

## Gastric and gastroesophageal junction carcinomas and its morphological features, tertiary care centre study

Linta Thampi<sup>1\*</sup>, PS Jayalakshmy<sup>2</sup>, Merin Jose<sup>3</sup>

<sup>1,3</sup>Senior Resident, <sup>2</sup>Additional Professor, Dept. of Pathology, Government Medical College, Thrissur, Kerala, India

### Article Info

**Received:** 5<sup>th</sup> February, 2019

**Accepted:** 12<sup>th</sup> March, 2019

**Published Online:** 9<sup>th</sup> August, 2019

**Keywords:** Gastric and gastroesophageal junction carcinoma, Intestinal type, Stage.

### Abstract

**Introduction:** Cancer is a global health burden affecting every region and socioeconomic levels. Gastric cancer is the fifth most common cancer in the world. Despite an overall declining incidence, gastric adenocarcinoma remains the second most common cause of death worldwide due to malignant disease.

**Materials and Methods:** A cross sectional study was done in the Department of Pathology, in a Tertiary care centre in central part of Kerala during a period of 18 months (January 2014 - July 2015). Gross examination and morphological assessment of 60 gastrectomy specimens received in the department were done. Study was approved by institutional ethical committee.

**Results:** 68.3 percentage of cases were located in the pyloric region. 65 percentage cases had extension into serosa. 46.7 percentage cases were intestinal type. 33.3 percentage diffuse type, 16.7 percentage mixed type and 3.3 percentage mucinous type were seen. 51.6 percentage cases were in pTNM stage 2.

**Conclusion:** Most of the gastric carcinomas were intestinal type. Cases showed a predominance of pathological stage 2 in this study.

### Introduction

Gastric cancer is the fifth most common cancer in the world with the highest incidence in Asia, Latin America and Caribbean and the lowest incidence in Africa and Northern America.<sup>1</sup> Cancers of the antropyloric region are more common in the high-risk regions whereas in the low-risk regions, tumours of the cardia predominate.<sup>2,3</sup> Men are affected more frequently than women, with a male to female ratio of 2:1. Low socioeconomic status, high intake of salt and dried or pickled foods, smoking and alcohol consumption are some of the environmental factors implicated in gastric cancer whereas vitamin C in fresh fruits and vegetables, carotenoids and green tea are protective.<sup>4</sup>

Clinicopathologically, gastric carcinoma can be classified into two broad categories. First one is the early gastric cancers or superficially invasive lesions which are limited to the mucosa or the mucosa and submucosa, regardless of nodal status. The second one is the advanced adenocarcinomas extending at least to the muscularis propria. The prognosis of early gastric carcinoma is excellent, with a 5 year survival rate as high as 90%.<sup>5</sup>

Another most commonly used categorisation of gastric adenocarcinoma is the histologic classification of Lauren which subdivides gastric adenocarcinoma into two main types: intestinal and diffuse.<sup>6</sup> Histologically, gastric carcinoma demonstrates marked heterogeneity in

architecture and pattern of growth. These are histologically classified by WHO.<sup>7</sup>

Tumor location and histologic type should prompt specific concerns. Diffuse carcinoma of the antropyloric region have a high frequency of serosal and lymphovascular invasion and lymph-node metastases. Staging was done according to pTNM staging for gastric carcinoma.<sup>8</sup>

### Materials and Methods

It was a cross sectional study to histomorphologically study all the gastrectomy specimens received in Department of Pathology, which are histologically diagnosed as gastric and gastroesophageal junction carcinomas. 60 cases were collected and examined.

### Inclusion Criteria

Resected specimens received in the Department of Pathology, during the study period, which were diagnosed histologically as gastric and gastroesophageal carcinoma.

### Exclusion Criteria

Small biopsy specimens were excluded.

### Methodology

Gross examination of gastric and gastroesophageal carcinomas was done and tumour site, tumour size, appearance of the cut surface, depth of tumour invasion, appearance of the adjacent mucosa and lymph nodes sampled were documented.

Tissue sampling was done.

\*Corresponding Author: Linta Thampi, Senior Resident, Dept. of Pathology Government Medical College, Thrissur, Kerala, India  
Email: [lintathampi@gmail.com](mailto:lintathampi@gmail.com)  
<http://doi.org/10.18231/j.ijpo.2019.075>

After hematoxylin and eosin staining, the tissue samples were studied and tumour typing was done. Pathological TNM stage of the tumour,<sup>8</sup> number of lymph nodes with metastatic deposits, involvement of proximal and distal resected margins, presence of lymphovascular emboli were noted.

**Pathologic TNM Staging of Gastric Carcinoma**

**T—Primary Tumor**

pT1 Tumor invades lamina propria, muscularis mucosae or submucosa

pT1a—Tumor invades lamina propria or muscularis mucosae

pT1b—Tumor invades submucosa

pT2 Tumor invades muscularis propria

pT3 Tumor invades subserosa

pT4 Tumor perforates serosa or invades adjacent structures

pT4a—Tumor perforates serosa

pT4b—Tumor invades adjacent structures

**N—Regional Lymph Nodes**

pN0 No regional lymph node metastasis

pN1 Metastasis in 1-2 regional lymph nodes

pN2 Metastasis in 3-6 regional lymph nodes

pN3 Metastasis in 7 or more regional lymph nodes

pN3a—Metastasis in 7-15 regional lymph nodes

pN3b—Metastasis in 16 or more regional lymph nodes

**M—Distant Metastasis**

M0 No distant metastasis

M1 Distant metastasis present

(Pathologic staging cannot usually comment on the presence or absence of distant metastasis, unless biopsies of distant organs have been submitted for histologic examination)

**Data Analysis**

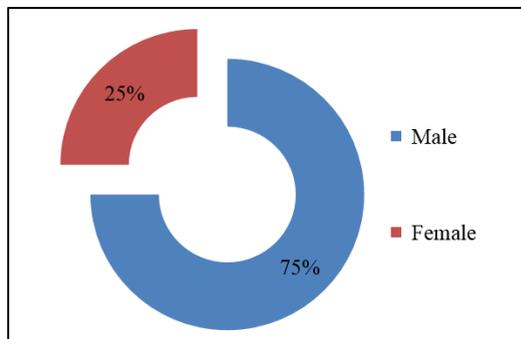
Statistical analysis was done by Chi-Square tests and Fisher's Exact Test. Cross tabulations were done using Microsoft Excel and SPSS software.

**Observations and Results**

In this study, 60 cases of gastric carcinoma specimens were studied.

**Table 1:** Age wise distribution

Age group	Frequency	Percent
21 - 40yrs	3	5
41 - 60	27	45
61 - 80	27	45
Above 80yrs	3	5
Total	60	100

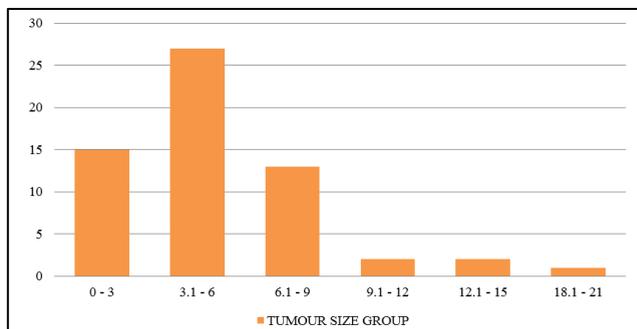


**Fig. 1:** Distribution among sex

Most of the patients were males (75%) with a male to female ratio of 4:1.

**Table 2:** Clinical symptoms

	Frequency	Percent
Loss of weight and appetite	18	30
Vomiting	2	3.3
Abdominal discomfort	8	13.3
Loss of weight and appetite & Vomiting	17	28.4
Vomiting & Abdominal discomfort	10	16.7
Loss of weight and appetite & abdominal discomfort	5	8.3



**Fig. 2:** Tumour size

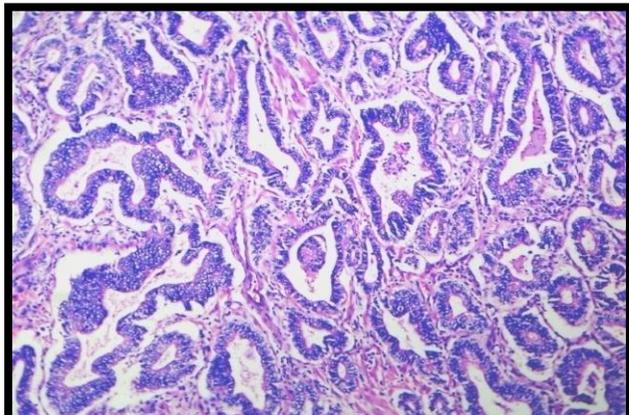
45% (27 cases) of tumours had a greatest dimension ranging from 3.1 – 6cm followed by 25%(15 cases) ranging from 0-3cm.

**Table 3:** Distribution of tumour sites

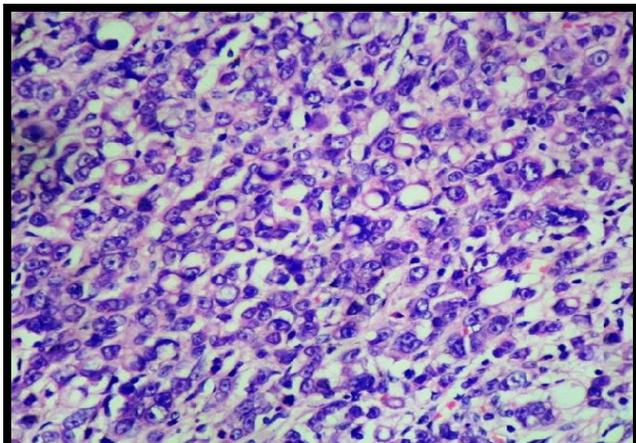
Tumour sites	Frequency	Percent
Pylorus	41	68.3
Body	6	10
GE Junction	4	6.7
Entire Stomach	1	1.7
Pylorus and body	6	10
Cardia and GE junction	2	3.3
Total	60	100

**Table 4:** Histopathological types

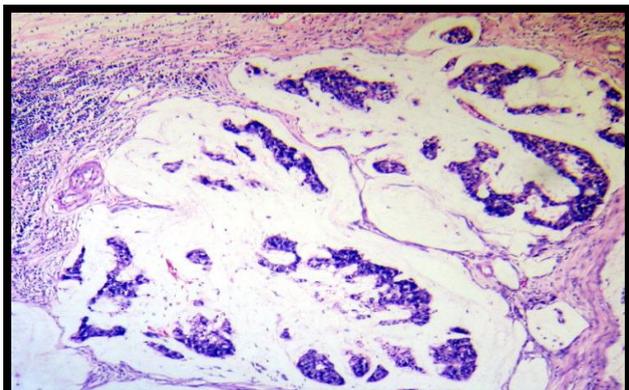
	Frequency	Percent
Intestinal	28	46.7
Diffuse	20	33.3
Mixed	10	16.7
Mucinous Adenocarcinoma	2	3.3
Total	60	100



**Fig. 3:** Intestinal type of gastric adenocarcinoma



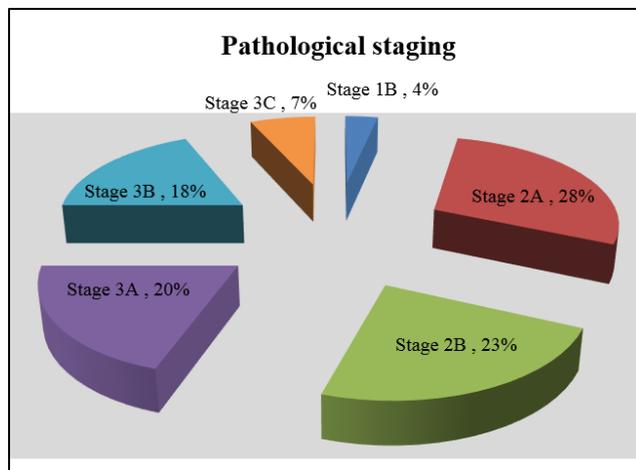
**Fig. 4:** Diffuse type of gastric adenocarcinoma with Poorly cohesive neoplastic cells admixed with few signet ring cells



**Fig. 5:** Tumour cell nests floating in extracellular mucin in mucinous adenocarcinoma stomach

**Table 5:** Lymphnodes with metastasis

Number of lymphnodes with metastasis	Frequency	Percent
0 (pN0)	17	28.3
1 - 2 (pN1)	16	26.7
3 - 6 (pN2)	21	35
7 - 15 (N3a)	5	8.3
16 & above (pN3b)	1	1.7
Total	60	100



**Fig. 6**

Microscopically, serosal perforation and invasion into the perigastric fat was seen in 76.7% cases

Lymphovascular emboli was seen in 31.7% of the cases

**Discussion**

The cancer burden in India is growing at an alarming rate. It accounts for about 7% deaths in India.<sup>9</sup> As per reports from the National Cancer Registry Programme, stomach is a frequent site of cancer in males in Chennai followed by Bangalore, Mumbai, Delhi, Bhopal.<sup>9,10</sup> In this study also male predominance present. . Majority were of the age group 41-80yrs (90% each) with a mean age of 60.

The most frequent symptom was loss of weight and appetite (30%). 28.4% of the patients had loss of weight and appetite together with vomiting. But, this did not have any relevance in the study.

45%(27 cases) of tumours had a greatest dimension ranging from 3.1 – 6 cm followed by 25%(15 cases) ranging from 0-3cm. Majority of the tumours were located in the pylorus (68%). This was concordant with studies by Ho Sung Son, et al and Indu et al in which most of the tumours were located in the pyloric antrum (54.7 and 76.7% respectively).<sup>11</sup>

As per few literature, over the last few decades, there is an increasing rate of proximal stomach tumours than that of the distal region. In the present study, 68% cases were in pylorus indicating distal region. Similarly, a progressive increase in the diffuse type has also been mentioned.<sup>12,13</sup> The intestinal type shows well-defined glandular structures with papillae, tubules, or even solid areas. The diffuse type,

by contrast, consists mainly of scattered poorly cohesive individual cells or clusters of cells. Tumours that contain approximately equal quantities of intestinal and diffuse components are called mixed carcinomas. Carcinomas too undifferentiated to fit neatly into either category are placed in the indeterminate category.<sup>6</sup> In our study, most of the tumours were of intestinal type(46.7%) followed by the diffuse type(33.3%).16.7% were of mixed type and 3.3% were mucinous adenocarcinoma. Similar results were obtained in other studies also with a predominance of the intestinal type of gastric cancer.<sup>14,11,15</sup> Mallika Tewari et al in her study conducted in a tertiary care hospital in North India found that about 71.4 % were of diffuse type.<sup>16</sup>

According to WHO classification system, Gastric adenocarcinomas are categorised as<sup>7</sup>

1. Adenocarcinoma
  - a) Intestinal type
  - b) Diffuse type
2. Papillary adenocarcinoma
3. Tubular adenocarcinoma
4. Mucinous adenocarcinoma
5. Signet-ring cell carcinoma
6. Adenosquamous carcinoma
7. Squamous cell carcinoma
8. Small cell carcinoma
9. Undifferentiated carcinoma

Tubular adenocarcinoma contain prominent dilated or slitlike and branching tubules of varying sizes and shapes. Papillary subtypes are less common than tubular adenocarcinomas. These are well-differentiated exophytic carcinomas with elongated finger-like processes with a central fibrovascular connective tissue cores lined by cylindrical or cuboidal cells.

Mucinous adenocarcinomas are defined by more than 50% of the tumour volume composed of extracellular mucinous pools. Malignant epithelial components can be glands lined by a columnar mucous-secreting epithelium with interstitial mucin or chains or irregular cell clusters floating freely in mucinous lakes. Scattered signet-ring cells may be present but do not dominate the histological picture.

If more than 50% of the tumour consists of isolated or small groups of malignant cells containing intracytoplasmic mucin with nuclei pushed against the cell membranes, the tumour is classified as signet-ring cell carcinomas.<sup>7</sup>

In this study 85% cases had extension of neoplasm into subserosa and 76.7% had serosal perforation with perigastric fat infiltration. According to Song KY et al subserosal extension indicates infiltrative type growth pattern with carcinomatosis. These cases usually have poor prognosis.<sup>17</sup> Tumors with subserosal invasion have a 5-year survival rate of 50% only.<sup>18</sup>

In this study, lymphovascular emboli was seen in 31.7% of the cases. A study by Dicken et al showed lymphovascular emboli in 59.6% cases. According to their study prognosis of patients with lymphovascular emboli are very poor. They concluded that lymphovascular emboli can be considered as independent prognostic factor.<sup>19</sup>

## Conclusion

In this study, incidence of gastric carcinoma was more in male with male to female ratio of 4:1. Most of the cases fall into 41 to 80yrs age group. Major presenting complaints were nonspecific symptoms like loss of weight and loss of appetite. Most cases had tumour size ranging from 3.1 – 6cm .68.3% tumours located in the pylorus region of stomach. In this study, common histological type was Intestinal type of gastric carcinoma. 28% cases were in stage 2A.

**Conflict of Interest:** None.

**Funding:** None.

## References

1. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, Rebelo M, Parkin DM, Forman D, Bray, F. Cancer Incidence and Mortality Worldwide: IARC Cancer Base No. 11. International Agency for Research on Cancer; 2014. Available from:<http://globocan.iarc.fr>. 2015.
2. Parkin D. The global health burden of infection-associated cancers in the year 2002. *Int J Cancer* 2006;118(12):3030-44.
3. Curado MP, Edwards B, Shin HR, Storm H, Ferlay J, Heanue Mea. Cancer Incidence in Five Continents. Lyons: IARC Press, 2007. 2015.
4. Stewart B W, Kleihues P 2003 World cancer report. IARC Press, Lyon, France. 2015.
5. Everett S, Axon A. Early gastric cancer in Europe. *Gut* 1997;41(2):142-50.
6. Lauren T. The two histologic main types of gastric carcinoma. *Acta Pathol Microbiol Scand* 1965;64:34.
7. WHO, digestive system
8. Sobin L H, Gospodarowicz M K, Wittekind C (eds) 2009 International Union against Cancer: TNM classification of malignant tumours, 7th ed. Wiley, New York.
9. Imran Ali, Waseem A. Wani and Kishwar Saleem. Cancer Scenario in India with Future Perspectives Cancer Therapy. 2011;8:56-70.
10. Park D, Yun J, Park J, Oh S, Kim H, Cho Y et al. HER-2/neu Amplification Is an Independent Prognostic Factor in Gastric Cancer. *Dig Dis Sci* 2006;51(8):1371-9.
11. Son H, Shin Y, Park K, Seo K, Yoon K, Jang H. Correlation between HER2 Overexpression and Clinicopathological Characteristics in Gastric Cancer Patients Who Have Undergone Curative Resection. *J Gastric Cancer* 2014;14(3):180-6.
12. Surgical pathology of the GI tract, liver, biliary tract, and pancreas, Second Edition, Edited by Robert D. Odze, John R. Goldblum: chapter 21,pg 562.
13. Henson D E, Dittus C, Younes M. Differential trends in the intestinal and diffuse types of gastric carcinoma in the United States, 1973–2000. *Arch Pathol Lab Med* 2004;128:765-70.
14. Bang YJ, Van Cutsem E, Feyereislova A, Chung HC, Shen L, Sawaki A, et al. ToGA Trial Investigators. Trastuzumab in combination with chemotherapy versus chemotherapy alone for treatment of HER2-positive advanced gastric or gastro-oesophageal junction cancer (ToGA): a phase 3, open-label, randomised controlled trial. *Lancet* 2010;376:687-97.
15. Indu Rajagopal, S R Niveditha, R Sahadev, Preethan Kamagere Nagappa, Sowmya Goddanakoppal rajendra. HER2 Expression InGastric and Gastroesophageal Adenocarcinoma. *J Clin Diagn Res* 2015;9(3).
16. Tewari M, Kumar A, Mishra RR, Kumar M, Shukla HS.HER2 expression in gastric and gastroesophageal cancer: report from a tertiary care hospital in North India. *Indian J Surg* 2013;31-5.

17. Song KY, Hur H, Jung CK, Jung ES, Kim SN, Jeon HM, Park CH. Impact of tumor infiltration pattern into the surrounding tissue on prognosis of the subserosal gastric cancer (pT2b). *Eur J Surg Oncol* 2010;36(6):563-7. doi:10.1016/j.ejso.2010.04.006. Epub 2010 May 11. PubMed PMID: 20462730.
18. Yoshikawa K, Maruyama K. Characteristics of gastric cancer invading to the proper muscle layer-with special reference to mortality and cause of death. *Jpn J Clin Oncol* 1985;15:499-503.
19. Dicken BJ, Graham K, Hamilton SM, Andrews S, Lai R, Listgarten J, Jhangri GS, Saunders LD, Damaraju S, Cass C. Lymphovascular invasion is associated with poor. *Ann Surg* 2006;243(1):64-73.

**How to cite this article:** Thampi L, Jayalakshmy PS, Jose M. Gastric and gastroesophageal junction carcinomas and its morphological features, tertiary care centre study. *Indian J Pathol Oncol* 2019;6(3):388-92.