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Original Research Article

Clinicopathological Spectrum of Gastric Adenocarcinoma: A Tertiary Care Experience with Histological and Staging Correlation

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ABSTRACT

Background: Gastric adenocarcinoma remains a major cause of cancer-related morbidity and mortality worldwide, with significant geographic variation in incidence and pathological patterns.
Aim: To evaluate the demographic and clinicopathological spectrum of gastric adenocarcinoma in a tertiary care centre.
Methods: This descriptive study included 63 histopathologically confirmed cases of gastric adenocarcinoma. Demographic details, histological subtype, tumor grading, and TNM staging (in resection specimens) were analysed. Data were analysed using descriptive statistical methods.
Results: The mean age was 58.8 ± 14.3 years (range 29–85 years). A male predominance was observed (63.5%). The intestinal type was the most common subtype (63.5%) followed by diffuse type (33.3%). Among resection specimens (n=25), moderately and poorly differentiated tumors were equally common (40% each). The most frequent pathological stage was pT3N0 (20%). A subset of cases demonstrated nodal involvement.
Conclusion: The study highlights a predominance of intestinal-type gastric adenocarcinoma with male preponderance and a considerable proportion presenting at advanced pathological stages. These findings contribute regional data to the understanding of gastric carcinoma patterns.

Keywords: Gastric Adenocarcinoma, Clinicopathological Profile, Lauren Classification, TNM Staging, Histopathology.

INTRODUCTION

Gastric cancer remains one of the leading causes of cancer-related morbidity and mortality worldwide. According to GLOBOCAN 2020 estimates, gastric cancer ranks among the top causes of cancer deaths globally, with significant geographic variation in incidence and mortality.[1,2] The burden is particularly high in East Asia, Eastern Europe, and parts of South America, while developing countries continue to experience substantial disease impact.[1,3]

The pathogenesis of gastric adenocarcinoma is multifactorial and involves environmental, dietary, microbial, and genetic factors. Chronic *Helicobacter pylori* infection, dietary nitrosamines, smoking, and chronic gastritis have been implicated in gastric carcinogenesis.[3,4] Correa described the multistep cascade of gastric carcinogenesis progressing from chronic gastritis to atrophy, intestinal metaplasia, dysplasia, and eventually carcinoma.[4]

Histologically, gastric adenocarcinoma is broadly classified into intestinal and diffuse types according to Lauren's classification, which continues to have clinical and prognostic relevance.[5] The intestinal type is often associated with environmental risk factors and follows the Correa cascade, whereas the diffuse type is more frequently associated with genetic predisposition and carries a comparatively poorer prognosis.[5,6]

The World Health Organization (WHO) classification further categorizes gastric adenocarcinoma based on morphological patterns, providing standardized criteria for histopathological diagnosis.[7] Accurate pathological staging using the American Joint

Committee on Cancer (AJCC) TNM system is essential for determining prognosis and guiding therapeutic decisions.[8]

Epidemiological studies consistently demonstrate a male predominance in gastric carcinoma, with reported male-to-female ratios ranging from 1.5:1 to 3:1.[3,9] Despite advances in diagnosis and management[10], a substantial proportion of patients continue to present at advanced stages, particularly in resource-limited settings.[1,3]

Institutional clinicopathological studies contribute valuable regional data that may help in understanding disease patterns and guiding management strategies.[11-14] In this context, the present study was undertaken to evaluate the demographic and clinicopathological profile of gastric adenocarcinoma in a tertiary care center.

MATERIALS AND METHODS

Study Design and Setting

This descriptive observational study was conducted in the Department of Pathology at a tertiary care centre from June 2021 to May 2024.

Study Population

A total of 63 consecutive histopathologically confirmed cases of gastric adenocarcinoma were included in the study. Both endoscopic biopsy specimens and gastrectomy specimens were evaluated.

Inclusion and Exclusion Criteria

Cases with confirmed diagnosis of gastric adenocarcinoma and adequate clinicopathological data were included. Cases with insufficient tissue, non-adenocarcinoma gastric malignancies, or incomplete records were excluded.

Histopathological Evaluation

All specimens were processed using standard histopathological techniques and stained with hematoxylin and eosin. Tumors were classified according to:

- Lauren classification (intestinal, diffuse, mixed)[5]
- WHO histological classification[7]
- Tumor grading
- TNM staging system (AJCC 8th edition)[8]

Additional pathological parameters including lymph node status, lymphovascular invasion, and perineural invasion were recorded.

Statistical Analysis

Data were entered into Microsoft Excel and analysed using SPSS software version 25.0 (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as frequency and percentage. Continuous variables were expressed as mean ± standard deviation. Associations between categorical variables were analysed using the Chi-square test or Fisher's exact test, as appropriate. A p-value ≤0.05 was considered statistically significant.

Ethical Approval

The study was conducted after obtaining approval from the Institutional Ethics Committee.

RESULTS

A total of 63 histopathologically confirmed cases of gastric adenocarcinoma were analysed.

Demographic Profile

The mean age of patients was 58.8 ± 14.3 years (range: 29–85 years). The majority of patients were male (n = 40, 63.5%), while females constituted 36.5% (n = 23), resulting in a male-to-female ratio of 1.74:1

Variable	Number (n)	Percentage (%)
Total cases	63	100
Male	40	63.5
Female	23	36.5
Mean age (years)	58.8 ± 14.3	—
Age range	29–85	—

Table 1. Demographic Characteristics of Study Population

Specimen Distribution

Endoscopic biopsy specimens constituted the majority (n = 38, 60.3%), followed by distal subtotal gastrectomy (n = 17, 27.0%) and total gastrectomy specimens (n = 8, 12.7%).

Specimen Type	Number (n)	Percentage (%)
Biopsy	38	60.3

Distal subtotal gastrectomy	17	27.0
Total gastrectomy	8	12.7
Total	63	100

Table 2. Distribution of Specimen Types

Lauren Classification

According to Lauren classification, the intestinal type was the predominant subtype (n = 40, 63.5%), followed by diffuse type (n = 21, 33.3%) and mixed type (n = 2, 3.2%).

Lauren Type	Number (n)	Percentage (%)
Intestinal	40	63.5
Diffuse	21	33.3
Mixed	2	3.2
Total	63	100

Table 3. Distribution According to Lauren Classification

Tumour Grading

Resection Specimens (n = 25)

Among resected cases, moderately differentiated and poorly differentiated adenocarcinomas were equally common (n = 10 each, 40.0%), while well-differentiated tumors accounted for 20.0% (n = 5).

Tumor Grade	Number (n)	Percentage (%)
Well differentiated	5	20.0
Moderately differentiated	10	40.0
Poorly differentiated	10	40.0
Total	25	100

Table 4. Tumor Grading in Resection Specimens

Biopsy Specimens (n = 38)

In biopsy specimens, well-differentiated tumors were most common (n = 16, 42.1%), followed by moderately differentiated (n = 12, 31.6%) and poorly differentiated tumors (n = 10, 26.3%).

Tumor Grade	Number (n)	Percentage (%)
Well differentiated	16	42.1
Moderately differentiated	12	31.6
Poorly differentiated	10	26.3
Total	38	100

Table 5. Tumor Grading in Biopsy Specimens

TNM Staging (Resection Specimens)

TNM staging was assessed in 25 resection specimens. The most frequently observed stage was pT3N0 (20.0%). A range of early and advanced stages were observed, with several cases demonstrating nodal involvement.

pTNM Stage	Number (n)	Percentage (%)
pT3N0	5	20.0
pT2N0	3	12.0
pT4aN3a	3	12.0
Other individual stages	14	56.0
Total	25	100

Table 6. Distribution of Cases According to pTNM Staging (Resection Specimens)

DISCUSSION

Gastric adenocarcinoma continues to represent a significant global health burden and remains among the leading causes of cancer-related mortality worldwide. According to GLOBOCAN 2020 data, gastric cancer ranks among the top causes of cancer-related deaths globally, with marked geographic variation in incidence and mortality patterns.[1] Higher incidence rates are observed in East Asia and certain developing

regions, reflecting environmental, dietary, and infectious influences.[2,3]

The mean age of patients in the present study was 58.8 ± 14.3 years, with most cases occurring in the sixth decade of life. This observation is consistent with previously reported epidemiological patterns in both regional and international literature, where gastric carcinoma predominantly affects middle-aged and elderly populations.[3,15] The age distribution reflects the cumulative effect of chronic mucosal inflammation and environmental carcinogenic exposure over time.[4]

A distinct male predominance (63.5%) was observed in this study. Several epidemiological investigations have demonstrated a higher incidence among males, with reported male-to-female ratios ranging between 1.5:1 and 3:1.[3,9] The higher incidence in males has been attributed to differences in smoking habits, occupational exposures, dietary patterns, and possibly hormonal influences. Additionally, gender-related differences in susceptibility to *Helicobacter pylori* infection and immune response may contribute to this disparity.[3,9]

With respect to anatomical distribution, distal gastric involvement was predominant, particularly involving the pylorus and antrum. Distal gastric carcinoma has historically been associated with *Helicobacter pylori* infection and environmental risk factors.[3] Although some Western populations have demonstrated a proximal shift in gastric carcinoma incidence, distal predominance remains characteristic of several Asian and developing populations.[16] The distribution pattern observed in this study is therefore consistent with existing epidemiological data.

Histologically, intestinal-type adenocarcinoma was the predominant subtype (63.5%) in the present study. Lauren's classification remains clinically relevant in differentiating tumor biology and epidemiological behavior.[5] The predominance of intestinal-type adenocarcinoma observed here is comparable to findings reported in multiple institutional studies.[11-14] The intestinal subtype has been strongly associated with environmental risk factors and follows the multistep carcinogenic pathway described by Correa.[4]

Diffuse-type carcinoma constituted 33.3% of cases. Diffuse-type tumors are characterized by infiltrative growth, lack of gland formation, and frequent signet ring cell morphology.[5] These tumors are often associated with genetic predisposition and are generally considered to have a more aggressive biological behavior and poorer prognosis compared to intestinal-type carcinoma.[5,6] In the present study, diffuse-type tumors were associated with higher histological grade, supporting their aggressive morphological profile.

Tumor grading in resection specimens revealed that moderately and poorly differentiated tumors each constituted 40% of cases. Histological grading is an important pathological parameter reflecting tumor aggressiveness and proliferative potential.[6,17] Poorly differentiated tumors typically demonstrate higher mitotic activity, greater invasive potential, and unfavorable outcomes.[6] The substantial proportion of high-grade tumors in this study may reflect late presentation and delayed diagnosis.

TNM staging demonstrated that pT3N0 was the most frequently observed stage, although a considerable proportion of cases exhibited nodal involvement. The AJCC TNM staging system remains the gold standard for pathological staging of gastric carcinoma.[8] Lymph node metastasis is a well-established adverse prognostic factor, significantly influencing survival outcomes.[18,19] The presence of advanced nodal disease in a subset of patients in this study underscores the importance of meticulous lymph node evaluation in resection specimens.

Tumor location has also been reported to influence prognosis and survival, with some studies indicating differences between proximal and distal gastric carcinomas.[18] The distal predominance observed in the present study aligns with patterns described in developing populations.

Overall, the clinicopathological characteristics documented in this study are largely consistent with established literature.[3,11-14] The findings reinforce known epidemiological and pathological trends and contribute valuable regional data regarding the demographic and morphological spectrum of gastric adenocarcinoma.

Limitations

The study is limited by small sample size and single-centre design. TNM staging was available only for resection specimens.

CONCLUSION

The present study demonstrates intestinal-type predominance and male preponderance in gastric adenocarcinoma, with a substantial proportion presenting at advanced pathological

stages. These findings provide meaningful regional clinicopathological data relevant to clinical practice.

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No funding was received for this study.

Conflict of Interest
The authors declare no conflict of interest.

Author Contributions
The author contributed to study conception, data collection, histopathological evaluation, data interpretation, manuscript drafting, and final approval of the manuscript.

Data Availability Statement
The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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