

Gastric cancer—a clinicopathological study in a tertiary care centre of North-eastern India

Arun Kumar Barad¹, Sanjeet Kumar Mandal², Hiriyur S Harsha³, Birkumar M. Sharma¹, Th Sudhirchandra Singh¹

¹Department of General Surgery, ²Department of Radiotherapy, RIMS, Imphal, Manipur, India; ³Department of General Surgery, JSS Medical College, Mysore, Karnataka, India

Correspondence to: Dr. Arun Kumar Barad, Post Graduate. Department Of General Surgery, Rims, Lamphelpat, Imphal, Manipur PIN-795004, India. Email: arunkumarb23@gmail.com.

Background: The incidence of gastric cancer varies in different parts of the world and among various ethnic groups. It remains the fifth most common cancer among males and seventh most common cancer among females in India.

Materials and methods: We conducted a retrospective study using the data base of 158 patients of primary gastric cancer diagnosed in the Department of Surgery at Regional Cancer Centre, RIMS, Manipur, India from July 2009 to June 2013.

Results: Our study revealed a male to female ratio of 2.16:1, distribution of age varied from 28 to 91 years. Majority of the men were in the age group of more than 60 years (45.37%) and majority of females were of 51-60 years (44%). Nearly 7.6% patients had a positive family history. Dietary history of intake salted, fermented fish was present in 67.7% of patients, whereas history of consumption of smoked meat was found in 77.8% of patients. Only 27.8% of patients in our study had history of regular consumption of fresh fruits. About 35.4% of the patients had poor drinking water source. Nearly, 67.6% of males and 44% of females had smoking history. Combined consumption of alcohol and smoking was present in 33.5% of patients. Vague abdominal discomfort was the most common presenting symptom in 61.4% of patients. The most common site of gastric cancer in our study was antrum (50.6%) followed by cardia (17.1%). The most common histological type was adenocarcinoma (95.6%). Most of our patients presented in locally advanced stage (62.7%).

Conclusions: Our analysis suggests that poor dietary habits such as smoked mead, dried fish and excessive use of tobacco are associated with high occurrence of gastric cancer in this part of the India. Increasing the awareness regarding the aetiology and varied clinical presentation among general population and health providers is needed for prevention and early detection.

Keywords: Gastric cancer; North-eastern India; dried fish; smoked meat

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Introduction

Cancer is a biggest burden of modern society. This is the second most common disease after cardiovascular disorders for maximum deaths in the world (1). Carcinoma of the stomach is a second leading cause of cancer death worldwide. The incidence of gastric cancer varies in different parts of the world and among various ethnic groups. It remains the fifth most common cancer among males and seventh most common cancer among females in

India (2). However, the overall incidence of gastric cancer in India is less compared to the worldwide incidence and India falls under the low incidence region category for gastric cancer. Incidence of gastric cancer varies widely among the various regions within India due diverse culture and related food habits. Reports from the National Cancer Registry Programme (NCRP) 2010, suggested that the mean age-adjusted rate (AAR) of gastric cancer among urban registries in India varied from 3.0 to 13.2, with the highest rate being

recorded in Chennai registry (3-5). However, the prevalence was found to be much higher in the north eastern region of India. Currently, the north eastern state of Mizoram occupies the first position among Indian states and fifth position globally with AAR of 46.3 to 70.2 (6).

The prevalence of gastric cancer is also high in the state of Manipur. Based on our Hospital Based Cancer Registry (HBCR) 2012 gastric cancer is the second most common cancer among males comprising 6.1% of all the cancers and represents 2% in females. The aetiology of gastric cancer is multi-factorial and various dietary and environmental factors have been attributed. Diet is believed to play a major role in the development of gastric cancer. It is very well known that salt rich, smoked or poorly preserved foods, nitrates, nitrites have been associated with an increase in gastric cancer. Conversely, diets high in raw vegetables, fresh fruits (containing vitamin C, antioxidants) are associated with decreased risk (7-9). *Helicobacter pylori* infection is associated with an approximately two-fold increased risk of developing gastric cancer (10-12). *Pylori H* have been categorized as a "Group-1 human carcinogen" by the International Agency for Research on Cancer (13). The role of tobacco in the occurrence of gastric cancers cannot be undermined (6).

The state of Manipur, located in the north eastern region of India bordering Myanmar, has different customs, food habits, life-style, diverse ethnic groups, and the pattern of tobacco use as compared to the rest of the country. Majority of the people here consume dried salted fish, fermented, smoked and pickled meat and the use of tobacco is also widely prevalent. We undertook this study to analyse the demographic pattern, clinical presentations, pathological characteristics and stage at presentation of stomach cancer at Regional Cancer centre, Regional Institute of Medical Sciences (RIMS), situated in Imphal, Manipur state, is the biggest referral centre for the neighbouring North eastern states in India and bordering Myanmar.

Materials and methods

We conducted a retrospective study using the data base of 158 patients of primary gastric cancer diagnosed in the Department of Surgery at Regional Cancer Centre, RIMS, Manipur, India from July 2009 to June 2013. All these patients were diagnosed on clinical, radiological and endoscopic examination. The diagnosis was confirmed pathologically after the histopathological examination of either the resected specimen or the endoscopic biopsy

specimen. All the patients with a confirmed gastric carcinoma were included in the study. The cases with primary gastric lymphoma, gastro intestinal stromal tumours (GIST) and gastric melanoma were excluded. Restaging was performed according to AJCC staging system (7th edition) based on the available clinical and radiological findings. The compiled data included demographic data, medical history of chronic gastritis, peptic ulcer disease, family history of gastric cancer, dietary habits (intake of fermented, smoked meat, red meat), drinking water source, smoking habits, consumption of alcohol, chief presenting complaints, histological grade, TNM staging and the site of metastasis.

Descriptive statistics were used for analysing the data using SPSS version 20 and results were presented in percentage and simple frequency.

Results

This study included 158 patients with male to female ratio of 2.16:1, distribution of age varied from 28 to 91 years old. Majority of the men were in the age group of more than 60 years old (45.37%), followed by 51-60-year age group (31.4%) whereas majority of females were of 51-60-year-old category (44%), followed by more than 60-year-old group (36%). All in all, 93.5% males and 96% of females were more than 50 years old. Out of 158 patients in this study, 7.6% patients had a positive family history. Dietary history of intake salted, fermented fish was present in 67.7% of patients, whereas history of consumption of smoked meat was found in 77.8% of patients. Only 27.8% of patients in our study had history of regular consumption of fresh fruits. About 35.4% of the patients had poor drinking water source. Nearly, 67.6% of males and 44% of females had smoking history. Male to female ratio of smoking was 3.3:1. History of alcohol consumption was present in 55.5% of male and 10% of female cases. Combined consumption of alcohol and smoking was present in 33.5% of patients. Vague abdominal discomfort was the most common presenting symptom in 61.4% of patients followed by weight loss (59.5%), nausea (39.9%), early satiety and poor appetite (34.8%), vomiting (20.9%), dysphagia (18.4%) and melaena (15.8%) (*Figure 1*). About 25.3% of patients presented with abdominal lump, 55.5% of patients with tumour at cardia had history of dysphagia, 62.3% of patients with tumour in antro-pyloric region had history of weight loss, and 84.2% of patients had multiple presenting symptoms (*Table 1*). Pallor was noted in 48.7% of patients

at presentation, 53/108 males (49.07%) and 24/50 females (48%). Most common site of gastric cancer in our study was antrum (50.6%) followed by cardia (17.1%), body (13.9%), pylorus (13.3%) and fundus (2.5%). The most common site of tumour in both males and females was antrum, 57.4% and 36% respectively. The second most common site was cardia (17.6%) in males and body of the stomach (22%) in females. The most common histological type was adenocarcinoma (95.6%) followed by squamous cell carcinoma (3.2%). About 44.3% of the tumours were poorly differentiated, 35.8% moderately differentiated and 19.6% well differentiated (Table 2). Majority of the patients were of T3 stage (53.2%) at presentation followed by T2 (23.4%), T4 (15.8%) and T1 (7.6%). Likewise, N2 nodal staging was leading with 35.4% followed by N0 (27.8%), N1 (20.3%) and N3 (16.5%). Overall 37.3% of patients had distant metastasis at the time of presentation. Liver was the most common site of metastasis found in 17.1% patients followed by left supraclavicular lymph node (7.6%), peritoneal metastasis (7%) and multiple metastases (5.1%). Majority of the patients in our study were found to have

locregional disease at presentation (62.7%); of these early gastric cancers was found in 7.6% patients (Figure 2).

Discussion

There is worldwide variation regarding the incidence and patterns of gastric cancer. Countries of Southeast Asia, Japan, South Korea and China have noted a high incidence of gastric cancer (14,15). The overall incidence of gastric cancer in India is less compared to rest of the world (4-6). However, certain regions of India have recorded a high incidence, especially the north eastern states like Mizoram (6). In North-East region very high incidence of all sites of cancers in general and tobacco related cancers in particular have been reported. Pattern of tobacco use is noted to be different in North-East region. The genetic susceptibility of cancer due to ethnic variation related to polymorphism and mutation in autosomal recessive genes has been suspected. Certain dietary and tobacco related carcinogens are known to act as co-factors to bring out genetic changes (16). A high incidence of gastric cancer has also been reported in the state of Manipur, where it constitutes the second most common malignancy among males. There is lack of clinic-pathological information about gastric cancer from Manipur.

In our study, the peak incidence of gastric cancer was in age group older than 60 years old (42.4%). Also male predominance was noted with male to female ratio of 2.16:1, which are comparable with other studies (17-21). Presumably, this male preponderance could be attributed to the high incidence of smoking (67.6%) found among the males, with male to female smoking ratio of 3.3:1 in our study. About 7.6% of patients in our study had a positive family history which was similar to another study (17).

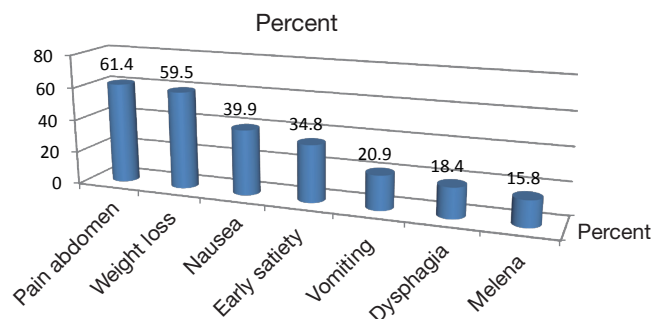


Figure 1 Common symptoms in gastric cancer patients.

Table 1 Symptoms with respect to location of tumour

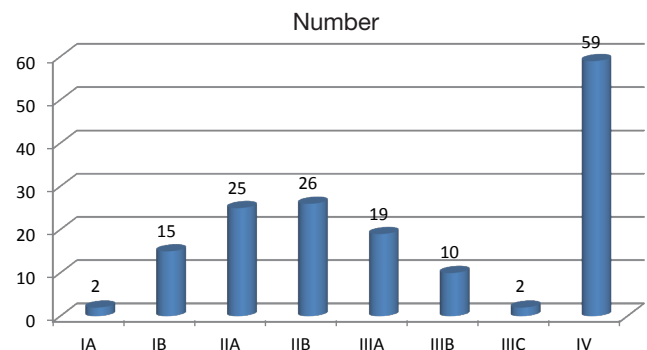
Symptoms	Cardia	Fundus	Body	Antrum	Pylorus	Nos	Total [%]
Weight loss	16	3	10	50	13	2	94 [59.5]
Pain abdomen	9	3	14	55	12	4	97 [61.4]
Nausea	10	3	9	32	7	2	63 [39.9]
Vomiting	6	1	4	17	4	1	33 [20.9]
Early satiety	7	2	7	33	6	0	55 [34.8]
Dysphagia	15	1	2	9	2	0	29 [18.4]
Melena	3	2	5	11	4	0	25 [15.8]
Anemia	13	3	10	39	10	2	77 [48.7]
Mass abdomen	4	2	5	22	6	1	40 [25.3]

Table 2 Demographic and Clinico-pathologic characteristics of patients with gastric cancer

Variable	Subgroup	N [%]
Age at diagnosis [years] [n=158]	<40	9 [5.7]
	41-50	26 [16.5]
	51-60	56 [35.4]
	>60	67 [42.4]
Sex	Male	108 [68.4]
	Female	50 [31.6]
Family history	Present	12 [7.6]
Dietary history	Dried, fermented fish	107 [67.7]
	Fresh fruits	44 [27.8]
	Smoking	95 [60.12]
	Alcohol	65 [41.13]
Tumour site	Antrum	80 [50.6]
	Cardia	27 [17.1]
	Pylorus	21 [13.3]
	Body	22 [13.9]
	Others	8 [5]
T stage	T1	12 [7.6]
	T2	37 [23.4]
	T3	84 [53.2]
	T4	25 [15.8]
N stage	N0	44 [27.8]
	N1	32 [20.3]
	N2	56 [35.4]
	N3	26 [16.5]
M stage	M0	99 [62.7]
	M1	59 [37.3]
Tumour grade*	Well differentiated	31 [19.6]
	Moderately	55 [34.8]
	Poory	70 [44.3]
Tumour stage	Early gastric cancer	12 [7.6]
	Advanced Gastric cancer	87 [55.1]
	Systemic disease	59 [37.3]

*, tumour grade information not available for two cases.

However, many other studies have reported a positive family history of 17% of patients (22). Our low estimate of family history could have been because of poor reporting by patient attendees. An overwhelming majority of patients (77.8%) in our study had a history of consumption of smoked meat, and 67.7% of patients had history of consumption of dried, fermented fish. Whereas, only 27.8%

**Figure 2** Frequency of overall staging.

of the patients had a history of regular consumption of fresh fruits. Consumption of dried fish has found to increase the risk of gastric cancer (23). It is also well known that high consumption of smoked meat and decreased consumption of fresh fruits increases the risk of gastric cancer (8,9). The most common presenting symptoms in our study abdominal pain (61.4%) and weight loss (59.5%), which were similar to other studies (17,24). Our findings revealed that most common site of tumour was antrum (57.45%) followed by cardia (17.1%) which are consistent with many other studies (25-28). However, increased incidence of tumour occurrence in gastro-esophageal junction has been noted in many western studies (27).

Considering the histological type, majority (95.6%) were found to be adenocarcinoma consistent with other studies (17,29). Majority of the tumours (44.3%) in our study were poorly differentiated, similar to other studies (17,30). Studies have shown that elder patients were more likely to have well or moderately differentiated tumours and young patients were more likely to have poorly-differentiated tumours [Nakamura *et al.*, (31)]. Similarly in our study six out of nine patients with <40 years old of age had poorly differentiated tumours. Early gastric cancer was present in 7.6% cases and majority (62.7%) had locally advanced gastric cancers at the time of presentation in our study. This figure is less compared 9-17% seen in western countries and far less compared to the prevalence of Japan where mass screening programmes for gastric cancer are in place (32). This highlights the need for aggressive endoscopy and biopsy for minimally symptomatic patients to improve the survival.

There is evidence to implicate chronic Pylori H infection as a major risk factor for the development of intestinal type of gastric cancer (9,11,12). However, we had no information regarding the infection status of patients in our study.

Conclusions

Our analysis suggests that poor dietary habits such as smoked meat, dried fish and excessive use of tobacco are associated with high occurrence of gastric cancer in this part of the India. Symptoms of weight loss and abdominal pain in elderly population should alert the healthcare providers about the possibility of gastric cancer. Increasing the awareness regarding the aetiology and varied clinical presentation among general population and health providers is needed for prevention and early detection. High risk subset may be undertaken for screening the disease.

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