Analysis of the clinicopathological features and population distribution of gastric carcinoma in Southern India – A Descriptive study.

Running title: A descriptive analysis of Gastric carcinoma in southern India.

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ABSTRACT:

Background: The majority common type of cancer in India is gastric carcinoma, which has a male predominance. Dietary habits, Helicobacter pylori infection, genetic polymorphisms, cigarette smoking are the major causes of Gastric carcinoma. Early diagnosis leads to better treatment and higher survival rates for gastric carcinoma. In this study, retrospective and observational data were analyzed regarding patients diagnosed with gastric carcinoma. Materials and Methods: Detailed demographics and histopathology were collected from Sixty-nine histopathology records obtained from various tertiary care centers in Southern India. There were both males and females included in this study who were diagnosed with gastric carcinoma. Results and Conclusion: Based on our result Gastric antrum was the most common site of carcinoma. Average age group of gastric carcinomas was 59 years. It was found that the most common type of adenocarcinoma, according to Lauren's classification, was intestinal in 49 % of cases (34), signet ring cell type in 42 % of cases (29), and mucinous type in 9 % of cases (6). The average tumor size was 2.4 x 2.2 x 2.1cm. Most of the carcinoma cases were of grade 3. Lymphovascular invasion was present in all the cases. Lymph nodes were the site of most metastatic lesions.

Keywords: Gastric, Carcinoma, Cancer, clinicopathology, Histopathology

INTRODUCTION :

In modern society, cancer is one of the biggest burdens. Besides cardiovascular disorders, this is the second most common cause of death in the world (1). Cancer deaths from stomach cancer are second only to lung cancer in the world. There is a wide variation in the incidence of gastric cancer around the globe and among different ethnic groups. The disease remains the fifth most common cancer among males in India and the seventh most common cancer among females (2). Despite this, the overall incidence of gastric cancer in India is lower than the worldwide average, and it falls within 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. According to the National Cancer Registry Programme (NCRP) 2010, the age-adjusted gastric cancer rate among urban registries in India varied from 3.0 to 13.2, with the highest rate recorded in the Chennai registry. Gastric carcinoma is more prevalent in Southern India than anywhere else in the country.

Multiple dietary and environmental factors have been attributed to the etiology of gastric cancer. A major role is played by diet in the development of gastric cancer. The consumption of salty, smoked, or poorly preserved foods, as well as nitrates and nitrites has been shown to increase gastric cancer. On the other hand, diets high in raw vegetables and fresh fruits (containing antioxidants and vitamin C) lower risk (7-9). A Helicobacter pylori infection increases the risk of gastric cancer by approximately twofold (10-12). The International Agency for Research on Cancer has classified H. Pylori as a "Group-1 human carcinogen" (13). The role of tobacco in the development of gastric cancers cannot be overstated (6). Polymorphisms in inflammation-related genes such as interleukin, toll-like receptor 4, human leukocyte antigen, and NAT1 play a role in gastric cancer. In terms of geographic variation, gastric cancer is more prevalent in certain countries in Europe, Japan, and China, as well as some countries in Latin America.Among the low-risk areas are North America, India, the Philippines, most African nations, some Western European nations, and Australia. Often, cases of gastric cancer are reported late, when the cancer has progressed to an advanced stage, and survival rates are about 20 percent in developing countries and less than 30 percent in developed countries [3]. A substantial proportion of patients with early-stage disease are asymptomatic or unspecified, resulting in late diagnosis. Therefore, it is crucial to diagnose the disease at an early stage to achieve a radical cure [4].

Gastric adenocarcinomas account for 95 percent of all stomach tumors [5]. Lauren's classification is currently the most useful histological classification. In patients undergoing gastrectomy for gastric cancer, it is an independent prognostic factor. There are three types of gastric cancer according to this classification: intestinal, diffuse, and indeterminate [6]. According to the WHO classification, there are four types of gastric cancer : tubular, papillary, mucinous, poorly cohesive (including signet ring cell carcinoma) and histologic variants [7]. Intestinal type is related to environmental agents such as Helicobacter pylori infection. A diffuse type is characterized by infiltrating single or poorly cohesive cells into the gastric wall [8]. In most cases, it is a familial occurrence.

The incidence of gastric cancer increases with age, peaking between the ages of 50 and 70. Gastric cancer occurs in 2% to 8% of individuals under 40 years of age [10]. Younger individuals under 30 years of age developing gastric cancer is very rare. Males are more likely to contract the disease than females, with rates two to four times higher [11]. Different rates of genetic polymorphisms according to tumor sub-site suggest different susceptibilities to gastric cancer [9].

Surgery combined with chemotherapy is the most common treatment for gastric cancer. Even when the survival rate of patients undergoing surgery is low, surgery is still the preferred treatment for gastric carcinoma. In several studies, it has been found that patients who have developed advanced

cancer have a chance of surviving for less than 12 months after diagnosis. Gastric cancer treatment requires prompt assessment of the condition, consideration of prognosis risk after therapy, and development of reasonable postoperative care programs. The prognosis of patients with gastric carcinoma can be influenced by several factors, such as tumor size, age, gender, site, grade, and stage. The purpose of this retrospective, observational, and descriptive study is to establish an understanding of gastric carcinoma and its demographic details as well as histopathologic types and features. A relation will be established between site, size, type, grade, and stage of gastric carcinoma in this study. As a result, physicians can make an accurate and timely diagnosis.

MATERIAL AND METHODS:

In this retrospective, observational, and descriptive study, All histopathological data of patients diagnosed with gastric cancer between January 2022 and February 2023 will be analyzed. Based on histopathological records from various tertiary care centers in southern India, the demographic and histopathological details were collected. All collected information was kept confidential. The sample and the details collected was studied without any bias to any group. A total of 69 cases were analyzed for demographic details and the site, size, type, grade, stage, and metastases (if present) of gastric carcinoma were noted from the records. Both male and females diagnosed with gastric carcinoma.Individuals diagnosed with benign gastric neoplasms and population under Paediatric age group were excluded. The results were tabulated and analyzed using SPSS version23.

Results:

A population of 69 patients having 23 females and 46 males with a average age of diagnosis of 59.1 years.

SAMPLING TECHNIQUE :

Convenience sampling.

PROCEDURE :

EXPECTED OUTCOME :

Gastric carcinoma is expected to be more common in individuals above 40 years of age and more common in males. The common site is expected to be gastric antrum and common types are intestinal (based on Lauren's classification) and tubular type (based on WHO classification). pT3,pN2 stage is expected to be the common stage and grade 3 is more common.

DISCUSSION :

This was a retrospective and observational study with a population of 69 individuals with an average age of 59.1 years diagnosed with gastric carcinoma. The average size was 2.4*2.2*2.1 cm. The carcinoma was diagnosed in gastric antrum in 58 % cases (n=40), pylorus in 13 % cases (n=9), distal stomach in 13 % cases (n=9), stomach body in 7 % cases (n=5), prepyloric in 4 % cases (n=3) and proximal stomach in 4 % cases (n=3). Adenocarcinoma had more occurrence than any other gastric cancers. Based on Lauren's classification, the types are

intestinal and diffuse. In this study, after analysis of the histopathological records, intestinal type – 58 % cases (n=40) was more common than diffuse type – 42 % cases (n=29). Based on WHO classification, tubular type occured in 49 % cases (n=34), signet ring cell type occurred in 42 % cases (n=29) and mucinous occurred in 9 % cases (n=6). The gastric carcinoma was histologically graded into Grade 1, Grade 2 and Grade 3. 48 % cases (n=33) of gastric carcinoma were of grade 3, 38 % cases (n=26) of gastric carcinoma were of grade 2 and 14 % cases (n=10) of gastric carcinoma were of grade 1.

Gastric carcinoma tends to occur more in older individuals than in younger individuals. Individuals between 50 to 70 years of age were more affected with gastric carcinoma. There was higher occurrence in males – 67 % cases (n=46) than in females – 33 % cases (n=23). There was no clear relationship between the type and age. About 45 % cases (n=31) were ulceroproliferative, 32 % cases (n=22) were infiltrating and 23 % cases (n=16) were ulcerative. Most ulceroproliferative cases were of intestinal type – based on Lauren's classification and tubular – based on WHO classification. TNM staging of the gastric carcinoma shows that pT3,pN2 occurred in 33 % cases (n=23), pT3,pN1 occurred in 29 % cases (n=20), pT3,pN0 occurred in 17 % cases (n=12), pT2,pN0 occurred in 10 % cases (n=7) and pT2,pN2 occurred in 4 % cases (n=3). pT3,pN3a, pT3,pN3b , pT4a,pN2 occurred in 1 % cases (n=1). Intestinal metaplasia was found in 51 % cases (n=35). In about 36 % cases (n=25) Helicobacter pylori organism were seen.

Lymphovascular invasion was present in 72 % cases (n=50) and absent in 28 % cases (n=19). Proximal stomach showed higher chances of lymphovascular invasion. According to Lauren's classification, lymphovascular invasion occurred more in diffuse type – 93 % cases (n=27) than intestinal type – 58 % cases (n=23) and in WHO classification, the invasion occurred more in signet ring cell type – 93 % cases (n=23) than tubular – 58 % cases (n=20) and mucinous – 50 % cases (n=3). 89 % of grade 3 carcinoma cases showed lymphovascular invasion. Perineural invasion was present in 28 % (n=19) cases and absent in 72 % (n=50) cases. Mostly perineural invasion occurred along with lymphovascular invasion. Diffuse type (based on Lauren's classification) and signet ring cell type (based on WHO classification) were more prone to perineural invasion. 67 % of cases that occurred in prepyloric site showed perineural invasion. In Lauren's classification, 41 % cases (n=12) of diffuse type presented with perineural invasion. In WHO classification 41 % cases (n=12) of signet ring type presented with perineural invasion. 39 % of grade 3 carcinoma cases showed perineural invasion. Perigastric lymph nodes were found to be the most common site of metastasis. Lymph node metastasis also included celiac and common hepatic lymph nodes. Extranodal metastasis was absent.

SUMMARY:

This study was conducted on the histopathological data obtained from the records of the patients diagnosed with gastric cancer from June 2018 to December 2019. The average age of diagnosis was found to be 59.1 years. The average size was 2.4*2.2*2.1 cm.The common site of occurrence of gastric carcinoma was gastric antrum. There was male predominance. Adenocarcinoma was found to be more common. Most of the carcinoma cases were of intestinal type (based on Lauren's classification) and tubular type (based on WHO classification). Most of the carcinoma cases were of histologic grade 3. According to TNM staging, pT3,pN2 was more common. Lymphovascular invasion was more commonly found and perineural invasion was seen along with lymphovascular invasion in some cases. The common site of

lymph node metastasis was found to be perigastric lymph nodes. Celiac and common hepatic nodes were other site of lymph node metastasis.

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