International Surgery Journal
Dogra V et al. Int Surg J. 2022 Feb;9(2):345-349
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20220039

Original Research Article

A tertiary care prospective of epidemiology and etiopathogenesis of esophageal carcinoma from Northern India

Varun Dogra[1], Silvi Sandhu[2], Ishfaq Ahmad Gilkar[3]*, Umer Mushtaq[3], Shyam Gupta[3]

[1]Department of General Surgery, Jammu and Kashmir Health Services, Jammu, Jammu and Kashmir, India
[2]Department of Pathology, GMC Jammu, Jammu, Jammu and Kashmir, India
[3]Department of Surgery, GMC Srinagar, Jammu and Kashmir, India

Received: 29 December 2021
Revised: 04 January 2022
Accepted: 14 January 2022

***Correspondence:**
Dr. Ishfaq Ahamd Gilkar,
E-mail: drishfaqahmadgilkar@gmail.com

ABSTRACT

Background: Esophageal cancer is considered to be a one of the most lethal malignancy. Indian population have seen a lot of changes in the epidemiology of this deadly cancer. However very few studies have been done from northern India regarding the epidemiology and etiopathogenesis of this disease. Majority of esophageal cancers (about 90%) are either squamous cell or Adenocarcinoma. Any factor that causes chronic irritation and inflammation of the esophageal mucosa appears to increase the incidence of the esophageal. The aim of the study was to perform an epidemiological study and determine the various factors that are implicated in the pathogenesis of carcinoma esophagus.
Methods: This study was conducted in the department of general surgery, Government Medical College, Jammu, as an observational prospective study. It took into account the patients from 2015 to 2020. A total of 23 patients of carcinoma oesophagus who presented to Outdoor patient wing of department of surgery were included in the study. After detailed history, examination and investigations, the various variables were extracted and data was processed.
Results: In this study, the majority of people were from rural areas in their seventh decade of life with males: female ratio of 3:1. The majority of people complained of dysphagia and weight loss. The site of tumor was Gastroesophageal junction.
Conclusions: This study emphasised the need of health education in our population, especially in young adults to lessen the risk factors for carcinoma esophagus.

Keywords: Esophageal cancer, Alcohol, Smoking, Food habits

INTRODUCTION

Esophageal cancer is considered to be a one of the most lethal malignancy. Indian population have seen a lot of changes in the epidemiology of this deadly cancer. Many innovations and developments have taken in past few decades which have led to some significant improvement in prognosis.

Esophageal carcinoma shows a wide spectrum of epidemiological features in the world ranging from less than 5 cases per 1,00,000 population in western countries to more than 20 cases per 1,00,000 population in several eastern countries.

Of special mention is the 'esophageal cancer belt' where more than 100 cases per 100000 population can be seen. The various countries forming this belt are China, Japan, the Caspian littoral of Iran, the Transkey district of South Africa and central South Africa, the departments of Brittany and Normandy in northern France and some Muslim republics in what used to be the Union of Soviet Socialist Republics.[1]

In a nearby province of Kashmir, incidence of esophageal carcinoma amounts to 42.6/100,000 in men and 27.5/1,00,000 in women. However, no such studies have been done in jammu province of Jammu and Kashmir. Esophageal cancer stands at seventh, when it comes to mortality due to cancer in American men.[3] However, on a worldwide prospective, it stands as the sixth leading cause of death from cancer.[4]

Pathogenesis

Majority of esophageal Cancers (about 90%) are either squamous cell or adenocarcinoma followed by less common types such as melanomas, leiomyosarcomas, carcinoids and lymphomas.[5] Squamous cell carcinomas are evenly distributed between the middle and lower part, however adenocarcinomas are predominantly found in the lower esophagus.[5,6]

The pathogenesis of esophageal cancer is quite intricate and remains unclear. Data from studies in animals suggest that oxidative damage from factors such as smoking or gastroesophageal reflux, which cause inflammation, esophagitis, and increased cell turnover, may initiate the carcinogenic process.[7] Any factor that causes chronic irritation and inflammation of the esophageal mucosa appears to increase the incidence of squamous cell carcinoma of the esophagus. Such factors like Substantial alcohol intake, especially in combination with smoking, greatly increases the risk of squamous cell carcinoma (but not adenocarcinoma), and may account for more than 90% cases of squamous cell carcinoma in the developed world.[8,9]

Conditions such as achalasia and esophageal diverticuli also cause chronic esophageal irritation due to the various chemical irritants which are released as a result of decomposition of food by bacteria, releasing various chemical irritants.[10,11] Frequent consumption of extremely hot beverages have also been documented to have increased risk of squamous-cell carcinoma as a result of chronic thermal injury and irritation.[12,13] Persons with history of lye or other caustic fluids ingestion need to be carefully observed as they have increased risk of developing carcinoma esaophagus.[14]

Person with recurring symptoms of reflux have an eightfold increase in the risk of esophageal adenocarcinoma.[15] Various causes of gastroesophageal reflux disease such as hiatal hernia, esophageal ulcer, and frequent use of antacids or histamine-H_2 blockers are thus indirectly associated with an increased risk of adenocarcinoma esophagus.[16] Drugs that relax the gastroesphageal sphincter and increase reflux, such as anticholinergic agents, aminophyllines, and beta-blockers, may contribute to the development of up to 10 percent of these cancers.[17,18]

Once cancer develops, it may spread rapidly, 14 to 21 percent of submucosal cancers (T1 lesions) and 38 to 60 percent of cancers that invade muscle (T2 lesions) are associated with spread to lymph nodes.[6,19]

There has been a significant change in the histological pattern of this disease in past three decades. On one side, the rate of adenocarcinoma has increased while the incidence of squamous cell carcinomas has decreased in both the black population and the white population.[3,20] Trends in smoking and obesity as well as changes in nutrition and the use of medications may account for some of these changes. Currently, there are probably more new cases of adenocarcinoma than of squamous cell carcinoma in the United States and elsewhere.[21,22]

Aims and objectives

The aim of the study was to perform an epidemiological study and determine the various factors that are implicated in the pathogenesis of carcinoma esophagus.

METHODS

This study was conducted in the department of general surgery, Government Medical College, Jammu, as an observational prospective study. It took into account the patients from 2015 to 2020. A total of 23 patients were included in the study. These included 23 consecutive patients that came to Outdoor patient wing of department of surgery from 2015 to 2020. All the patients were over the age of 40 years.

A detailed history was sought from the patients and a comprehensive clinical examination done. Patients with prior history of gastric or esophageal malignancy were excluded from this study. Patients who were enrolled in the study were subjected to all baseline investigations such as complete blood count, hemogram, coagulogram, kidney and liver function tests, etc. Patients also underwent detailed imaging to access the extent of tumor which included computed tomography, magnetic resonance imaging etc. Patients were also subjected to a bisopsy which was in most cases via endoscopy. The samples were subjected to histpathological examination to access the nature of tumor. The data was tabulated and results expressed using IBM SPSS software.

RESULTS

This was a prospective observational study that was done in Government Medical College Jammu over an period of 5 years and consisted of 23 consecutive patients who were evaluated to have carcinoma esophagus. Study period was from January 2016 to December 2020.

Age and sex distribution

Majority of the patients were in their seventh decade of life. mean age of patient was 64.2±7.3 in years (Table 1). Also, about 2/3rd of the patients were male with males being about 69% and females being 31%.

Rural vs urban

In this prospective study, we found that majority of the patients enrolled in our study were from rural background where as a lot less patients were from the urban areas of our province. The details are mentioned in Table 2.

Presenting complaints

The major complaints in such patients were dysphagia, weight loss, heart burn, odynophagia, regurgitation and early satiety. Some patients also came with an incidental finding as they were being evaluated for some non-specific symptom. However nearly all the patients complained of dysphagia which was the single most important complaint (Table 3).

Risk factors

Various risk factors associated with carcinoma esophagus have been documented in literature. Important among them such as history of smoking, alcohol intake, intake of red meat, intake of hot beverages, history of reflux disease etc., were also noted in our study population. Smoking and intake of red meat were the most common risk factors seen in our population group followed by intake of hot beverages and intake of pickled bv vegetables (Table 4).

Site of tumor

Oesophageal tumors can occur at upper, middle or lower-oesophagus. Tumor can also grow at the gatro-esophageal junction. In this study we found maximum number of patients having carcinoma oesophagus at the gastro-oesophageal junction.

We also found patients having growth at more than one site in oesophagus. The details are given in the below mentioned Table 5.

Tumor histology

Out of 23 patients who were enrolled in the study, 21 patients got their biopsy done, while two of the patients didnt't gave consent for biopsy. Majority of the patients had squamous cell carcinoma, while a few had adeno carcinoma out of the 21 patients. No other type of carcinoma was seen in our study population.

Table 1: Age distribution (n=23).

Age group (years)	N	%
<40	0	0
41-50	03	13.04
51-60	07	30.43
61-70	11	47.82
>70	02	08.69
Total	23	100.0

Table 2: Urban verses rural (n=23).

Dwelling	N	%
Rural	15	65.21
Urban	8	34.78

Table 3: Presentation in patients (n=23).

Presenting complaints	N	%
Dysphagia	19	82.60
Weight loss	11	47.82
Heart burn	7	30.43
Odynophagia	3	13.04
Regurgitation	4	17.39
Early satiety	3	13.04
Non-specific	3	13.04

Table 4: Risk factors (n=23).

Risk factors	N	%
Smoking (bidi/hukka/cigarettes)	19	82.60
Intake of red meat	18	78.26
Dried and pickled vegetables	17	73.91
Intake of hot beverages	17	73.91
History of reflux	13	56.52
Intake of spicy food	13	56.52
Sun dried and smoked fish	12	52.17
Alcohol intake	11	47.82
Family history of carcinoma	1	4.34

Table 5: Site of tumor (n=23).

Locations	N	%
Upper oesophagus	02	08.69
Mid oesophagus	14	60.86
Distal oesophagus	12	52.17
Gastro oesophageal junction	16	69.56

Table 6: Tumor histology (n=23).

Tumor history	N	%
Squamous cell carcinoma	16	76.19
Adenocarcinoma	05	21.74
Other	0	0

DISCUSSION

This was a prospective observational study that was done in Government Medical College Jammu over a period of 5 years from January 2016 to December 2020.

In this study, we evaluated 23 patients suffering from Carcinoma oesophagus. There were no patients below 40 years of age. The youngest patient was a 48 years old female while the oldest patient was also a female who was 79 years old. It was seen that majority of the patients were

in their seventh decade of life and mean age of patient was 64.2±7.3 in years (Table 1). In a similar study by Ninh et al the mean age of study group was 64 years with SD of ±12.[23] Most of the patients were between 50 and 70 years with mean age between 62±8 years. Also majority of the study subjects in our study were male and male to female ratio was around 3:1. In a study by Chen et al found that the burden of oesophageal cancer remained high in China, especially for males in rural areas.[24] In this prospective study also, we found that majority of the patients enrolled in our study were from rural background where as a lot less patients were from the urban areas of our province.

On taking a detailed and thorough history, we found that the patients were having more than one symptom. The major complaints in such patients were dysphagia, weight loss, heart burn, odynophagia, regurgitation and early satiety. Some patients also came with an incidental finding as they were being evaluated for some non-specific symptom. However nearly all the patients complained of dysphagia which was the single most important complaint found in more than 80% of subjects. Significant weight loss was present in 11 patients (47.82%). Similar results have been reported by many studies in literature such as those by Gurkan et al, Steven et al, Chang et al.[25,26] They found that patients with oesophageal cancers most often complained of dysphagia and weight loss.

Various risk factors associated with carcinoma oesophagus have been documented in literature. Important among them such as history of smoking, alcohol intake, intake of red meat, intake of hot beverages, history of reflux disease etc were also noted in our study population. Smoking and intake of red meat were the most common risk factors seen in our population group followed by intake of hot beverages and intake of pickled by vegetables. Cigarette smoking has been a predominant problem in our population especially in youth. So, a major cause of oesophageal carcinoma came out to be smoking. Also, a vast population in our region likes to consume excessive amount of tea leading to regular irritation of oesophagus due to thermal injury. Apart from these, custom of pickling and consumption of smoked fish also contributes to increased risk of carcinoma oesophagus. In a similar study by Wu et al reported that Cigarette smoking and high body mass index were significant, independent risk factors for oesophageal and gastric cardia adenocarcinomas.[8] In another study by Brown et al concluded that low income, moderate/heavy alcohol intake, tobacco use, and infrequent consumption of raw fruits and vegetables were the major risk factors leading to a majority of squamous cell oesophageal cancers.[9]

Oesophageal tumours can occur at upper, middle or lower oesophagus. Tumour can also grow at the gatroesophageal junction. In this study we found maximum number of patients having carcinoma oesophagus at the gastro oesophageal junction. We also found patients having growth at more than one site in oesophagus. The details are given in the below mentioned table (Table 5). In a study that was done by Tabatabai et al found that tumour was detected in the middle one third part of the oesophagus in a majority of his patients (50.7%).[27]

Out of 23 patients who were enrolled in the study, 21 patients got their biopsy done, while two of the patients didn't gave consent for biopsy. Majority of the patients had Squamous cell carcinoma, while a few had adenocarcinomas out of the 21 patients. No other type of carcinoma was seen in our study population. In a study conducted by Law et al they found squamous cell variant to be the predominant histology which is comparable to our study.[28]

Limitation

This study was limited by the small sample size. There is a need to have large trials to confirm these findings.

CONCLUSION

From this study we found that carcinoma oesophagus is common in Jammu region with dysphagia being the most common symptom. The menace of smoking has contributed a large proportion to this problem. Faulty Food habits and customs are adding fuel to the fire. There is a growing need to aware the population especially the youth regarding the hazardous impact of smoking on their health. Smoking cessation and moderation of alcohol intake are important steps in reducing the risk of squamous cell carcinoma of the oesophagus. The risk of this cancer decreases substantially a decade after smoking cessation. People also need to be made aware regarding the benefits of healthy eating habits and life styles so as to reduce the risk of carcinoma oesophagus in our population.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Chow WH, Blaser MJ, Blot WJ, Gammon MD, Vaughan TL, Risch HA, et al. An inverse relation between cagA+ strains of Helicobacter pylori infection and risk of esophageal and gastric cardia adenocarcinoma. Cancer Res. 1998;58(4):588-90.
2. Khuroo MS, Zargar SA, Mahajan R, Banday MA. High incidence of oesophageal and gastric cancer in Kashmir in a population with special personal and dietary habits. Gut. 1992;33(1):11-5.
3. Lag R, Eisner MP, Kosary C. Seer cancer statistics review, 1973-1999. Bethesda: National Cancer Institute; 2002.
4. Pisani P, Parkin DM, Bray F, Ferlay J. Estimates of the worldwide mortality from 25 cancers in 1990. Int J Cancer. 1999;83(1):18-29.
5. Daly JM, Fry WA, Little AG, Winchester DP, McKee RF, Stewart AK, Fremgen AM. Esophageal cancer: results of an American College of Surgeons

Patient Care Evaluation Study. J Am Coll Surg. 2000;190(5):562-72.
6. Siewert JR, Stein HJ, Feith M, Bruecher BL, Bartels H, Fink U. Histologic tumor type is an independent prognostic parameter in esophageal cancer: lessons from more than 1,000 consecutive resections at a single center in the Western world. Ann Surg. 2001;234(3):360-7.
7. Terry P, Lagergren J, Ye W, Nyrén O, Wolk A. Antioxidants and cancers of the esophagus and gastric cardia. Int J Cancer. 2000;87(5):750-4.
8. Wu AH, Wan P, Bernstein L. A multiethnic population-based study of smoking, alcohol and body size and risk of adenocarcinomas of the stomach and esophagus (United States). Cancer Causes Control. 2001;12(8):721-32.
9. Brown LM, Hoover R, Silverman D, Baris D, Hayes R, Swanson GM, et al. Excess incidence of squamous cell esophageal cancer among US Black men: role of social class and other risk factors. Am J Epidemiol. 2001;153(2):114-22.
10. Sandler RS, Nyrén O, Ekbom A, Eisen GM, Yuen J, Josefsson S. The risk of esophageal cancer in patients with achalasia. A population-based study. JAMA. 1995;274(17):1359-62.
11. Avisar E, Luketich JD. Adenocarcinoma in a mid-esophageal diverticulum. Ann Thorac Surg. 2000;69(1):288-9.
12. Garidou A, Tzonou A, Lipworth L, Signorello LB, Kalapothaki V, Trichopoulos D. Life-style factors and medical conditions in relation to esophageal cancer by histologic type in a low-risk population. Int J Cancer. 1996;68(3):295-9.
13. Ghavamzadeh A, Moussavi A, Jahani M, Rastegarpanah M, Iravani M. Esophageal cancer in Iran. Semin Oncol. 2001;28(2):153-7.
14. Csíkos M, Horváth O, Petri A, Petri I, Imre J. Late malignant transformation of chronic corrosive oesophageal strictures. Langenbecks Arch Chir. 1985;365(4):231-8.
15. Lagergren J, Bergström R, Lindgren A, Nyrén O. Symptomatic gastroesophageal reflux as a risk factor for esophageal adenocarcinoma. N Engl J Med. 1999;340(11):825-31.
16. Farrow DC, Vaughan TL, Sweeney C, Gammon MD, Chow WH, Risch HA, et al. Gastroesophageal reflux disease, use of H2 receptor antagonists, and risk of esophageal and gastric cancer. Cancer Causes Control. 2000;11(3):231-8.
17. Vaughan TL, Farrow DC, Hansten PD, Chow WH, Gammon MD, Risch HA, et al. Risk of esophageal and gastric adenocarcinomas in relation to use of calcium channel blockers, asthma drugs, and other medications that promote gastroesophageal reflux. Cancer Epidemiol Biomarkers Prev. 1998;7(9):749-56.
18. Lagergren J, Bergström R, Adami HO, Nyrén O. Association between medications that relax the lower esophageal sphincter and risk for esophageal adenocarcinoma. Ann Intern Med. 2000;133(3):165-75.
19. Collard JM, Otte JB, Fiasse R, Laterre PF, Kock M, Longueville J, et al. Skeletonizing en bloc esophagectomy for cancer. Ann Surg. 2001;234(1):25-32.
20. Devesa SS, Blot WJ, Fraumeni JF. Changing patterns in the incidence of esophageal and gastric carcinoma in the United States. Cancer. 1998;83(10):2049-53.
21. Medical Research Council Oesophageal Cancer Working Group. Surgical resection with or without preoperative chemotherapy in oesophageal cancer: a randomised controlled trial. Lancet. 2002;359(9319):1727-33.
22. Burmeister BH, Smithers BM, Fitzgerald L. A randomized phase-III trial of preoperative chemoradiation followed by surgery (CR-S) versus surgery alone(S) for localized resectable cancer of the esophagus. Prog Proc Am Soc Clin Oncol. 2002;21:130.
23. Nguyen NT, Follette DM, Wolfe BM, Schneider PD, Roberts P, Goodnight JE. Comparison of minimally invasive esophagectomy with transthoracic and transhiatal esophagectomy. Arch Surg. 2000;135(8):920-5.
24. Chen W, He Y, Zheng R, Zhang S, Zeng H, Zou X, et al. Esophageal cancer incidence and mortality in China, 2009. J Thorac Dis. 2013;5(1):19-26.
25. Wu B, Xue L, Qiu M, Zheng X, Zhong L, Qin X, et al. Video-assisted mediastinoscopic transhiatal esophagectomy combined with laparoscopy for esophageal cancer. J Cardiothorac Surg. 2010;5:132.
26. Cash JC, Zehetner J, Hedayati B, Bildzukewicz NA, Katkhouda N, Mason RJ, et al. Outcomes following laparoscopic transhiatal esophagectomy for esophageal cancer. Surg Endosc. 2014;28(2):492-9.
27. Tabatabai A, Hashemi M, Mohajeri G, Ahmadinejad M, Khan IA, Haghdani S. Incidence and risk factors predisposing anastomotic leak after transhiatal esophagectomy. Ann Thorac Med. 2009;4(4):197-200.
28. Law SY, Fok M, Cheng SW, Wong J. A comparison of outcome after resection for squamous cell carcinomas and adenocarcinomas of the esophagus and cardia. Surg Gynecol Obstet. 1992;175(2):107-12.

Cite this article as: Dogra V, Sandhu S, Gilkar IA, Mushtaq U, Gupta S. A tertiary care prospective of epidemiology and etiopathogenesis of esophageal carcinoma from Northern India. Int Surg J 2022;9:345-9.