# **Original Research Article**

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# Clinico-pathological presentation of gastric carcinoma and its relation to the anatomical site of occurrence among patients in the hilly state of Himachal Pradesh, India

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## **ABSTRACT**

**Background:** The incidence of gastric cancer varies in different parts of the world and among various ethnic groups. Himachal Pradesh, located in the north of India, has different customs, food habits, life-style and diverse ethnic groups. We undertook this study to analyze the clinical presentations and pathological characteristics of stomach cancer patients in the biggest referral center in the state.

**Methods:** All endoscopic biopsy proven cases of carcinoma stomach attending the OPD or admitted in the general surgery ward between July 2014 to June 2015, went through a thorough clinical examination, routine and diagnostic investigations and endoscopic biopsies for histopathological confirmation.

**Results:** The study included 62 patients of adenocarcinoma stomach with maximum cases between 45 to 65 yrs age, more in males (2:1). Borrmann type II was most common macrocsopic appearance followed by type IV. As per Lauren classification, 36 were of intestinal, 24 diffuse and 2 had mixed type. 10 patients had well differentiated, 28 moderately differentiated and 24 patients had poorly differentiated tumors. Anorexia, abdominal pain, weight loss, nausea and vomiting was the most common symptoms seen in antral lesions (distal) and anemia was the most common sign followed by dehydration, mass abdomen and ascitis.

**Conclusions:** The study has added to the literature of clinical and pathological presentation and relation of signs and symptoms to the site of occurrence of gastric carcinoma from the hilly and rural state of northern India.

**Keywords:** Clinical and pathological presentation, Gastric carcinoma, Relation of signs and symptoms with site of occurrence

# INTRODUCTION

Cancer is a biggest burden of modern society. This is the second most common disease after cardiovascular disorders and responsible for maximum deaths in the world.<sup>1</sup> Adenocarcinoma of the stomach is the second leading cause of cancer death worldwide. The incidence

of gastric cancer varies in different parts of the world and among various ethnic groups. In many parts of the world, however, the incidence of gastric cancer has gradually decreased, principally because of changes in diet, food preparation, and other environmental factors. Stomach cancer incidence rates are much lower in India than elsewhere, but the stomach remains one of the 10 leading

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sites of cancer in both sexes in most of the metropolitan registries. Cancer rates in India are rising with increasing migration of rural population to the cities, increase in life expectancy and changes in lifestyles. It remains the fifth most common cancer among males and seventh most common cancer among females in India.<sup>2</sup>

However, India falls under the low incidence region category for gastric cancer. Incidence of gastric cancer varies widely among the various regions within India due to diverse culture and related food habits. 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.<sup>3</sup>

The state of Himachal Pradesh, located in the north of India, 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 analyze the clinical presentations, pathological characteristics and stage at presentation of stomach cancer in the Department of General Surgery, Indira Gandhi Medical College (IGMC), Shimla which is the biggest referral center in the state.

Objectives was to study the clinical presentation and the histopathological pattern of all biopsy proven cases of gastric carcinoma and to study the relationship with anatomical site of occurrence.

# **METHODS**

The descriptive observational study was carried out in Department of General Surgery, IGMC, Shimla, a tertiary level hospital in Himachal Pradesh. It was conducted between July 2014 to June 2015 and included all biopsy proven cases of carcinoma stomach.

#### Inclusion criteria

All endoscopic biopsy proven cases of carcinoma stomach attending the surgical and gastroenterology OPD or admitted in the general surgery ward were included in the study after their due informed and written consent.

# Exclusion criteria

All those patients who refused to give consent.

## Procedure

After their enrolment in the study, all patients' went through a thorough clinical examination and investigations which included routine investigations e.g. hematological (Hb, total and differential count) and

biochemical (blood sugar, renal function tests, liver function tests serum electrolytes, chest X-rays, ECG and blood grouping).

Diagnostic investigations included UGI endoscopy (using a fibro-optic endoscope) and biopsy, CECT pelvis and abdomen for staging, CECT chest and bone scan for distant metastasis where indicated were done. Multiple biopsies from the growth or suspicious area were taken for histopathological confirmation.

#### Statistical methods and tools

All entries were made in the excel sheets in duplicates and were checked and rechecked before making any calculation for their correctness and duplicity, if any. Descriptive statistics were used for analysing the data using excel sheets and open Epi and results were presented in percentages and simple frequency.

#### **RESULTS**

The study included sixty two (62) patients of endoscopic biopsy proved cases of adenocarcinoma stomach.

Table 1: Age and sex distribution of carcinoma stomach.

Age (in years)	Total cases	% age	Male	Female
<25	0	0	0	0
25-34	1	1.61	1	0
35-44	4	6.45	1	3
45-54	20	32.25	14	6
55-64	18	29.03	12	6
65-74	14	22.58	9	5
<b>75</b> +	5	8.06	3	2
Total	62	100	40 (64.5%)	22 (35.5%)

Carcinoma stomach was seen in the age range from 29 years to 83 years in this study with maximum cases seen between the age groups of 45 to 65 yrs. It was more common in males with the M: F ratio of nearly 2:1.

In the present study majority of the patients (75.80%) belonged to the low socioeconomic groups followed by middle income groups (24.2%). None of the patients in our study belonged to high socioeconomic strata.

Table 2: Endoscopic location of tumor in carcinoma stomach.

Site	Total cases (%) N=62	Male cases (%) n=40	Female cases (%) n= 22
Proximal	11 (17.74)	6 (9.67)	5 (8.06)
Body	15 (25.80)	10 (16.12)	6 (9.67)
Distal	36 (58.06)	22 (35.48)	14 (22.58)

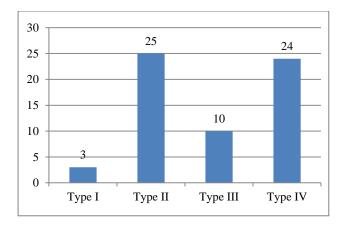


Figure 1: Endoscopic appearance (Borrmann's type).

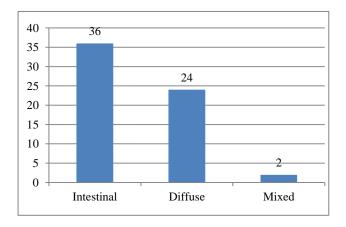


Figure 2: Lauren classification.

Borrmann type II was most common macrocsopic appearance followed by Borrmann type IV. In our study 36 (58.07%) cases were of intestinal type, 24 (38.70%) were diffuse type and 2 patients had mixed type.

There were 10 patients (16.12%) had well differentiated, 28 (45.16%) cases had moderately differentiated tumors. 24 patients (38.70%) had poorly differentiated tumors with female predominance.

Anorexia was the most common symptom reported in 44 (70.96%) patients, followed by vague abdominal pain (69.35%) and weight loss more than 10% (66.12%). Nausea/vomiting were seen in 40 (64.51%) cases.

Proximal tumors involving the gastro esophageal junction had dysphagia as the predominant symptom. One patient presented with features of peritonitis and was found to have a growth in the body of the stomach which had perforated, another one with features of sub-acute intestinal obstruction and acute renal failure, both indicating the advanced disease.

Early satiety was reported in 29 (46.77%) of the patients which is characteristic of tumors involving the stomach wall diffusely. Symptom analysis of the two sexes revealed that anorexia, abdominal pain, weight loss

followed by nausea and vomiting were the most common symptoms in both sexes. Overall, anemia was the most common sign in 43 (69.35%) of the cases followed by dehydration (29.03%), mass abdomen (17.74%) and ascitis (16.12%). Visible gastric peristalsis the characteristic sign of gastric cancer was seen only in 7 (11.29%) of the cases, 6.45% in males and 4.54% in females.

In females, anemia and ascites were the most common signs. Presentation with mass abdomen was more common in females (11.29%) than in male (6.45%). Ascites at presentation suggesting the advanced stage of the disease was more common in males (11.29%). Lymphadenopathy was seen in only 4 patients (6.45%), out of which 3 females had supraclavicular and 1 male presented with Sister Joseph Nodule. Icterus was seen in only 2 patients (3.22%).

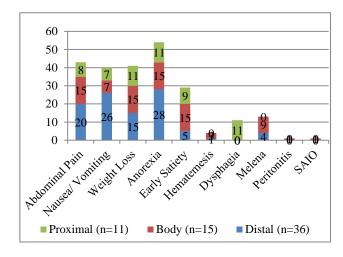


Figure 3: Relation of symptoms with the site of the tumor.

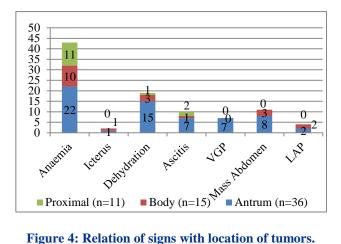


Figure 4: Relation of signs with location of tumors.

Antral lesions (distal) presented predominantly with nausea/vomiting (73.68%) anorexia and pain abdomen and early satiety were seen mainly in the tumors involving body (100%), followed by proximal tumors. Dysphagia was (100%) predominant symptoms in proximal, reflecting the aggressive nature of such tumors.

Malaena and Hemet emesis were more common in lesion of the body followed by the antrum.

All patients with proximal tumors had anemia at presentation indicating its occurrence more in the tumors

of proximal gastric unit. Ascites was seen more in the patients with distal growth accounting for 19.44% followed by the tumors located in Proximal. Dehydration was noticed more common in distal. All the cases with visible gastric peristalsis were antral growths (19.44%).

Table 3: Relation of symptoms with macroscopic appearance.

Bormann type					
Symptoms	Total cases	I N=6	II N=20	III N=12	IV N=24
		Cases (%)	Cases (%)	Cases (%)	Cases (%)
Abdominal pain	43	3 (50)	12 (60)	12 (100)	16 (66.6)
Nausea/vomiting	40	4 (66.6)	14 (70)	10 (83.3)	12 (50)
Weight loss	41	0	9 (45)	12 (100)	20 (83.3)
Anorexia	44	3 (50)	11 (55)	10 (83.3)	20 (83.3)
Early satiety	24	0	0	0	24 (100)
Hemetemesis	3	0	2 (10.0)	0	1 (4.16)
Dysphagia	11	0	0	2 (16.6)	9 (37.5)
Malaena	13	0	4 (20)	4 (33.3)	5 (20.8)
Peritonitis	1	0	0	1 (8.3)	0
SAIO	1	0	0	1 (8.3)	0

Table 4: Relation of clinical signs with macroscopic appearance.

	Total cases	Borrmann types			
Signs		I (6)	II (20)	III (12)	IV (24)
		Cases (%)	Cases (%)	Cases (%)	Cases (%)
Anaemia	43	0	7 (35)	12 (100)	24 (100)
Icterus	2	0	1 (5)	1 (8.3)	0
Dehydration	19	0	9 (45.5)	6 (50)	4 (16.6)
Ascites	10	0	3 (15)	3 (25)	4 (16.6)
VGP	7	0	4 (20)	3 (25)	0
Mass abdomen	11	0	5 (25)	4 (33.3)	2 (8.3)
Virchows LN	3	0	0	1 (8.3)	2 (16.6)
Migratory thrombophlebitis	0	0	0	0	0
SJN	1	0	0	0	1 (4.16)
Acanthosis nigrican	0	0	0	0	0

Well and moderately differentiated tumors were seen more in distal tumors accounting for 23.6 and 55.5% respectively. Poorly differentiated were more common in body and proximal regions.

In respect to the relation of Lauren's class with the tumor site, Intestinal types were found predominantly in distal tumors (88.88%), and diffuse types were found predominantly in body and proximal tumors.

Bormann type IV was observed in 38.70% of cases with poorly differentiated tumors (in diffuse type). BI BII and BIII were found to have relation with WD and MD tumors accounting for 20%, 60% and 40% respectively.

In our study blood group A was found in 38.7% of cases predominantly in diffuse and poorly differentiated

tumors. Blood group B was found in 29.0% of cases with moderate and well differentiated tumors or intestinal type of tumors followed by blood group AB and O.

In our study 3 patients (4.83%) had diabetes mellitus type II, 2 cases (3.22%) had chronic obstructive lung diseases (COPD) and 2 patients (3.22%) had hypertension.

Majority of patients (45.16%) were in stage III at presentation followed by stage IV, stage II and stage I acounting for 43.54%, 8.06% and 3.22% respectively.

In our study 28 patient (45.16%) had R1 resection and 21 patients (33.87%) had R2 (palliative/debulking) resection. 6 (9.67%) cases had only gastrojejunostomy and 7 (11.29%) cases were inoperable.

#### **DISCUSSION**

There have been widespread reductions in gastric cancer incidence and mortality around the world in the last 50 years, which have been described by some authorities as an "unplanned triumph". Nonetheless, gastric cancer is still estimated to account for about 10% of invasive cancers worldwide and is the second leading cause of cancer death. The incidence of gastric cancer varies greatly across populations.

This observational study was undertaken to study the clinicopathological pattern in gastric cancer as occurring at IGMC Shimla, Himachal Pradesh, which is a tertiary care centre with a input of cases from all across the state. The study included sixty two patients of endoscopic biopsy proven cases of adenocarcinoma stomach.

Since histopathological confirmation was an inclusion criterion for the study, suspected cases were not included for lack of definite tissue diagnosis. Gastric cancer is more common in males with the global age-standardized incidence for males about 2.2 times higher than for females circa 1990, Males had higher rates in all regions. Men have greater exposure to one or more environmental carcinogens and are more susceptible.

Age wise trends in carcinoma stomach have been reported worldwide being largely a disease of the older age groups in most countries. In our study maximum of cases were observed after the age of 45 years with peak age ranging 45 to 65 yrs. Sen et al, studying cancer patterns in eastern India and Gajalakshmi et al also noted a similar age trend with increasing incidence of gastric cancer after 60 years of age. 4,5

Similar in our study gastric cancer have been found more common in male than female with M:F ratio of almost 2:1. These findings were comparable to a study by Sumathi et al.<sup>6</sup>

In our study from topographical point of view gastric cancer was found more in Chopal, Chirgaon (Rohru), Kotkhai-Jubbal and Theog area of District Shimla where it accounted for 41.93% of cases followed, by hilly/remote areas of district Mandi and in some tribal areas of Chamba, Lahul-Spiti and Kinnaur, where people usually consumed non veg. diet (dried and roasted red meat) and high salted food due to some cultural habits.

In our study majority of the cases belonged to the low socioeconomic status. The scenario is similar across India where majority of the population belong to the low socioeconomic group further contributing evidence of dietary role of carcinogens. Studies at Chennai and other parts of the country have shown consistent correlation between the lower socioeconomic group and higher prevalence of gastric cancer.

#### Location of tumors

The west has noted a paradigm shift in site of gastric cancer tumors with a steady increase in proximal tumors and a decline in distal tumors. However in our study distal tumors continued to be the most common site of affliction which are almost consistent with the finding of Cherian et al who studied a 16 year trend of gastric cancer at Chenai.<sup>7</sup>

Macroscopic features: In our study Borrmann type II were predominant macroscopic lesions usually with intestinal types and Borrmann type IV lesions have been observed with diffuse type of tumors usually located in body (middle third) and proximal parts of the stomach.

#### Tumor histopathology

Majority of tumors (95.6%) were found to be adenocarcinoma consistent with other studies. And Mixed adenocarcinoma was found in only 2 (3.22%) cases. Majority of the tumors in our study were moderate and well differentiated usually observed with distal tumors. Poorly differentiated/diffuse type have been seen in 38.70% cases, usually associated with proximal and body tumors similar to a study by Barad at al. Studies have shown that elder patients were more likely to have well or moderately differentiated tumors and young were more likely to have poorly differentiated by tumors. Similarly in our study 10 out of 24 cases who had poorly differentiated tumors were younger than 50 yrs. Intestinal type was most common Lauren class, noticed in 58.07% cases.

# Symptomatology and signs

Anorexia, vague abdominal pain and weight loss were the major symptoms reported in our study which were comparable to a study by Safaee et al. 10 The findings suggested that patients in our set up presented with locally advanced stage of the disease with both local and regional spread. Nausea/vomiting were noticed as predominant symptoms in distal tumors.

Early satiety was observed in diffuse infiltrating tumors and dysphagia was main symptom of proximal tumors which were comparable to a study by Barad et al who conducted a retrospective study using a data base of 158 patients of primary gastric cancer at Manipur, India from July 2009 to June 2013.8 In our study one male patient had peritonitis due to perforation of the growth and one female patient had sub acute intestinal obstruction due to disseminated metastasis. Anemia was over all most common sign noticed more in the tumors of body and proximal regions. Dehydration, ascitis and mass abdomen were predominantly seen in distal tumors. Visible gastric peristalsis was observed as exclusive sign in distal tumors. Icterus and lymphadenopathy (Lt supraclavicular and Sister Mery Joseph) were seen in patients with tumors of antrum and body.

A cohort case study of 1045 gastric cancer patients was done in Shanghai, Ruijin Hospital. Hospital. Among them, 41.91% were blood group A and on comparing these with the healthy control groups it was found that risk of gastric cancer in blood group A was significantly higher than that in non A groups (OR=1.34, 95% CI 1.25-1.44). In our study blood group A was found in 35.48% (18) cases predominantly in diffuse type of histology.

In our study 3 patients (4.83%) were observed to have diabetes, 2 patients (3.22%) had hypertention and 2 (3.22%) had chronic obstructive lung disease.

Studies have shown that comorbidites may have changed theirs life styles, daily activity and dietary components or may have taken some other medications. A detection bias related with multiple comorbidites is also possible. Patients with more comorbidities have frequent/increased diagnostic testing, physician visits and reporting of morbidities. This detection bias therefore should be seriously taken into account in future studies.

## Staging

As there is no endoscopic ultrasound at our institution therefore CECT (IV and oral contrast) was done in all the patients for staging of disease and to see the extent and site of lesion. Sussman et al has shown that CT scan does not accurately display the exent of disease. In their study 47 % cases were inccurately staged with about 31% being understaged and 16% being over staged. In present study also majority of the patients were incorrectely staged by CT scanning. 55 out of 62 were in stage III and IV indicating that majority of the patients (45.16%) had locally advanced and (43.54%) advanced matastatic disease at presentation. These findings were comparable to a study by Barad et al.

# Operations performed

In our study 28 cases (45.16%) underwent R1 resection, R2 resection (palliative/debulking) was possible in 21 patients while in 6 patients, only gastrojejunostomy could be done. Seven patients were inoperable. Majority of patients present with advanced stage where Ro resection is not possible. Even then, palliative resection significantly improves the quality of life of patients suffering from obstruction or hemorrhage.

#### **CONCLUSION**

This observational study included 62 patients of endoscopic biopsy proven cases of carcinoma stomach attending the surgical and gastroenterology OPD or admitted in the surgery ward. In our study, the peak occurrence of the disease was seen in the age group of 45 to 65 years with the age range from 29 to 83 yrs. Gastric cancer was more common in male with sex ratio of nearly 2:1. Occurrence was noticed highest in areas where people usually consume high salted food, roasted and

dried red meat due to cultural habits. Majority (75.80%) of patients belonged to low and middle socioeconomic groups. Distal gastric unit (non cardia) was the predominant site in contrast to western countries which have shown a consistent shift toward proximal. Borrmann type II was most common macroscopic appearance and had relation to intestinal type followed by type IV which predominated to diffuse type. Intestinal, WD and MD histologic sub types were found to have more predilections to distal tumors. Poorly differentiated/diffuse type were found predominantly (38.70%) in proximal gastric unit with predilection to younger age groups.

Anorexia, vague abdominal pain and weight loss were the most common symptoms reported in body and proximal tumors whereas nausea/vomiting were usually seen in distal tumors. Early satiety reported in 46.77% cases was characteristic symptom seen in diffusely infiltrating tumors involving the stomach wall indicating the advance stage. Dysphagia was characteristic symptom seen in proximal tumors. Overall, anemia was the most common sign (69.35%) followed by dehydration (29.03%), mass abdomen (17.74%) and ascitis (16.12%) respectively. Visible gastric peristalsis a characteristic sign of gastric cancer was observed exclusively in distal tumors. In our study 4.83% female had Lt supraclavicular lymph nodes and one male patient Sister Mary Joseph Nodule indicating the advance metastatic disease.

Blood group A was the prevalent blood group found in 38.70% of cases in diffuse and poorly differentiated tumors. Blood groups B, AB and O were found predominantly in moderate and well differentiated tumors. Diabetes, hypertension and chronic obstructed pulmonary lung diseases were associated comorbidities noticed in 11.29% cases. Majority of the patients (53.22%) presented with locally advance stage, only 3.22% cases were found with an early stage of the disease, indicating the lack of mass screening programs. There were 45.16% patients underwent R1 resection (curative surgery) and 33.87% cases underwent palliative surgery (R2 resection) whereas 11.29% were inoperable due to associated co morbidities

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