.

Complaints	Number of Cases	Percentage
Dysphagia	86	98%
Weight loss	55	62%
Anorexia	20	23%
Vomiting	15	17%
Abdominal pain	18	20%
Chest pain	3	3%
Cough	4	5%
Hoarseness	0	0%
Dyspnoea	3	3%
Melena	2	2%

Table 4. Clinical Features

Among the presenting complaints, the commonest and at many a times the only complaint was dysphagia (98%). The second most common was the weight loss (62%).

Location	Number of Cases	Percentage
Upper 1/3rd	24	21%
Middle 1/3rd	52	48%
Lower 1/3rd	21	18%
OGJ	15	13%

Table 5. Distribution of Tumour according to Site of Tumour

The commonest site of the carcinoma of oesophagus was the lower 3rd in our Institution, about 52 patients were having middle-third carcinoma (46%). Lower 3rd along with OGJ contributes to 31% (36) cases.

Various studies have documented a major shift in the histological pattern of the cancer oesophagus from a traditional squamous cell carcinoma to adenocarcinoma. But, in our study, the commonest histological pattern is still squamous cell carcinoma in our Institution.

Type of Growth	Number of Cases	Percentage
Fungating	3	3%
Ulcerative	45	51%
Infiltrative	38	43%
Polypoid	2	2%

Table 6. OGD Scopy Finding

Most of the patients (51%) were found to have ulcerative growth. Infiltrating type of growth (43%) were the second most common type of growth.

Type	Number of Cases	Percentage
Squamous	70	80%
Adeno	18	20%
Total	88	100%

Table 7. Histological Varieties

Surgery	No. of Cases	%
Transhiatal Oesophagectomy	37	42%
Thoracoscopic Oesophagectomy	3	3%
Feeding Jejunostomy	47	54%
Total Gastrectomy with Oesophagectomy	1	1%

Table 8. Curative and Palliative Surgery

Patients were selected for curative surgery according to their general condition, scopy findings, extent of disease, histological grade of lesion without any metastases and complications.^[8] Patients selected for curative surgery were planned for either transhiatal oesophagectomy^[9] or thoracoscopic oesophagectomy.^[10]

Patients in whom there is no curative resection possibility underwent feeding jejunostomy and followup Radiotherapy.^[11] Out of those 88 patients, 47 patients underwent feeding jejunostomy followed by radiotherapy. These 47 patients had one of these following exclusion criteria.

Factors	Number of Cases	Percentage
> 80 years	2	2%
Co-morbid illnesses	4	5%
Poor general condition	8	9%
Extensive growth	24	27%
Metastases	6	7%
Not willing for major surgery	3	3%
Total	47	53%

Table 9. Patients underwent Palliative FJ

All these patients underwent palliative feeding jejunostomy and referred to Radiotherapy Unit for further management.

Patients (41) who had curative surgery like transhiatal oesophagectomy and thoracoscopic oesophagectomy had following post-operative complications.

Complications	Number of Cases	Percentage
Wound infection	3	7%
Anastomotic leak	6	14%
Stricture	1	2%
Wound dehiscence	4	9%
Pneumonitis	2	5%
Haemothorax	0	0%
Death	1	2%
Total	17	39%

Table 10

3 patients who had wound infections and 4 patients who had wound dehiscence were managed conservatively and settled in followup; of those patients 6 patients had anastomotic leak in post-operative ward itself, those were managed as inpatients conservatively.^[12]

Leak stopped and discharged after that; 2 patients developed pneumonitis and treated medically; 1 died in post-operative period itself.

According to above observations, immediate post-operative mortality was 2%.

Followup periods of (41) patients were variable. During followup visits patients were subjected to investigations to find out any recurrence and any evidence of metastases. Those patients were referred for radiotherapy department in our hospital for further management.

Since the study period was 1 year 10 months, survival rate could not be calculated with these above data.

Statistical Analysis

	SCC	Adeno. CA	Marginal Row Total
Smokers	16 (21.48) (1.4)	11 (5.52) (5.43)	27
Non-Smokers	54 (48.52) (0.62)	7 (12.48) (2.4)	61
Total	70	18	88

Chi-square statistics is 9.8517

"p" value is 0.001697.

This result is significant at $p < 0.05$

	SCC	Adeno	Total
Alcohol	16	8	24
Non-Alcohol Users	54	10	64
	70	18	88

Chi-square statistics is 3.364.

"p" value is 0.0495, significant at < 0.05

Site of Carcinoma	Curative Surgery	FJ	Total
Middle 1/3	28	24	52
Lower 1/3	13	23	36
Total	41	47	88

The Chi-square statistic is 2.6889. The "p" value is 0.10 > 0.05.

It is not significant.

	SCC	Adeno. CA	Total
Curative Surgery	34	7	41
FJ	36	11	47
	70	18	88

Chi-square statistic is 0.5394.

"p" value of 0.46 > 0.05, not significant.

DISCUSSION

Epidemiology, Sex and Age Incidence

The epidemiological characteristics of oesophageal carcinoma are unusual, since the incidence in different geographic areas is extremely variable with the greatest differences recorded for all tumours. The incidence of oesophageal carcinoma varies from 8.1% recorded at Chennai registry to 4.6% in Delhi. The incidence as per the surveillance made by the National Cancer Registry Project (NCRP) quotes an incidence of 8.6% at Bangalore and 6.8% at Mumbai. The incidence of carcinoma oesophagus in our Institution is 5.2%.

As per the study, the rise in oesophageal cancer commences in the thirties and peaks in the 6th decade. Studies conducted both in India and abroad show peak incidence in the 7th and 8th decades.

Aetiology and Risk Factors

All the patients in our study, who presented with oesophageal carcinoma were of the lower socioeconomic group. Day and Munoz 1982 and Scottenfeld 1984, and several other series have shown an association between oesophageal cancers and low socioeconomic status.

Low levels of retinol, riboflavin, ascorbic acid and alpha tocopherol are prevalent in population of Linxian, China where oesophageal cancer is epidemic. In Japan, poor food variety has been identified as a risk factor and combination of fruits and vegetables and sand fresh meat appear to be risk reducing factors.

De Carli et al 1989 has stated that low intake of fruits, particularly citrus fruits has much of vitamin C associated with increased risk deficiency of Zinc and Molybdenum, also cited as possible aetiological factors.

Francheschi et al 1990 discovered that deficiencies are believed to make one more susceptible to the carcinogenic effects of exogenous factors.

From the data given in our study, there is strong association between the use of tobacco in both of its forms of usage (Chewing and Smoking).

The most important risk factors for cancer oesophagus in developed countries are cigarette smoking (IARC 1986) alcohol consumption (IARC 1988). The association between cigarette smoking and alcohol consumption and oesophageal cancer is difficult to separate, largely because of the correlation in the two exposures and their mutual association with the risk of cancer oesophagus.

The risk of oesophageal cancer has shown to be increased among non-tobacco smokers who consume alcohol and non-drinkers of alcohol who smoke tobacco, (La Vecchia and Negri 1989).

The role of alcohol consumption was not clearly demonstrated in the French Department of Ille-et-Vilaine, where the risk rose steadily with the amount of alcohol consumed (Tuyns et al 1977).

The risks associated with tobacco use appears to increase with the number of cigarettes smoked per day, duration of smoking and tar content (Tuyns et al 1979; Rossi et al 1982; Yu et al 1988).

The synergistic effect for the combined habit of alcohol drinking and tobacco smoking or chewing has also been reported.

Morphological Type and Location

The prominent histological type noted in our hospital is squamous cell carcinoma (80%).

In Europe and America, adenocarcinoma is more prevalent.

Stiger et al 1987, stated that primary adenocarcinoma represent 3 - 8% of the oesophageal cancer. Observations made in our study also show a rise in the incidence of adenocarcinoma (20%).

Oesophageal cancer is usually located in the middle third in about 50%, and in upper and lower third oesophagus contributes only less (Giuli and Gignoux 1980).

In our study, we found same result as that of Giuli and Gignoux 1980 the Middle third carcinoma is contributing about 48%. Lower third and upto OGJ were about 31%. Carcinoma in Upper third was 21%.

Surgical Approach

Transhiatal oesophagectomy without thoracotomy (Orringer et al 1993) has been performed by an increasing number of authors in recent years. It is performed by isolating the mediastinal oesophagus through a cervicotomy and laparotomy (Orringer et al 1984, 1987). We at KAPV Govt. Medical College and MGM GH, Trichy, have adopted this technique in the selected patients for so many years.

In the recent time, we adopted Thoracoscopic oesophagectomy^[13] and the operative morbidity and mortality is less with this technique. All 3 cases who had undergone thoracoscopic oesophagectomy had less post-operative morbidity and mortality.

Akiyama et al 1978 stated that stomach is the viscus of choice to replace the oesophagus resected for cancer. It is isolated, tubulised before transposition. According to this statement, stomach tubulisation allows removal of the lymph nodes located in the gastric vessels, a possible metastasis station, improves the gastric vascularisation and avoids mediastinal encumbrance, which is possible when the whole stomach is transposed.

Interpositioning of colonic segment and the transposition of a Roux-en-Y loop of jejunum was done on one case of lower oesophageal cancer.

In our Institution, oesophagogastric anastomosis was done by hand-sewn technique.

Wong et al 1987, identified that the main post-operative complication is the anastomotic leakage. The anastomotic leakage rate in our cases is well within our acceptable range. It was about 14%.

Result of Surgical Resection

Contrasting data regarding the respectability rates and the long-term survival rates are reported in literature, that is because of varying criterias for the selection of patients for different types of treatment and biological behaviour of the disease.

Observations in our study, the mortality rate was about 2.0%.

Studies	Percentage
Katariya et al	6.7%
Moon et al	7.3%
Michigan University	7.2%
Goldminc et al	6.4%
Bolton et al	5.9%
Schakelfordt et al	5.7%
Orringer et al	4.0%
Our Study	2.0%

Table 11. Post-Operative Mortality

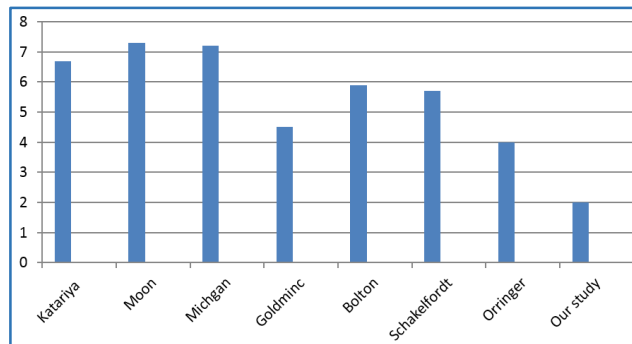


Figure 1

Anastomotic leak observed in our study was about 14%. All were managed conservatively.

Studies	Anastomotic Leak
Katariya et al	15%
Goldminc et al	14%
Michigan University	12.0%
Schekelfordt et al	13.5%
Orringer et al	7.9%
Our Study	14%

Table 12

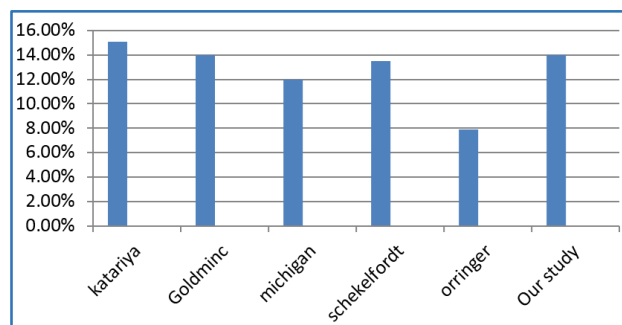


Figure 2

One year survival rate according to our study was 25%. Since the study period was very less, we were unable to calculate the 5-year survival rate.

CONCLUSION

- Carcinoma oesophagus is one among the cancers that have increased male: female ratio.
- More commonly occurring in low socioeconomic groups.
- The predominant histology is squamous cell variety.
- There is significant rise of adenocarcinoma.
- A strong association coexists between carcinoma oesophagus with smoking and alcoholism.
- Transhiatal oesophagectomy and thoracoscopic oesophagectomy scores significant role in surgical management of lower 1/3 and middle 1/3 carcinomas.
- Around 50% of the patients when diagnosed were in inoperable stage.
- Inoperability is due to biological nature of the disease, in which feeding jejunostomy and followup RT is the treatment option.
- Significant 1-year survival rate can be achieved by transhiatal as well as thoracoscopic oesophagectomy.

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REFERENCES

- [1] Zhang Y. Epidemiology of esophageal cancer. *World J Gastroenterol* 2013;19(34):5598-606.
- [2] Napier KJ, Scheerer M, Misra S. Esophageal cancer: a review of epidemiology, pathogenesis, staging work up and treatment modalities. *World Journal of Gastrointest Oncology* 2014;6(5):112-20.
- [3] Polenak AP. Secular trend in U.S. black-white disparities in selected alcohol related cancer incidence rates. *Alcohol Alcohol* 2007;42(2):125-30.
- [4] Enzinger PC, Mayer RJ. Oesophageal cancer. *N Engl J Med* 2003;349(23):2241-52.
- [5] Polenak AP. Trend in survival of both histological types of esophageal cancer in US surveillance, epidemiology and end result areas. *Int J Cancer* 2003;105(1):98-100.
- [6] Pennathur A, Gibson MK, Jobe BA, et al. Oesophageal carcinoma. *Lancet* 2013;381(9864):400-12.
- [7] Kumbasar B. Carcinoma of esophagus: radiologic diagnosis and staging. *Euro J Radiol* 2002;42(3):170-80.
- [8] Safranek PM, Cubitt J, Booth MI, et al. Review of open and minimal access approaches to esophagectomy for cancer. *Br J Surgery* 2010;97(12):1845-53.
- [9] Orringer MB, Sloan H. Esophagectomy without thoracotomy. *J Thoracic Cardiovasc Surg* 1978;76(5):643-54.
- [10] Yammamoto S, Kawahara K, MacKawa T, et al. Minimally invasive esophagectomy for stage 1 and stage 2 esophageal cancer. *Ann Thoracic Surg* 2005;80(6):2070-5.
- [11] Jabbour SK, Thomas CR. Radiation therapy in postoperative management of esophageal cancer. *J Gastrointestinal Oncology* 2010;1(2):102-111.
- [12] Orringer MB, Marshall B, Lannettoni MD. Eliminating the cervical esophagogastric anastomotic leak with a side-to-side stapled anastomosis. *J Thoracic Cardiovasc Surg* 2000;119(2):277-88.
- [13] Luketich JD, Alvelo-Rivera M, Bueneventura PO, et al. Minimally invasive esophagectomy: outcome with 222 patients. *Ann Surg* 2003;238(4):486-95.