

Clinico-Epidemiological Profile of Cancer Esophagus among South Indian Population

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Abstract

Background: Cancer of esophagus is one of the common cancers in the whole world. Recent estimates have placed cancers of the esophagus in the 5th place among males and 7th place among females. Studies had shown that bidi smoking, paan chewing, alcohol and nutritional habits like spicy foods & mal-nourishment are strongly associated with cancer esophagus. *Aim:* To assess the clinical and epidemiological profile of the patients with carcinoma of esophagus and to study their various treatment modalities and the prognosis over a period of one year for the patients with carcinoma esophagus. *Methodology:* A prospective longitudinal study was conducted at Kidwai Memorial Institute of Oncology from Jan 2012 to June 2012, a regional cancer center in South India. A total of 356 confirmed cases of carcinoma esophagus were included in the study. For assessing the association of risk factors equal number of age and sex matched controls were selected, from the attenders and relatives of the patients. For all the patients endoscopy was done to assess the exact site of location of cancer of esophagus and a small sample of the cancer site was taken and sent for histopathological examination to identify the pathological type of cancer esophagus. All the patients were followed for a period of one year for assessing the prognosis of the disease. *Results:* Among the various factors smoking, alcohol, non vegetarian diet, high intake of spicy foods and oily foods and high amount of coffee consumption had shown a strong association for the incidence of esophageal cancer as their odds ratio were more than one. More than 50% of the study subjects had the cancerous lesion in the middle one third of the esophagus and the most common type of cancer was squamous cell carcinoma. The overall survival with a fair to good prognosis with effective treatment at the end of one year was found to be 20%. *Conclusion:* Early diagnosis is a key element in the management of cancers, which would have a direct impact in the prognosis of cancers. So, timely intervention on the dietary and lifestyle habits in addition to the improvement in the economic status may address the problem to a considerable extent.

Keywords: Esophageal Cancer; Risk Factors; Squamous Cell Carcinoma; Prognosis.

Introduction

The word cancer was coined by Hippocrates. It is not a single disease but a group of various forms of

diseases having an individual set of symptoms and signs and high morbidity and mortality [1]. Cancer is currently the cause of 12% of all deaths worldwide, in approximately 20 years time the number of cancer deaths annually will increase from 6 million to 10

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million [2]. Cancer of esophagus is one of the common cancers in the whole world. Recent estimates have placed cancers of the esophagus in the 5th place among males and 7th place among females. In India the incidence of cancer esophagus is about 8.2/100000. In Bangalore cancer esophagus is 3rd most common cancer in males & the 4th most common in females [13].

Etiological factors studied indicated that bidi smoking, paan chewing, alcohol, & nutritional habits like spicy foods & mal-nourishment are strongly associated with cancer esophagus. About 15% of esophageal cancer can be linked to a diet poor in fruits and vegetables [4]. Commonly used fresh and sun-dried vegetables and chilies also have a high content of nitrates and nitrogen ions and may be associated with higher rate of esophageal cancer [5]. A study done in Coimbatore on risk factors of cancer esophagus revealed that risk was 3.5 times higher with alcohol consumption, 2.5 times higher for tobacco users, 2.8 times higher for betel nut chewers and smokers [6]. This calls for an extensive researches, studies, epidemiological investigations on esophageal cancer to know its etiological factors, distribution, mortality, morbidity and treatment.

Based on the site of distribution of the esophageal cancer, 50% of the esophageal cancers are located in the middle third, 30% in the lower third and 15% in the upper third of the esophagus [7]. Based on the histopathological manifestations 90% of the cancers are squamous type carcinoma, and 10% adenocarcinoma, a few reports had also shown the incidence of adenocarcinoma was 20% [8]. However the precursors of adenocarcinoma such as reflux esophagitis and barretsesophagus are very common in India. Studies had shown that at initial presentation 57% of cancers are localised, 14% have contiguous extension, and 14% reveal metastasis. Approximately 19% of patients with head and neck cancers have metachronous cancer in the esophagus [9,10].

There has been increasing interest in the role of human papilloma virus infection in the causation of cancer esophagus, recent prospective studies had proven this. Esophagitis is the earliest event in the proposed carcinogenesis model. Chronic esophagitis and inflammation is the most frequent lesion found in 80% of the high risk population. In these population it is prevalent in younger age group and is seen multifocally in middle and lower esophagus. The role of chronic esophagitis as a precursor of cancer in nonendemic population remains speculative [11].

As of now only few studies had been done in India to assess the etiological factors, site of occurrence and treatment options for esophageal cancer and so the current study was undertaken.

Aim

1. To assess the clinical and epidemiological profile of the patients with carcinoma of esophagus.
2. To study the various treatment modalities and their prognosis over a period of one year for the patients with carcinoma esophagus.

Methodology

A prospective longitudinal study was conducted at Kidwai Memorial Institute Of Oncology from Jan 2012 to June 2012, a regional cancer center in South India. All cases of cancer referred from various South Indian states like, Andhra Pradesh, Tamil Nadu and Kerala to Kidwai Memorial Institute of Oncology were registered in the institute. Cases which were confirmed or suspected as cancer esophagus are included in the study. The other cases were excluded from the study. The suspected cases were subjected for further investigation and the confirmed cases-were reinvestigated in the institute according to necessity. All efforts were made to collect reliable information in this study by establishing a good rapport with the patients and their attenders. A total of 356 confirmed cases of carcinoma esophagus were included in the study. Demographical and risk factor data were collected using a short structured questionnaire, including information on age, gender, educational level, socio-economic status, family history of esophageal cancer (first-degree relatives), clinic pathological symptoms and dietary habits. Habits related to smoking and alcohol was also assessed. Frequency (daily, weekly, monthly and annually) and portion size of consumption were asked for each food item. Amounts of dietary nutrients per day were calculated by multiplying the frequency of consumption of each food by the nutrient content of the indicated portion size. For assessing the association of risk factors equal number of age and sex matched controls were selected, from the attenders and relatives of the patients. For all the patients endoscopy was done to assess the exact site of location of cancer of esophagus and a small sample of the cancer site was taken and sent for histopathological examination to identify the pathological type of cancer esophagus. Based on the type of cancer, intervention in the form of surgery,

chemotherapy or radiotherapy was assigned for the patients. All the patients were followed for a period of one year for assessing the prognosis of the disease.

Results

The age wise distribution of the study population shows that majority of them were in the age group of more than 55 years and the male : female ratio was 1.19:1 and the mean age among males was 57 and for females it was 52 years (Table 1). 89.6% of males had a positive history of smoking whereas among females it was only 4% (Table 2) and the duration of smoking habits was more than 20 years for majority of the male

population. Tobacco chewing habits was more common among females than males (Table 3). Among male subjects 40.2% of them had a positive history of consuming alcohol and in females it was only 3% (Table 4) and the average duration of consuming alcohol was more than 15 years with a mean quantity of 180 ml/day. Among the dietary pattern majority of the study population were used to take non vegetarian diet, high spicy food and oily foods and 83% of them used to take 5 times coffee per day (Table 5). Among the various factors smoking, alcohol, non vegetarian diet, high intake of spicy foods and oily foods and high amount of coffee consumption had shown a strong association for the incidence of esophageal cancer as their odds ratio were more than one (Table 6). The odds ratio was calculated by taking age

Table 1: Age and sex wise distribution of the study population

Age - group In years	Males		Females		Total	
	Frequency	%	Frequency	%	Frequency	%
25-34	6	1.6	0	0.0	006	01.62
35-44	16	4.4	29	8.1	045	12.62
45-54	34	9.5	45	12.6	079	22.27
55-64	55	15.4	43	12.0	098	27.54
65 & above	83	23.3	45	12.6	128	35.95
Total	194	54.4	162	45.6	356	100

Chi 21.33, df-4, P=<0.05.

Table 2: Age and sex wise distribution of the study population based on their smoking habits

Age group	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
25-34	5	2.74	0	0	5	2.76
35-44	15	8.24	1	0.54	16	8.80
45-54	32	17.58	1	0.54	33	18.15
55-64	48	26.37	2	1.09	50	27.50
65>	74	40.65	4	2.19	78	42.86
Total	174	95.58	8	4.42	182	100

Chi-.63, DF-4, P= 0.006 (<0.05)

Table 3: Distribution of the study subjects based on different type of tobacco chewing habits

Chewing Habits	Males		Females		Total	
	Frequency	%	Frequency	%	Frequency	%
Paan or Betelnut or tobacco	1	0.8	2	1.6	3	2.47
Paan + Betelnut	2	1.6	3	2.4	5	4.13
Paan+Betel+Lime	9	7.4	34	28.0	43	35.50
Paan+Betel+Lime+Tobacco	13	10.7	57	47.1	70	57.85
Total	25	20.6	96	79.3	121	100

Table 4: Age and sex wise distribution of the study subjects based on their habit of consuming alcohol.

Age	Males		Females		Total	
	Frequency	%	Frequency	%	Frequency	%
25-34	3	3.60	0	0	3	3.60
35-44	12	14.45	2	2.4	14	16.86
45-54	26	31.32	1	1.2	27	32.50
55-64	20	24.00	0	0	20	24.00
65&>	17	20.48	2	2.4	19	22.89
Total	78	93.90	5	6.0	83	100

Chi-square value = 59.8 DF = 4 P<.005

Table 5: Age and sex wise distribution of the study subjects based on their dietary habits

Diet type	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Vegetarian	36	10.1	60	16.8	96	26.9
Non-vegetarian	158	44.3	102	28.6	260	73.1
Spices	192	53.9	159	44.6	351	98.5
Oils and fats	189	53.0	160	44.9	348	97.7
Vitamins	2	0.56	0	0	2	0.56
Coffee	163	45.7	132	37.0	295	82.8
Tea	36	10.1	32	8.90	68	19.1

Table 6: Risk factor assessment for the development for esophageal cancer among the study subjects

Risk Factor	Odds Ratio	95% CI
Smoking	4.33	3.56 - 5.02
Tobacco chewing	3.98	2.67 - 4.79
Alcohol	4.27	3.17 - 5.28
Non - vegetarian diet	2.89	2.08 - 3.92
Regular intake of spicy foods	2.32	1.21 - 3.08
Regular intake of oily foods	2.19	1.32 - 3.27
High intake of coffee	1.88	0.98 - 2.12

Table 7: Distribution of the study subjects based on the nature of the presenting complaint

Nature of complaint	Males		Females		Total	
	Frequency	%	Frequency	%	Frequency	%
Chest pain	139	39.0	123	34.5	262	74.0 %
Loss of weight	119	33.4	103	28.9	224	62.9 %
Pain abdomen	62	17.4	38	10.6	97	27.2 %
Dyshagia	159	44.6	100	28.0	259	72.7 %

Table 8: Distribution of the study subjects based on the endoscopy and histopathological findings to identify the site and type of esophageal cancer

Endoscopy finding	Male		Female		Total		
	Frequency	%	Frequency	%	Frequency	%	
HPE findings	Upper third	36	18.5	25	15.4	61	17.1
	Middle third	88	45.3	94	58	182	51.1
	Lower third	42	21.6	23	14.1	65	18.2
	Squamous cell carcinoma	142	73.1	124	76.5	266	74.7
	Adenocarcinoma	24	12.3	8	4.9	32	8.9
	Poorly differentiated	5	2.5	2	1.2	7	1.9
	Non-squamous cell carcinoma	1	0.5	0	0	1	0.2
	Metastasis	2	1.03	0	0	2	0.5
	Others	20	10.3	28	17.2	48	13.4

and sex matched controls for assessing the association of the risk factor towards the disease. The controls were selected from the relatives and attenders of the patients. Most of the study subjects presented with dysphagia as a chief presenting complaint, followed by chest pain, loss of weight and abdominal pain (Table 7). The endoscopy findings had revealed that the middle one third was the most common site of incidence of esophageal cancer, as more than 50% of the study subjects had the cancerous lesion in the middle one third of the esophagus followed by lower one third and upper one third. Among the

histopathological reports squamous cell carcinoma was reported in 75% of study subjects followed by adenocarcinoma(8.9%) (Table 8). All type of interventions were applied to the patients based on their histopathological reports and the clinical findings. Radiotherapy was given for majority of the patients (64.3%) and only 14 patients received chemotherapy (Table 9). The prognosis was assessed at the end of 1 year and it was seen that, for 22% of the population the patient had shown improvement both in the symptoms and their histopathological grading, 17% of the study subjects had lost follow up

Table 9: Distribution of the study subjects based on the type of intervention for esophageal cancer

Intervention given	Males	%	Females	%	Total	%
Radiotherapy	120	33.7	109	30.6	229	64.30
Surgery	31	8.7	27	7.5	58	16.20
Chemotherapy	13	3.6	7	1.9	20	5.61
Symptomatic	35	9.8	14	3.9	49	13.70

Table 10: Prognosis of the study subjects based on the type of intervention given

Type of intervention (frequency)	Patients doing well at the end of 1 year (%)	Disease advanced at the end of 1 year (%)	Patients lost for follow up (%)	Died (%)
Radiotherapy (160)	39 (24.3)	28 (17.5)	41 (25.6)	1 (0.6)
Surgery (23)	12 (52.1)	6 (26)	5 (21.7)	0
Chemotherapy (6)	0	5 (83.3%)	1 (16.7%)	0
Surgery and radiotherapy (28)	11 (39.2)	9 (32.1)	8 (28.5)	0
Radiotherapy and chemotherapy (23)	12 (52.1)	8 (34.7)	3 (13)	0
Surgery and chemotherapy (3)	2 (66.6)	1 (33.3)	0	0
Surgery, chemotherapy and radiotherapy (3)	2 (66.6)	0	1 (33.3)	0

and one patient died and for 16% of the study subjects the disease had progressed to next stage (Table 10).

Discussions

The present study had shown the mean age of the patients with esophageal cancer ranged between 50 – 55 years and a similar type of results was also quoted by Bathijaetal [12] and Chitra etal [6]. A better understanding of the etiology of esophageal cancer is likely to provide opportunities for primary protection, as it has an extremely poor prognosis and little prospect of improvement in early detection or treatment. Based on our observations, it is apparent that smoking, alcohol consumption, oily and spicy foods are risk factors in our study subjects. The results are consistent with the earlier findings where various habits like smoking and consuming alcohol, predispose the subjects to carcinoma. Nutrition deficiencies may contribute to high incidence of esophageal cancer by enhancing susceptibility to the effects of other environmental or genetic risk factors, for example, by altering metabolism of carcinogens or by impairing DNA repair [13]. On the contrary, consumption of fruits and vegetables on regular basis shows a protective effect, which may be explained by the presence of vitamins and carotene having antioxidant effects [14]. A significant inverse association between fruit and vegetable intake and the risk of carcinoma esophagus has been reported in several studies [15]. This protective effect has been attributed to the presence of beta-carotene and

vitamins C and E in them [16].

Moderate to heavy smokers face an increased risk of both SCC and adenocarcinoma of the esophagus. Research suggests that when a smoker ingests tobacco condensates, it causes tobacco carcinogens, particularly nitrosamines, to come in contact with the esophageal mucosa. There is a direct correlation between the number of cigarettes a smoker smokes per day; the length of time the smoker spends smoking, and the risk of esophageal cancer [17]. Our study also proves that smoking is a major risk factor for esophageal cancer.

Ample evidences had shown that chewing habit of tobacco at a younger age, intake of high doses more frequently during the day and for longer periods of time, predispose a person to a greater risk of cancer.¹⁴ Similar findings have also been reported from different places in India [18] and in our study also it has been emphasised. Majority of our patients belong to a lower socio-economic group like grade IV workers where most of them were coolie by occupation. So, these patients are more prone for vitamin deficiencies which is a predisposing factor for esophageal carcinoma [19].

The incidence of squamous cell carcinoma of the esophagus has been found to dramatically increase in the presence of any factor that causes chronic irritation and inflammation, such as excessive alcohol intake, especially in combination with smoking [20,21]. In the present study also we found squamous cell carcinoma as the most common cancer. Chronic esophageal irritation also occurs when food is

retained and decomposed by bacteria, releasing various chemical irritants. Literatures had quoted that frequent consumption of hot beverages increases the incidence of SCC and in our study it had been proven as many people had the habit of consuming hot coffee frequently [22].

Ansari et al, from North India had shown that 80% of oesophageal neoplasm were of the squamous type [23]. Mehrotra et al [24], reported that the middle third of the oesophagus was the most common site of oesophageal cancer in India and more than 95% of neoplasms were of the SCC type and another study from Mumbai had quoted that 50% of oesophageal cancers were located in the middle third, 30% in the lower third and 15% in the upper third of the oesophagus and in that 90% of them were squamous cell type and only 10% were adenocarcinomas [25]. These reports were almost in par with the present study where we found the most common site of cancer was in the middle one third of esophagus and the most common type was squamous cell carcinoma.

Although the overall outlook for patients diagnosed with esophageal cancer has improved in the past 30 years, most patients still present with advanced disease, and their survival remains poor. Studies had quoted that one-third to one-half of patients treated with either chemoradiation therapy or chemoradiation therapy plus surgery are alive at 2 years, without recurrence of esophageal cancer [26]. In our study the prognosis was assessed at the end of one year of treatment with either radiotherapy, chemotherapy, surgery or combination of two or three modes of treatment, and we found that 20 percent of the population had shown some minimal improvement in the symptoms and histopathological grading, and one of the limitation in our study is we did not analyse the five year survival rate in these patients which would exactly show the prognosis of these cancers. The major strength of the present study was we had involved a large sample of study subjects and a limitation of this study was we had not assessed the genetic factors involved in cancer esophagus.

Conclusion

The major risk factors for esophageal cancer were smoking, alcohol consumption, regular non-vegetarian diet, diet pattern with increased usage of spicy foods and oily foods. The most common site of esophageal cancer was middle one third and the most common type was squamous cell carcinoma. The overall survival with a fair to good prognosis with effective treatment at the end of one year was found to be 20%.

Early diagnosis is a key element in the management of cancers, which would have a direct impact in the prognosis of cancers. So, timely intervention on the dietary and lifestyle habits in addition to the improvement in the economic status may address the problem to a considerable extent. Further studies are needed to find a correlation between various possible etiological factors and the occurrence of these cancers.

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