

Retrospective Study of Sociodemographic, Endoscopic, and Histopathologic Features of Esophageal Cancer at a Tertiary Care Hospital of Himachal Pradesh, India

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Abstract

Background: Esophageal Cancer (EC) is one of the least responsive tumors to cancer therapy with overall poor prognosis. Published data from different regions in India have indicated their observations on the local risk factors. Presently, as there seems little prospect of early detection and effective management of this cancer, understanding the etiology of EC may suggest opportunities for its primary prevention.

Material & Methods: A retrospective hospital record-based study was carried out for the period of five years (2014-2019) in Department of Gastroenterology of Indira Gandhi Medical College Shimla- a tertiary care hospital located in Sub – Himalyan ranges of North India in Himachal Pradesh.

Results: A total of 363 patients were diagnosed to have EC, 58.68% were male and 41.32% were female with male to female ratio of 1.42:1. Most patients come from rural areas (82.09%) and belonged to low socioeconomic status (38.01%). Most patients were illiterate (41.87%) and were involved in farming works (52.06%). Majority (76.03%) had a history of smoking bidi followed by alcohol consumption (29.20%). The most common primary location of the malignancy was middle third of the esophagus in 44.63% followed by lower third 35.54% and upper third 19.83%. Squamous cell histology was identified in 70.24% patients, while 29.75% patients had adenocarcinoma.

Conclusion: EC is one of the important cancers in northern Indian state of Himachal Pradesh. Squamous cell carcinoma is the most common type followed by adenocarcinoma. The most common primary location of the malignancy was middle third of the esophagus followed by lower and upper third. The major risk factors associated with EC included tobacco and alcohol consumption besides low socioeconomic status, illiteracy, rural background and occupation of farming.

Keywords: Esophageal cancer, human development index, adenocarcinoma, squamous cell carcinoma, World Health Organization

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Introduction

Esophageal cancer (EC) is the seventh most common cancer worldwide, with crude standardized rate 7.5 per 100000 and age standardized rate 6.3 per 100000 in 2018.^[1] About 80% cases of EC worldwide occur in less developed regions. In India, it is the fourth most common cause of cancer related deaths. Much regional variation exists in the incidence and pathology of esophageal cancer. It has been reported that in countries with higher human development index (HDI), there is a higher incidence of adenocarcinoma (AC) of the esophagus.^[2] For example, in the US, the incidence of AC of the esophagus has increased by over 400% over the past 25 years.^[3] In contrast, in countries with low HDI, like India, there is a higher incidence of esophageal squamous cell carcinoma (SCC). Currently, SCC is the most common type of esophageal cancer in the Indian subcontinent and the most common location is the distal third of the esophagus.^[4] Approximately, 47,000 new cases of EC are reported each year and the reported deaths reach up to 42,000 each year in India.^[5]

In North America and Western Europe, alcohol and tobacco use are the major risk factors for squamous cell carcinoma (SCC), accounting for 80–90% of cases.^[6] Diets of scant amounts of fruits, vegetables, and animal products are associated with increases in SCC.^[7] Other risk factors associated with EC include Plummer-Vinson syndrome (a condition characterized by iron-deficiency anemia and low riboflavin levels), achalasia, and tylosis.^[8] In India, EC is being reported in increasing numbers from Assam, Kashmir, Tamil Nadu, Karnataka, and Kerala.^[9] Understanding the etiology of esophageal cancer could inform interventions for primary prevention of this disease. Published data from different regions in India have indicated their observations on the local risk factors. For example, in the northern state of Kashmir, smoking (hookahs), snuff, sundried spices and vegetables, hot salted tea with baking soda, and red chilies have been implicated as risk factors.^[10] Another publication from Ludhiana, Punjab, looked at the risk factors of esophageal SCC in women (who generally neither smoke nor consume alcohol). Poor nourishment and consumption of hot beverages were found to be linked to SCC carcinogenesis in this study.^[11] The risk factors for adenocarcinoma esophagus include smoking, alcohol, obesity, chronic gastroesophageal reflux disease, and the presence of Barrett's esophagus. Since the prognosis in esophageal carcinoma is extremely poor and as there seems to be little prospect for early detection or treatment, a better

understanding of the etiology/risk factors may suggest opportunity for its primary prevention. Hence, the objective of the present study was to find out the socio-demographic determinants, endoscopic location and histology of patients with esophageal cancer who visited the department of Gastroenterology in a tertiary care teaching hospital of the state of Himachal Pradesh in Northern India.

Materials and Methods

This is a retrospective hospital record-based study carried out in Department of Gastroenterology of Indira Gandhi Medical College Shimla- a tertiary care hospital located in Sub-Himalayan ranges of North India. A retrospective analysis of the medical, endoscopic and histopathological records of the patients diagnosed to have esophageal cancer was performed. Thus, the data is derived from a hospital-based registry. Being a retrospective study, no ethical approval was required for the study as all the patients were diagnosed and treated with the standard departmental protocol. For extracting the data, the computerized data, hard copies of the files, and also the radiotherapy files of the patients were reviewed.

Data were collected for the year January 2014 to December 2019 (i.e., 5 years). A total of 363 patients were diagnosed to have EC. The sociodemographic parameters including age, gender, locality, socioeconomic status, occupation, and the addiction patterns of the patients were studied. Socio-economic status was assessed by the modified BG Prasad classification.^[12] The site of the disease based on endoscopic examination and the histology were also recorded. Non-smokers were defined as having smoked fewer than 100 cigarettes in their lifetime or less than one cigarette per day for 6 months or more. All others were counted as smokers for the purpose of recording in the history sheet. To assess alcohol consumption, subjects were asked about their usual intake of beer, wine, and liquor from the age at which they started drinking at least one alcoholic beverage per month. A never drinker was defined as having consumed less than one drink per month. All the recorded data was entered in Windows Excel sheet and imported to the statistical software to perform the calculations. Statistical calculations were performed using Statistical Package for Social Sciences (SPSS) for windows version 20.0 (IBM Corp., Armonk, USA).

Results

A total of 363 patients were diagnosed to have esophageal cancer, 213 (58.68%) were male and 150

(41.32%) were female with male to female ratio of 1.42:1 (Table I). The mean age of the study population was 62.11 ± 12.06 , with minimum age of 23 years and maximum age of 90 years. Most of the patients comes from rural areas (82.09%) and belonged to the low socio-economic status. As per the modified BG Prasad classification, 38.01% of the patients belonged to lower class, followed by 25.89% upper lower class, 22.58% lower middle class, 12.39% upper middle class while only 1.10% was from upper class (Table I). Most of the patients were illiterate (41.87%) and were involved in farming works (52.06%). Smoking was identified as a risk factor in most of the patients, with bidi (76.03%) as the most commonly smoked form of the tobacco. Alcohol consumption was identified as a risk factor in 29.20% of the patients. Only 10.74% were classified as patients without any addiction. The most common primary location of the malignancy was middle third of the esophagus in 162 (44.63%) followed by lower third of the esophagus in 129 (35.54%) and upper third of esophagus in 72 (19.83%) (Image 1a,1b, Table I).

Squamous cell histology was identified in 255 (70.24%) patients, while 108 (29.75%) patients had adenocarcinoma. The histological types in descending order of frequency includes: moderately differentiated squamous cell carcinoma (36.09%), well differentiated squamous cell carcinoma (30.03%), well differen-

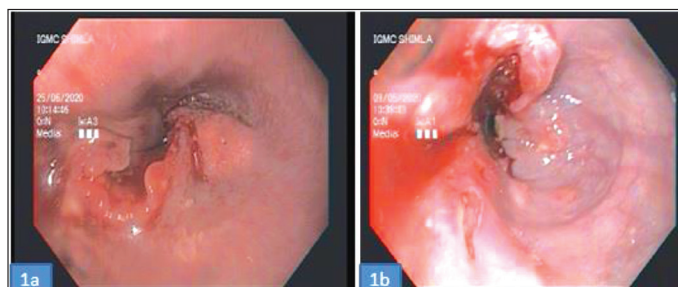


Image 1a: showing ulceroproiferative growth in middle third of esophagus.

Image 1b: showing ulceroproiferative growth in lower third of esophagus

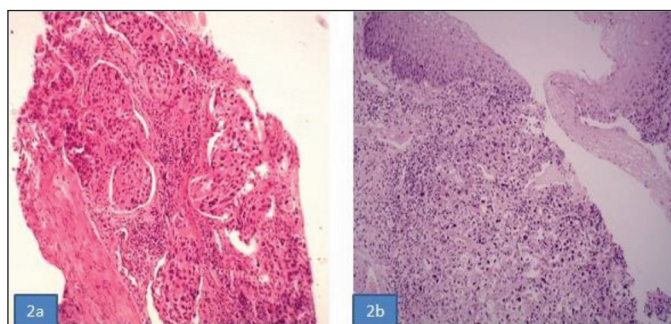


Image 2a: showing squamous cell carcinoma esophagus.

Image 2b: showing adenocarcinoma esophagus

Table I: Sociodemographic parameters and risk factors of the study patients

Sociodemographic determinant	Number	Percentage
Gender		
Male	213	58.68
Female	150	41.32
Locality		
Rural	298	82.09
Urban	65	17.90
Socioeconomic Status		
Upper	4	1.10
Upper Middle	45	12.39
Lower Middle	82	22.58
Upper Lower	94	25.89
Lower	138	38.01
Education		
Illiterate	152	41.87
Primary	102	28.09
Secondary	65	17.90
Graduate	44	12.12
Occupation		
Farmer	189	52.06
House Work	44	12.12
Self Employed	35	9.64
Labourer	66	18.18
Service	29	7.98
Risk Factor		
Habit	324	89.25
Bidi	276	76.03
Cigarette	52	14.32
Both Bidi and Cigarette	36	9.91
Hukka	28	7.71
Tobacco Chewing	33	9.09
Alcohol	106	29.20
No Habit	39	10.74
Site of Disease		
Upper Third Esophagus	72	19.83
Middle Third Esophagus	162	44.63
Lower Third Esophagus	129	35.54
Histology		
Squamous Cell – Well Differentiated	109	30.03
Squamous Cell – Moderately Differentiated	131	36.09
Squamous Cell – Poorly Differentiated	15	4.13
Adenocarcinoma - Well Differentiated	64	17.63
Adenocarcinoma -Moderately Differentiated	38	10.47
Adenocarcinoma-Poorly Differentiated	6	1.65

tiated adenocarcinoma (17.63%), moderately differentiated adenocarcinoma (10.47%), poorly differentiated squamous cell carcinoma (4.13%) and poorly differentiated adenocarcinoma (1.65%) (Image 2a,2b, Table I).

Discussion

Esophageal cancer is an upper digestive tract cancer, mainly prevalent in developing and underdeveloped countries. In the US, the mean age of EC patients at diagnosis is 68 years, while it was 62.1 years in our study.^[13] In a study by Kapoor A *et al.* from Northwest India the mean age was 54.6 years.^[14] In the present study, we observed a male preponderance with a male to female ratio of 1.4:1. Similar finding have been reported by Sankaranarayanan R *et al.*^[15] from south India with males to females ratio of 2:1. Another study from north India done by Sehgal S *et al.*^[10] also showed higher proportions of males than females with ratio of 2.1:1. A study from western India observed a ratio of 1.4:1.^[16] Similar sex distribution has been also reported by other authors.^[17]

In the present study, majority of (82.09%) cases were from rural background, as majority of the population in Himachal Pradesh resides in the rural area. The present hospital is one of the main referrals and tertiary care center of the state of Himachal Pradesh and caters to the health needs of whole of the state. Education level in the present study of the EC patients indicated that 41.87 % were illiterates and 38.01 % patients belonged to lower socio-economic status as per the modified BG Prasad scale. Similar findings were observed by Chitra S *et al.*^[18] in their study; majority 78% was illiterate and 93% patients belonged to lower socio-economic status. Sehgal S *et al.*^[10] in their study also revealed that the majority (63%) cases were illiterate and 59.5% were from lower socio-economic status. In a study by Kapoor A *et al.*^[14], 66.2% of the patients were illiterate and 48.6% belonged to the low socio-economic status while in a study by Giri PA *et al.*^[16], 30.91% were illiterates and 73.91% patients belonged to lower socio-economic status. Thus, our data are in agreement with already published literature.

In the present study, majority of (52.06%) cases of the EC are belonging to farmer category, this may stem from the fact that farming is the main source of income and employment in Himachal and about 90% of the population depends directly on agriculture. Another plausible explanation of this observation may be the use of organophosphorus pesticides in farming practices especially in apple orchards. However, exact comment on this etiology is not possible in the absence

of specifically designed studies investigating the level of organophosphates in the serum of these patients. In addition, alcohol and smoking (either cigarette, bidi, or both) is quite prevalent in our region, particularly among farmers and low socio-economic status. Smoking is an established risk factor for esophageal cancer. Western literature has reported alcohol and tobacco use to be the major risk factor for SCC, accounting for 80–90% of the cases.^[8] The relative risk of EC in relation to the amount of alcohol and tobacco consumed is 155:1 when consuming ≥ 30 g/day of tobacco with 121 g/day of alcohol.^[19] A meta-analysis showed that esophageal adenocarcinoma risk is 2.3 times higher in people with 40+ years of cigarette smoking, compared with never-smokers.^[20] Consumption of tobacco was observed to be highest in our study, in various forms like bidis (76.03%), cigarettes, hukkas, or tobacco chewing. Alcohol consumption was identified as a risk factor in 29.20% of the patients. These results are consistent with the earlier findings where various habits like smoking and consuming alcohol predispose the subjects to carcinoma. The present study also revealed the same.

In the present study, the most common primary location of the malignancy was middle third of the esophagus in 44.63% followed by lower third of the esophagus 35.54% and upper third of esophagus in 19.83%. Similar findings have been reported by Kapoor A *et al.*^[14] with 44% of the patients had malignancy of middle third of the esophagus, 29% had carcinoma of the lower third and 19.4% patients had carcinoma of upper third of the esophagus. In another study by Giri *et al.*^[16] the percentage of patients with upper, middle, and lower third cancer was 9.66, 40.57, and 49.76%, respectively.

In our study, Squamous cell histology was identified in 70.24% patients, while 29.75% patients had adenocarcinoma. Similar findings have been reported by Kapoor A *et al.*^[14] where 75.6% had squamous cell carcinoma, 18% patients had adenocarcinoma and 6.4% revealed undifferentiated carcinoma.

Limitations

A limitation of the study is the lack of availability of the dietary data of the patients, which could have helped in better understanding the role of the identified risk factors.

Conclusion

Esophageal carcinoma is one of the important cancers prevalent in northern Indian state of Himachal

Pradesh in the Western Himalayas. Squamous cell carcinoma is the most common type followed by adenocarcinoma. The most common primary location of the malignancy was middle third of the esophagus followed by lower third and upper third. The major risk factors associated with EC included modifiable risk factors like tobacco and alcohol consumption besides low socioeconomic status, illiteracy, rural background and occupation of farming. Modification of lifestyle with limiting the use of addictions may be an effective strategy in the prevention of this dreaded disease. The most feasible method to reduce esophageal cancer burden is to identify and target etiological factors, improve socio-economic status, and screen the high-risk group of people as well as generating awareness regarding modification of lifestyle.

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