Risk factors for esophageal cancer in Coimbatore, southern India: a hospital-based case-control study

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Background: Cancer of the esophagus is common in India. The risk factors predisposing to cancer in southern Indian patients are not known. Aim: To determine the role of smoking, alcohol and their combination, and diet factors in the etiology of cancer of the esophagus. Methods: Risk factors like alcohol consumption, smoking, tobacco chewing, and pre-illness diet details in 90 patients with cancer of the esophagus were compared with those in age- and sex-matched control subjects. Results: The risk for esophageal cancer was 3.5 times higher with alcohol consumption, 2.5 times higher for tobacco users, and 2.8 times higher each for betel nut chewers and smokers. The calculated odds ratio for the social habits and diet factors was significant amongst cases of cancer esophagus. Conclusion: Alcoholism, smoking, and chewing of tobacco are factors predisposing to esophageal cancer in southern India. [Indian J Gastroenterol 2004;23:19-21]

Key words: Dietary fiber, esophageal cancer, smoking, betel nut, alcohol

Esophageal cancer is common in Iran, Africa and China. In these regions, the diet is based on a single staple cereal with little intake of fresh fruits and vegetables. In India, it is the most common malignancy involving the gastrointestinal (GI) tract, and has been reported increasingly from the southern states of Karnataka, Tamil Nadu and Kerala, and from Assam and Kashmir.

A preliminary observation in the Gastroenterology outpatient clinic of the Government Hospital in Coimbatore city revealed a high registration rate of 8 to 12 cases of cancer of the esophagus per month. A case-control study was therefore undertaken to determine the risk of cancer of the esophagus associated with smoking, alcohol, tobacco chewing, and dietary factors.

Methods

Ninety consecutive patients with squamous cell carcinoma (mean [SD] age 54.5 [14.1] years; 62 men) registered in the department at Coimbatore Medical College and Hospital between June 1999 and June 2000, and an equal number of age- and gender-matched control subjects (age 52.2 [12.4] years; 62 men) undergoing upper GI endoscopy for dyspepsia, constituted the study group.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Cases (n=90)</th>
<th>Controls (n=90)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age distribution (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤30</td>
<td>2 (2%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>31-40</td>
<td>3 (3%)</td>
<td>3 (3%)</td>
</tr>
<tr>
<td>41-50</td>
<td>22 (24%)</td>
<td>20 (22%)</td>
</tr>
<tr>
<td>51-60</td>
<td>34 (38%)</td>
<td>37 (41%)</td>
</tr>
<tr>
<td>61-70</td>
<td>22 (24%)</td>
<td>21 (23%)</td>
</tr>
<tr>
<td>≥71</td>
<td>7 (8%)</td>
<td>7 (8%)</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>2 (2%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Lower middle</td>
<td>84 (93%)</td>
<td>75 (83%)</td>
</tr>
<tr>
<td>Upper middle</td>
<td>4 (4%)</td>
<td>14 (16%)</td>
</tr>
<tr>
<td>Literacy</td>
<td>22 (24%)</td>
<td>24 (27%)</td>
</tr>
<tr>
<td>Family history of cancer</td>
<td>5 (6%)</td>
<td>None</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hindu</td>
<td>83 (92%)</td>
<td>80 (89%)</td>
</tr>
<tr>
<td>Christian</td>
<td>3 (3%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Muslim</td>
<td>4 (4%)</td>
<td>8 (9%)</td>
</tr>
</tbody>
</table>

Information obtained included demographic data, occupation, religion, literacy and socioeconomic status. Other details noted in a pre-structured proforma included smoking, alcohol use, tobacco chewing, and use of nasal snuff. Pre-illness dietary habits, with special reference to salted pickle and fish, beverages like hot tea / coffee / milk, the number of times green vegetables were consumed per week, were recorded by a single person (CS). Five patients with adenocarcinoma of the esophagus seen during the study period were not included in the study.

Odds ratio and 95% confidence intervals for esophageal carcinoma were calculated using EpiInfo version 6. A p value less than 0.05 was considered significant.

Results

Five patients were below the age of 40 years; one-third were above the age of 60 (Table 1). A majority of the cases and control subjects (93% and 83%, respectively) belonged to the low socioeconomic status. Only 22% of cases and 27% of control subjects were literate (high school and above). Over 80% in both groups were Hindus. Sixty-six percent of smokers smoked bidi, 28% smoked cigarettes, and the rest smoked both. Four cases and two controls used nasal snuff.

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Table 2 shows the risk factors found to be significant on univariate analysis. The risk was 3.5 times higher with alcohol consumption, 2.5 times higher for tobacco users, and 2.8 times higher for betel nut chewers and smokers. Rice was the staple diet for both cases and controls; 71% of patients consumed green vegetables daily compared to 96% of control subjects; one-third of the patients consumed green vegetables less than once a week. The pattern of consumption of non-vegetarian diet was similar in cases and control subjects, i.e., once a week among 83% of cases and 88.8% of control subjects. In univariate analysis, alcoholism, smoking, and tobacco-chewing were risk factors, with odds ratio exceeding 2.5 (Table 2).

Discussion

In India, squamous cell carcinoma of the esophagus is the third leading cancer in men and fourth leading cancer in women. Regional variations have been observed, with high incidence rates in Jammu and Kashmir and the northeastern parts of India. This cancer is common in men (2:1), with a majority being in the 5th and 6th decades of life. In the present study, the cancer was more common in men and in those belonging to the lower economic stratum.

Bidli and cigarette smoking, paan, tobacco chewing, and alcohol are major risk factors for esophageal cancer in India. We found 2.8- and 2.5-fold increases in cancer risk amongst smokers and tobacco chewers, respectively. The risk with alcohol was 3.5 times, which is significantly higher than that reported previously from other Indian centers. The influence of alcohol depends on the quality and concentration of alcohol consumed. Beer specimens obtained from several Indian cities, mainly from southern India, contained N-nitrosodimethylamine in large amounts. Betel nut chewing is an important risk factor for esophageal cancer, in our study, the risk associated with it was 2.8.

Nutritional factors have been implicated in causation of cancer esophagus. A diet rich in green leafy vegetables and fruits was found to be less often associated with cancer esophagus. The high incidence of esophageal cancer in Kashmir was attributed to contamination of raw foodstuffs with N-nitroso compounds and use of salted tea. Low socioeconomic status and consumption of very hot beverages, smoked fish, dried and pickled vegetables, red chilli and tea have been associated with this cancer. In our study, consumption of spicy and fried foods and salted fish did not contribute to the risk of cancer, but the consumption of pickles did.

In conclusion, our study suggests an association of cancer esophagus with smoking, alcohol and betel nut chewing among southern Indian patients, similar to reports from other parts of the country and the world.

References


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