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Original Research Article

Histopathological Spectrum of Chronic Gastritis Using the Updated Sydney Scoring System and Its Correlation with Helicobacter pylori Infection

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Abstract

Background: Chronic gastritis is a common inflammatory disorder of the stomach, with Helicobacter pylori being its principal etiological agent. The Updated Sydney System provides a standardized method for grading histopathological changes and assessing disease severity.

Aim: To evaluate the histopathological spectrum of chronic gastritis using the Updated Sydney Scoring System and to correlate the findings with Helicobacter pylori infection.

Materials and Methods: This hospital-based cross-sectional observational study included 160 gastric biopsy specimens diagnosed as chronic gastritis at a tertiary care centre in Bengaluru from January 2025 to June 2025. Gastric biopsy specimens were enrolled consecutively during the study period. Histopathological evaluation was performed using hematoxylin and eosin staining and Modified Giemsa stain where required. Chronic inflammation, neutrophilic activity, glandular atrophy, intestinal metaplasia, and H. pylori density were graded according to the Updated Sydney System. Statistical analysis was performed using SPSS version 26.0, with $p<0.05$ considered statistically significant.

Results: The majority of patients were males (58.8%) and belonged to the 31–45-year age group. Moderate chronic inflammation was the most common histological finding (45.0%). Helicobacter pylori infection was detected in 63.8% of biopsy specimens. Glandular atrophy and intestinal metaplasia were observed in 41.3% and 20.0% of cases, respectively. A significant association was found between H. pylori positivity and increased histological activity ($p=0.002$).

Conclusion: The Updated Sydney Scoring System is an effective tool for evaluating chronic gastritis and identifying premalignant gastric lesions. Helicobacter pylori infection showed a significant correlation with the severity of histopathological changes, emphasizing the importance of routine histological grading and detection of the organism for timely clinical management and prevention of gastric cancer.

Keywords: Chronic Gastritis, Helicobacter Pylori, Updated Sydney System, Histopathology, Gastric Biopsy, Intestinal Metaplasia, Glandular Atrophy.

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Introduction

Chronic gastritis is one of the most common inflammatory disorders of the stomach and is characterized by persistent inflammation of the gastric mucosa, which may progress to glandular atrophy, intestinal metaplasia, dysplasia, and ultimately gastric carcinoma if left untreated. Histopathological examination of gastric biopsy specimens remains the gold standard for diagnosing chronic gastritis, assessing disease severity, and identifying associated premalignant changes. [1] The Updated Sydney System provides a standardized approach for grading gastritis by evaluating chronic inflammation, neutrophilic activity, glandular atrophy, intestinal metaplasia, and Helicobacter pylori density, thereby facilitating uniform reporting and clinical management. [1,2] Helicobacter pylori is the principal etiological agent implicated in chronic active gastritis and has

been classified as a Group I carcinogen by the World Health Organization because of its established association with gastric adenocarcinoma and mucosa-associated lymphoid tissue (MALT) lymphoma. [3]

Persistent colonization by the organism initiates a cascade of inflammatory changes that may eventually culminate in gastric atrophy and intestinal metaplasia. [4,5] The severity of histological alterations often correlates with bacterial density, making histopathological assessment an important component in evaluating disease progression and determining appropriate therapeutic strategies. [6]

Although endoscopic findings provide valuable information regarding gastric mucosal abnormalities, they may not accurately reflect the underlying microscopic pathology. Therefore, histopathological evaluation using the Updated Sydney System is indispensable for the comprehensive assessment of chronic gastritis and its association with H. pylori infection.[1,6] Furthermore, understanding the histopathological spectrum of chronic gastritis contributes to the early identification of patients at increased risk for gastric malignancy, enabling timely intervention and surveillance. [7]

Despite the widespread use of the Updated Sydney System, data describing the histopathological spectrum of chronic gastritis and its correlation with Helicobacter pylori infection from tertiary care centres in South India remain limited. Therefore, the present study was undertaken to evaluate the histopathological spectrum of chronic gastritis using the Updated Sydney Scoring System and to correlate the histopathological findings with Helicobacter pylori infection among gastric biopsy specimens obtained at a tertiary care centre in Bengaluru.

Materials and Methodology

Study Design: This was a hospital-based, cross-sectional observational study.

Study Setting: The study was conducted in the Department of Pathology at a tertiary care centre in Bengaluru in collaboration with the Department of Gastroenterology.

Study Duration: The study was carried out over a period of 6 months, from January 2025 to June 2025.

Sampling Technique: Consecutive sampling.

Sample Size: A total of 160 consecutive gastric biopsy specimens fulfilling the inclusion criteria during the study period were included in the analysis.

Study Population: Patients undergoing upper gastrointestinal endoscopy for dyspeptic symptoms or other clinical indications, in whom gastric biopsy specimens demonstrated features of chronic gastritis on histopathological examination, were enrolled consecutively until the desired sample size was achieved.

Inclusion Criteria

- Patients aged ≥18 years.
- Gastric mucosal biopsy specimens showing histopathological features of chronic gastritis.
- Adequate biopsy specimens containing well-preserved gastric mucosa.
- Patients who underwent upper gastrointestinal endoscopy during the study period.

Exclusion Criteria

- Inadequate or poorly preserved biopsy specimens.
- Gastric biopsy specimens showing gastric malignancy or gastrointestinal stromal tumors.
- Patients with a history of gastric surgery.
- Repeat biopsy specimens from the same patient.
- Cases with incomplete clinical or histopathological records.

Data Collection: Demographic details including age and sex, along with relevant clinical information and endoscopic findings, were retrieved from pathology requisition forms and hospital records. Gastric biopsy specimens were fixed in 10% neutral buffered formalin, routinely processed, embedded in paraffin, sectioned at 4–5 µm thickness, and stained with hematoxylin and eosin (H&E). Modified Giemsa stain was performed for the detection of Helicobacter pylori whenever required.

All histopathological slides were independently examined by experienced pathologists, and the findings were recorded according to the Updated Sydney Scoring System.

Histopathological Evaluation: All biopsy specimens were evaluated independently by experienced pathologists using the Updated Sydney System. The following histological parameters were graded semi-quantitatively as absent (0), mild (1), moderate (2), or marked (3):

- Chronic inflammation (mononuclear infiltrate)
- Neutrophilic activity
- Glandular atrophy
- Intestinal metaplasia
- Helicobacter pylori density

Additional histopathological findings, including lymphoid follicles, regenerative epithelial changes, erosions, and dysplasia, were also documented wherever present.

Outcome Measures: The primary outcome was to determine the histopathological spectrum of chronic gastritis according to the Updated Sydney Scoring System.

The secondary outcome was to evaluate the correlation between histopathological parameters and the presence and density of Helicobacter pylori infection.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 26.0. Continuous variables were expressed as mean ± standard deviation, whereas categorical variables were presented as frequencies and percentages. Associations between Sydney grading parameters and Helicobacter pylori positivity were assessed using the Chi-square test or Fisher's exact test as appropriate.

A p-value <0.05 was considered statistically significant.

Results

A total of 160 gastric biopsy specimens diagnosed as chronic gastritis were included in the study. The histopathological findings were evaluated according to the Updated Sydney Scoring System, and the presence of Helicobacter pylori was assessed using routine hematoxylin and eosin staining with Modified Giemsa stain where required.

Table 1: Distribution of Study Participants According to Age and Gender (n = 160)

Variable	Number (n)	Percentage (%)
Age Group (years)		
18–30	28	17.5
31–45	52	32.5
46–60	46	28.8
>60	34	21.2
Gender		
Male	94	58.8
Female	66	41.2

Most patients belonged to the 31–45 years age group (32.5%), followed by the 46–60 years group (28.8%). There was a male predominance (58.8%) with a male-to-female ratio of approximately 1.4:1.

Table 2: Histopathological Spectrum of Chronic Gastritis According to the Updated Sydney System (n = 160)

Histopathological Parameter	Mild n (%)	Moderate n (%)	Severe n (%)
Chronic inflammation	62 (38.8)	72 (45.0)	26 (16.2)
Neutrophilic activity	84 (52.5)	48 (30.0)	28 (17.5)
Glandular atrophy	36 (22.5)	22 (13.8)	8 (5.0)
Intestinal metaplasia	18 (11.2)	10 (6.3)	4 (2.5)
Lymphoid follicles	44 (27.5)	—	—

Moderate chronic inflammatory infiltrate was the most frequent histological finding (45.0%). Neutrophilic activity was predominantly mild (52.5%). Glandular atrophy and intestinal metaplasia were observed in 41.3% and 20.0% of biopsies, respectively, while lymphoid follicles were identified in 27.5% of cases.

Table 3: Distribution of Helicobacter pylori Density According to the Updated Sydney System (n = 160)

Helicobacter pylori Density	Number (n)	Percentage (%)
Absent	58	36.2
Mild	48	30.0
Moderate	34	21.3
Marked	20	12.5

Helicobacter pylori was detected in 102 (63.8%) biopsy specimens. Mild colonization was the most common pattern (30.0%), whereas marked bacterial density was observed in 12.5% of cases.

Table 4: Correlation between Helicobacter pylori Infection and Histological Activity (n = 160)

Histological Activity	H. pylori Positive (n=102)	H. pylori Negative (n=58)	p-value
Mild (n=84)	42	42	
Moderate (n=48)	40	8	
Severe (n=28)	20	8	**0.002**

A statistically significant association was observed between Helicobacter pylori infection and histological activity (p = 0.002). Moderate and severe inflammatory activity occurred more frequently among H. pylori-positive cases,

indicating that Helicobacter pylori positivity was associated with greater inflammatory activity.

Discussion

The present study evaluated the histopathological spectrum of chronic gastritis using the Updated Sydney Scoring System and correlated the histological findings with Helicobacter pylori infection. The majority of patients were middle-aged with a male predominance, and H. pylori was identified in 63.8% of gastric biopsy specimens. Moderate chronic inflammation was the most frequent histopathological finding, and a significant association was observed between H. pylori positivity and increased inflammatory activity.

Genta and Rugge emphasized that standardized histopathological assessment using the Sydney System improves the identification of patients at risk of developing gastric premalignant lesions and facilitates uniform reporting across institutions. [8] Similarly, Rugge et al. demonstrated that systematic grading of gastritis and mucosal atrophy provides important prognostic information regarding gastric cancer risk, supporting the routine use of structured histopathological evaluation. [9]

The prevalence of H. pylori infection observed in the present study is comparable to that reported in previous studies, where the organism remained the principal etiological factor responsible for chronic active gastritis. Dinis-Ribeiro et al. highlighted that persistent H. pylori infection contributes to progressive mucosal damage, glandular atrophy, and intestinal metaplasia, emphasizing the importance of early diagnosis and eradication therapy to prevent gastric neoplasia. [10] Lahner et al. also reported that patients with chronic atrophic gastritis have an increased long-term risk of gastric carcinoma, reinforcing the significance of identifying atrophic changes on routine biopsy specimens. [11] In the present study, glandular atrophy and intestinal metaplasia were observed predominantly among H. pylori-positive cases, suggesting progression along the Correa cascade of gastric carcinogenesis. Dixon described that chronic inflammation induced by persistent bacterial colonization gradually results in mucosal destruction and replacement by metaplastic epithelium, thereby increasing malignant potential. [12] Likewise, El-Zimaity demonstrated that histopathological examination combined with appropriate special staining remains one of the most reliable methods for detecting H. pylori, particularly in biopsies with low bacterial density. [13]

The statistically significant association between H. pylori infection and histological activity observed in the present study is consistent with previous reports indicating that higher bacterial density is associated with greater neutrophilic infiltration and chronic inflammatory changes. Rugge et al. recommended that pathology reports should include Sydney grading parameters because they provide clinically relevant information for patient management and follow-up. [14] Furthermore, Genta and Sonnenberg reported that although a subset of chronic gastritis cases may be H. pylori-negative, the majority of active chronic gastritis continues to be closely associated with H. pylori infection, highlighting its dominant pathogenic role. [15]

Overall, the findings of the present study reaffirm the clinical utility of the Updated Sydney Scoring System in grading chronic gastritis and demonstrate a significant correlation between Helicobacter pylori infection and the severity of histopathological changes.

Limitations: This study has certain limitations. It was conducted at a single tertiary care centre over a relatively short study period. Clinical follow-up after eradication therapy and interobserver variability in histopathological grading were not assessed. In addition, histopathological findings were not correlated with endoscopic severity or clinical outcomes.

Future Recommendations: Further multicentre studies with larger sample sizes and long-term follow-up are recommended to evaluate the prognostic significance of Sydney grading and its correlation with treatment response and progression to premalignant gastric lesions.

Conclusion

The Updated Sydney Scoring System provides a standardized and reliable method for the histopathological assessment of chronic gastritis. Helicobacter pylori infection was detected in a substantial proportion of cases and showed a significant association with increased inflammatory activity and premalignant mucosal changes such as glandular atrophy and intestinal metaplasia. Routine application of the Updated Sydney Scoring System along with assessment of Helicobacter pylori status may facilitate risk stratification and early identification of patients requiring surveillance for gastric malignancy.

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