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Original Research Article

# A Hospital-Based Study Evaluates Various Histopathological Parameters of Chronic Gastritis using the Updated Sydney System and to Correlate it with Presence of H. Pylori

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**Conflict of interest: Nil**

**Abstract:**

**Aim:** The aim of the present study was to evaluate various histopathological parameters of chronic gastritis using the updated Sydney system and to correlate it with presence of HP.

**Material & Methods:** The present study was a retrospective descriptive study conducted at Department of Pathology from January 2023 to June 2023. All endoscopic antral biopsies received in the Department of Pathology, were reviewed with reference to light microscopic findings. A total of 220 slides were analysed out of which 20 had features of malignancy and were excluded from the study. The remaining 200 cases with features of chronic gastritis were perceived.

**Results:** A total of 100 cases of chronic gastritis were reviewed. The mean patient's age was 42.8 (15 -80 yrs). Most of the patients (36.5%) were in the age group of 36-50 yrs. There were 110 males and 90 females. Chronic inflammation was observed in all (100%) cases of chronic gastritis. Majority around 100 (50%) of them had moderate inflammation. Activity as defined by the presence of polymorphonuclear infiltrate in the glands was seen with varying severity in 70 biopsies. Chronic gastritis cases with mild activity (17%) outnumbered the rest with moderate and severe in our study. 44 (22%) cases showed intestinal metaplasia of varying severity – 28 had mild, 14 had moderate and 2 had severe intestinal metaplasia. Atrophy was observed in only one case (0.5%) and it was of mild degree only. However, no HP was detected in gastritis case with atrophy. Lymphoid follicle was present in 36% of cases. Positivity for HP was high (89.28%) in severe grade of inflammation. A statistically significant association was accomplished between chronic inflammation and presence of HP, activity and lymphoid follicle ($p<0.01$). A strong positive correlation was evidenced between activity and presence of HP. The association of activity with HP, lymphoid follicle and intestinal metaplasia was found to be statistically significant ($p=0.000$).

**Conclusion:** The updated Sydney classification provides an objective mean of classifying chronic gastritis and increases the likelihood of detection of HP. Presence of intense grade of inflammation activity and lymphoid follicle should hint the histopathologist to search for HP. And also, the presence of one of these features is a strong indicator for the presence of the other.

**Keywords:** Chronic Gastritis, Helicobacter Pylori, Sydney Classification.



## Introduction

Gastritis, perhaps best defined as the inflammatory response of the gastric mucosa to injury, is an extremely common condition worldwide. The fundamental histologic change is an increase in the inflammatory cells in the gastric mucosa. Acute gastritis refers to acute mucosal damage after acute alcohol intoxication, drugs, corrosive substance, gastric irradiation etc. Chronic gastritis is mainly characterized by two main features, i.e. infiltration of lamina propria by chronic inflammatory cells and glandular atrophy. [1] Chronic gastritis being a more common disorder and usually manifest as a

pathologic spectrum of lesions ranging from active chronic gastritis to erosions and malignancy. Helicobacter pylori (HP) are associated with several gastroduodenal lesions.

Nearly half of the world's population is infected with HP. [2] Helicobacter pylori colonises gastric mucosa leading to production of pro-inflammatory cytokines causing direct epithelial cell injury resulting in gastritis. [3] Histopathological examination remains the gold standard for diagnosis. Helicobacter pylori is a curved to wavy bacterium, which can be identified by hematoxylin and eosin stain when numerous, but is more reliably recognized by other histochemical stains like Giemsa, Warthin-Starry or silver stains. [4] The pattern of inflammation is usually characterized by a mixed acute and chronic inflammatory cell infiltrate in the lamina propria frequently accompanied by intraepithelial infiltration of neutrophils.

As there is an effective specific treatment for H. pylori associated gastroduodenal disorders, pathologists are usually requested to identify the organism in endoscopic biopsies. [1] The histopathological classification of gastritis was rather simplified from many conflicting nomenclatures to one, the Sydney System. Combination of topographical, morphological and etiological factors in the diagnosis of chronic gastritis was used in The Sydney System (1990). [5] An upgradation of The Sydney System in 1994 at Houston, Texas gave a more appropriate classification system for gastritis including endoscopic findings. [6] It was seen that HP, chronic inflammatory infiltrate, neutrophilic infiltration, presence of lymphoid follicles and aggregates and surface epithelial damage are strongly associated with each other. The presence of one of these histological features is a strong indicator for presence of other features.

Thus, in this study by correlating the various parameters we can suggest the most predictive parameter associated with HP infection.

## Materials & Methods

The present study was a retrospective descriptive study conducted at Department of Pathology, Anugrah Narayan Magadh Medical College and Hospital , Gaya, Bihar , India from January 2023 to June 2023. All endoscopic antral biopsies received in the Department of Pathology, Anugrah Narayan Magadh Medical College and Hospital, Gaya , Bihar, India were reviewed with reference to light microscopic findings. Two slides were examined for each case, one H & E and Giemsa stain for histopathological examination and detection of HP on gastric mucosa respectively. A total of 220 slides were analysed out of which 20 had features of malignancy and were excluded from the study. The remaining 200 cases with features of chronic gastritis were perceived. The biopsies were evaluated for the presence and intensity of mononuclear inflammatory cell infiltrate, inflammatory activity, glandular atrophy, intestinal metaplasia, lymphoid aggregates and also for HP density.

All parameters were graded according to Houston updated Sydney system modified by Aydinet al [5] to provide a more subjective score.

Each morphological variable was scored as follows: absent (score 0), mild (score 1), moderate (score 2), severe (score 3).

Lymphoid follicles were ranked by the index proposed by Wotherspoon et al. [7]

### Statistical Analysis:

SPSS software (no 23) was used for statistical analysis. Chi square test was used to assess the association between various morphological variables and HP infection. Correlation between histological findings and HP infection was done by using spearman's correlation. A probability value of less than 0.05 was taken as statistically significant.

## Results

**Table 1: Age and gender wise distribution of chronic gastritis**

| Age in years | Male N | Female N | Total (%) |
|---|---|---|---|
| <20 | 3 | 3 | 6 (3) |
| 21-35 | 40 | 30 | 70 (35) |
| 36-50 | 37 | 36 | 73 (36.5) |
| 51-65 | 15 | 14 | 29 (14.5) |
| 66-80 | 15 | 7 | 22 (11) |
| Total | 110 | 90 | 200 |

A total of 100 cases of chronic gastritis were reviewed. The mean patient's age was 42.8 (15 -80 yrs). Most of the patients (36.5%) were in the age group of 36-50 yrs. There were 110 males and 90 females.

**Table 2: Histological grading of chronic gastritis according to updated Sydney system**

| Histological variables | Total | % | Grade | No. | % |
|---|---|---|---|---|---|
| Chronic Inflammation | 200 | 100 | Mild | 72 | 36 |
| | | | Moderate | 100 | 50 |
| | | | Severe | 28 | 14 |
| Activity | 70 | 35 | Mild | 34 | 17 |
| | | | Moderate | 24 | 12 |
| | | | Severe | 12 | 6 |
| Intestinal Metaplasia | 44 | 22 | Mild | 28 | 14 |
| | | | Moderate | 14 | 7 |
| | | | Severe | 2 | 1 |
| Atrophy | 1 | 0.5 | Mild | 1 | 0.5 |
| | | | Moderate | Nil | Nil |
| | | | Severe | Nil | Nil |
| HP | 72 | 36 | Mild | 16 | 8 |
| | | | Moderate | 44 | 22 |
| | | | Severe | 12 | 6 |

Chronic inflammation was observed in all (100%) cases of chronic gastritis. Majority around 100 (50%) of them had moderate inflammation. Activity as defined by the presence of polymorphonuclear infiltrate in the glands was seen with varying severity in 70 biopsies. Chronic gastritis cases with mild activity (17%) outnumbered the rest with moderate and severe in our study. 44 (22%) cases showed intestinal metaplasia of varying severity – 28 had mild, 14 had moderate and 2 had severe intestinal metaplasia. Atrophy was observed in only one case (0.5%) and it was of mild degree only. However, no HP was detected in gastritis case with atrophy. Lymphoid follicle was present in 36% of cases.

**Table 3: Association of HP and degree of chronic inflammation in chronic gastritis and Association of HP and degree of activity in chronic gastritis**

| Chronic inflammation | No. ofcases | HP positive | % |
|---|---|---|---|
| Mild | 72 | 2 | 2.77 |
| Moderate | 100 | 45 | 45 |
| Severe | 28 | 25 | 89.28 |
| **Activity** | | | |
| Mild | 34 | 23 | 67.64 |
| Moderate | 24 | 19 | 79.16 |
| Severe | 12 | 11 | 91.66 |

Positivity for HP was high (89.28%) in severe grade of inflammation. A statistically significant association was accomplished between chronic inflammation and presence of HP, activity and lymphoid follicle ($p<0.01$). A strong positive correlation was evidenced between activity and presence of HP. The association of activity with HP, lymphoid follicle and intestinal metaplasia was found to be statistically significant ($p=0.000$).

## Discussion

Disorders of the stomach are a frequent cause of clinical disease, with inflammatory and neoplastic lesions being particularly common. Diseases related to gastric acid account for nearly one third of all health care spending on gastrointestinal (GI) diseases. Symptomatology of gastric diseases range from dyspepsia to altered bowel movements and dysphagia to GI bleed. Patients presenting with dyspepsia are often subjected to upper GI endoscopy as the first line of investigation. Endoscopic screening may detect mucosal lesions at an early stage especially atrophy, intestinal metaplasia and dysplasia so as to prevent progress of lesions to invasive cancer. [8] Biopsy sampling of gastric mucosa at diagnostic endoscopy provides information that cannot be obtained by other means. The most common indication for gastric biopsy is the need to know whether or not the patient is infected with H. pylori, and whether the stomach is gastritis or not. Microscopic examination of gastric biopsy specimens, in addition to H. pylori status, provides information about the grade, extent, and topography of gastritis-related and atrophy related lesions in the stomach. It has been firmly established and known that the endoscopic findings in H. pylori gastritis do not correlate with histological changes. Biopsy provides an excellent opportunity for the clinician and histopathologist to correlate the clinical data, endoscopic findings and pathological lesions. H. pylori infection has been established firmly with

the development of peptic ulcer, chronic active gastritis, chronic persistent gastritis, atrophic gastritis and gastric neoplasia including gastric adenocarcinoma and gastric mucosa associated lymphoid tissue lymphomas. [9] The reported prevalence of H. pylori in patients with functional dyspepsia ranges from 39-87%. [10] It is widely accepted that colonization of the gastric surface epithelium by H. pylori is commonly associated with type B chronic gastritis. H. pylori were seen in 77% cases of gastritis [11] and 80% cases of gastric ulcer. [12]

A total of 100 cases of chronic gastritis were reviewed. The mean patient's age was 42.8 (15 -80 yrs). Most of the patients (36.5%) were in the age group of 36-50 yrs. There were 110 males and 90 females. Chronic inflammation was observed in all (100%) cases of chronic gastritis. Majority around 100 (50%) of them had moderate inflammation. Activity as defined by the presence of polymorphonuclear infiltrate in the glands was seen with varying severity in 70 biopsies. Chronic gastritis cases with mild activity (17%) outnumbered the rest with moderate and severe in our study. 44 (22%) cases showed intestinal metaplasia of varying severity – 28 had mild, 14 had moderate and 2 had severe intestinal metaplasia. Atrophy was observed in only one case (0.5%) and it was of mild degree only. However no HP was detected in gastritis case with atrophy. Lymphoid follicle was present in 36% of cases. Positivity for HP was high (89.28%) in severe grade of inflammation. Direct epithelial damage by HP results in liberation of epithelium derived proinflammatory cytokines leading to recruitment of inflammatory cells. Presence of chronic inflammatory infiltrates was perceived in all cases with the majority (50%) having moderate inflammation followed by severe inflammation. A study done by Witteman et al [13] observed chronic infiltrate in all biopsies with majority having moderate inflammation. Statistically significant association between chronic inflammation and acute inflammatory infiltrate, lymphoid follicle and density of HP was obtained akin to work done by Garg et al. [14] An increase in the positivity of HP with increasing grade of inflammation was notable in our study. Also chronic inflammation showed a strong positive correlation next only to activity for the presence of HP.

A statistically significant association was accomplished between chronic inflammation and presence of HP, activity and lymphoid follicle ($p<0.01$). A strong positive correlation was evidenced between activity and presence of HP. The association of activity with HP, lymphoid follicle and intestinal metaplasia was found to be statistically significant ($p=0.000$). Association of H. pylori with degree of chronic inflammation, neutrophilic activity, lymphoid aggregates, intestinal metaplasia and atrophy in chronic gastritis was evaluated. H. pylori were positive in 85.71% cases of chronic gastritis with severe inflammation similar to Misra V et al. [15] A significant association was seen between degree of chronic inflammation and H. pylori infection ($p<0.05$). Neutrophilic activity is an almost universal phenomenon in H. pylori gastritis. Biopsy specimens contain neutrophils in virtually all cases of H. pylori positive gastritis. Neutrophils are a very sensitive indicator for the presence or absence of H. pylori and disappear within days of cure of infection. [16]

The formation of germinal centre is a morphologic indication of lymphocyte response to antigen. Evidences in literature shows that proliferation of T cells and macrophages is induced by H. pylori, which release several cytokines (interleukin 2 and 6) which leads to proliferation of B cells and development of lymphoid follicles. [17,18] Scattered lymphoid aggregates were excluded and only germinal centre formation which is a morphological indicator of lymphocyte response to antigen was considered. Sixty four percent of the cases with the presence of lymphoid follicle were positive for HP. Similar to Mysorekaret al [19] we also noticed strong association between the presence of lymphoid follicle and mucosal inflammation, activity and HP infection.

## Conclusion

To conclude, our study has determined a strong association of chronic inflammation, activity, intestinal metaplasia and lymphoid follicle with HP. So the presence of any of the above parameters should allude the histopathologist to search for HP. By establishing a strong inter association among the parameters except for intestinal metaplasia, the presence of one parameter should clue the observer to search for the presence of other parameter and also for the presence of HP.

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