

## Histopathologic Study of Chronic Antral Gastritis

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### ABSTRACT

**Background:** Gastritis has a broad histopathologic and topographical spectrum and leads to different patterns of disease. The introduction of the Sydney system made it possible to grade histological parameters, identify topographic distribution and provide etiological information which would help to generate reproducible and clinically useful diagnoses. The aim of this study was to determine the prevalence of *Helicobacter pylori* in non-ulcer dyspepsia, duodenal ulcer and gastric ulcer; and to assess the histopathologic features associated with chronic gastritis.

**Methods:** Gastric antral biopsy specimens from 200 patients were examined for the prevalence of *H pylori*, and were classified and graded histologically.

**Results:** The overall colonization rate of *H pylori* was 44%. The colonization rates were 85%, 67% and 41% in patients with duodenal ulcer, gastric ulcer and non-ulcer dyspepsia respectively. There was not much difference between the degree of atrophy and intestinal metaplasia in *H pylori* positive and negative cases.

**Conclusions:** *Helicobacter* gastritis is the commonest type of gastritis present in patients presenting with dyspeptic symptoms. It is more common in patients presenting with duodenal ulcer. Adequate sampling is a must for accurate diagnosis of *H pylori* colonization.

**Keywords:** gastritis, *Helicobacter*, Sydney system

### INTRODUCTION

The diagnosis of gastritis is both overused and often missed - overused when it is applied loosely to any transient upper abdominal complaint in the absence of validating evidence, and missed because most patients with chronic gastritis are asymptomatic. Gastritis is simply defined as inflammation of gastric mucosa.<sup>1</sup> Chronic gastritis is the presence of chronic mucosal inflammatory changes leading eventually to mucosal atrophy and intestinal metaplasia, usually in the absence of erosion. A large body of evidence indicates that the most important etiologic association with chronic gastritis is chronic infection by the bacillus *Helicobacter pylori*.<sup>2-5</sup>

Gastritis has been classified in several ways, which differ from one country to another, sometimes from one department to another and even within a single institution, depending upon the investigator concerned.<sup>6</sup> In order to avoid confusion, the Sydney system has been proposed for the microscopic reporting of gastritis.<sup>7</sup> It incorporates topographical, morphological and etiological information into a schema that would help generate reproducible and clinically useful diagnoses.<sup>8,9</sup> The most important features of this system is the grading of the main histological features of gastritis accurately using the visual analogue scales.<sup>10</sup>

The aims of this study were to assess the colonization rate of *H pylori* in gastric antral biopsy specimens and

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to study the histological changes as a consequence of chronic gastritis.

**METHODS**

An observation study was conducted in Kathmandu Hospital P. Ltd. from January to Jun 2011. Only patients with histological evidence of gastritis were included and those with malignant diseases were excluded from the study. Patients were grouped under three clinical conditions: non-ulcer dyspepsia, duodenal ulcer and gastric ulcer.

The biopsy specimens were fixed in 10% formalin and routinely processed. Paraffin wax sections were cut at 4 micron thickness and stained with Hematoxylin and Eosin. Giemsa stain was done for *H pylori*. *H pylori* density, inflammation, activity, atrophy and intestinal metaplasia were graded using the Visual analogue scale as presented in the Sydney system (Figure 1).

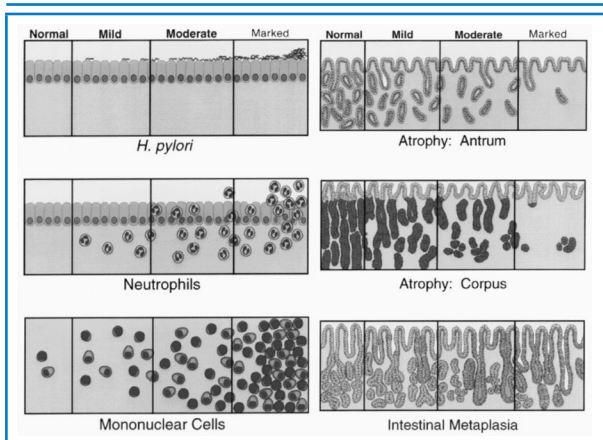


Figure 1. Visual analogue scales for grading gastric biopsy

**RESULTS**

Among the 200 biopsies, 26 (13%) patients had duodenal ulcer, six (3%) had gastric ulcer and the remaining 168 (84%) patients presented with non ulcer dyspepsia. One hundred and fifteen (67.5%) patients were male and 85 (42.5%) were female. The mean age was 41.5 years (range 18 - 79 years). The patients presented with various symptoms like abdominal pain, nausea, vomiting, belching, throat pain, water brash etc. Sixty two (31%) patients had a history of intake of proton pump inhibitors prior to the endoscopic biopsy. *Helicobacter pylori* was demonstrated in Giemsa stained slides in 88 (44%) cases, which included 50 male patients and 38 females.

With reference to the visual analogue scale, 40 (20 %) cases showed mild *H pylori* density, 32 (16%) showed

moderate and 14 (7%) showed marked *H pylori* density. *H pylori* was not detected in remaining 112 (56%) cases. The density of *H pylori* is demonstrated in Figure 2.

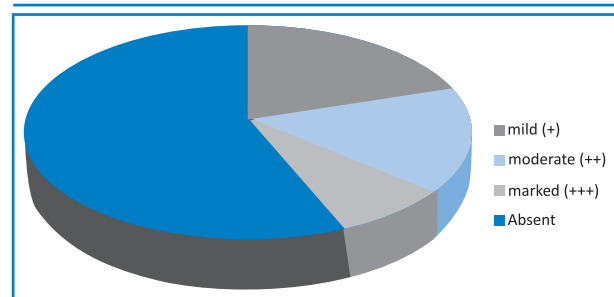


Figure 2. *H pylori* density

The colonization rate was 84.6% in duodenal ulcer, 66.6% in gastric ulcer and 40.9% in non ulcer dyspepsia.

The degree of mononuclear inflammatory infiltrate, neutrophilic activity, atrophic changes and intestinal metaplasia in *H pylori* positive and *H pylori* negative gastritis (Table 2-5). *Helicobacter pylori* was detected in all cases, where lymphoid follicles were detected.

Table 2. Degree of mononuclear infiltrate

Type of gastritis	Mild	Moderate	Marked	Lymphoid follicles present
<i>H pylori</i> positive	6 (3%)	66 (33%)	10 (5%)	6 (3%)
<i>H pylori</i> negative	30 (15%)	90 (45%)	2 (1%)	0 (0%)
Total	36 (18%)	156 (78%)	12 (6%)	6 (3%)

Table 3. Neutrophilic activity

Type of gastritis	Mild	Moderate	Marked	No activity
<i>H pylori</i> positive	70 (35%)	13 (6.5%)	5 (2.5%)	0 (0%)
<i>H pylori</i> negative	6 (3%)	2 (1%)	4 (2%)	100 (50%)
Total	76 (38%)	15 (7.5%)	6 (4.5%)	100 (50%)

Neutrophil activity was invariably present in all *H pylori* positive cases. Three of the five *H pylori* positive cases showed marked neutrophil activity.

Table 4. Atrophic changes

Type of gastritis	Mild	Moderate	Marked
<i>H pylori</i> positive	8 (4%)	2 (1%)	1 (0.5%)
<i>H pylori</i> negative	7 (3.5%)	2 (1%)	0 (0%)
Total	15 (7.5%)	4 (2%)	1 (0.5%)

Table 5. Intestinal metaplasia

Type of gastritis	Mild	Moderate	Marked
<i>H pylori</i> positive	1 (0.5%)	4 (2%)	0 (0%)
<i>H pylori</i> negative	2 (1%)	3 (1.5%)	0 (0%)
Total	3 (1.5%)	7 (3.5%)	0 (0%)

There was not much difference between the degree of atrophy and intestinal metaplasia in *H pylori* positive and negative cases.

## DISCUSSION

The study has shown a significant number of cases (44%) of chronic gastritis are positive for *Helicobacter pylori*. However, this figure is much less compared to other studies.<sup>11-4</sup> This discrimination is probably due to intake of proton pump inhibitors in sixty two patients prior to endoscopic biopsy. Moreover, the biopsy included tissue from the antral mucosa only. It is suggested that careful examination of four specimens (two antral and two corpus) has a high probability of establishing the correct *H pylori* status. Corpus biopsies are particularly valuable for yielding positive results after treatment.<sup>15,16</sup> Under these circumstances, organisms may be rare or disappear from the antrum but remain in the oxyntic mucosa, which may also develop cystic dilatations with hypertrophy of the parietal cells.<sup>17</sup> Though special stains like Giemsa stain illustrate *H pylori* in most cases, immunostains may be particularly useful in detecting coccoid forms.<sup>18,19</sup>

The study has shown that in duodenal ulcers, the gastric mucosa is colonized by *H pylori* in 84.6% of cases. Similarly, in gastric ulcers, the colonization rate is lower (66.6%). Dixon reviewed 12 studies from European and other developed and developing countries, and reported a colonization rate of *H pylori* of 93% for patients with duodenal ulcer and 80% for patients with gastric ulcer.<sup>20</sup> Again, this difference in *H pylori* positivity can be attributable to prior treatment with proton pump inhibitors.

Of all the six cases in which lymphoid follicles were seen, *Helicobacter pylori* was demonstrable easily. Lymphoid aggregates with germinal centers are characteristic of chronic *H pylori* gastritis and a hallmark of this diagnosis. If sufficient biopsy specimens are examined they are found in 100% of *H pylori* positive cases. Lymphoid follicles in a *Helicobacter* negative case suggest that the organisms have been missed (either overlooked or not present because of sampling errors) or that the infection has been cleared.<sup>10</sup>

Neutrophil polymorphs in a background of chronic inflammation were present in all *H pylori* positive gastritis. Three of the five *H pylori* positive cases with

marked neutrophil activity showed marked *H pylori* density as well. Neutrophil "activity" is likely to be linked to tissue damage. Chronic inflammation in the absence of neutrophils is also "active" in the sense that cytotoxic T lymphocytes and other cell effectors may play a role in tissue damage, and operate in glandular destruction in some patterns of gastritis. Neutrophil activity is an almost universal phenomenon in *H pylori* gastritis. Biopsy specimens contain neutrophils in virtually all cases of *H pylori* positive gastritis if a sufficient biopsy from both antrum and corpus is examined. Neutrophils may be seen in the lamina propria, within the epithelium (particularly in the region of glandular neck), and within the foveolar lumen, where they may form pit abscesses. The density of intraepithelial neutrophils has been correlated with the extent of mucosal damage and with the intensity of *H pylori* infection.<sup>21,22</sup> Neutrophils are a very sensitive indicator for the presence or absence of *H pylori* and disappear within days of cure of infection.<sup>23</sup>

Among 112 cases in which *H pylori* could not be demonstrated, neutrophil activity was present in 15 cases, of which three showed marked neutrophilic activity. No other supportive tests (such as rapid urease test, serological test for *H pylori* etc) were performed in these patients. The other etiologic factors causing active gastritis could be biliary gastritis, drug/ alcohol associated gastritis, autoimmune gastritis etc.<sup>10</sup> One of the biopsies showed marked eosinophilic infiltrate in the lamina propria. Eosinophilic infiltration was present in duodenal biopsy as well. Hence the diagnosis of eosinophilic gastroenteritis was made in that case.

Topographic classification of gastritis, as described in the Sydney system was not possible in this study as it included antral biopsy only. However, when intestinal and atrophic changes in antral mucosa alone was taken into account there was no significant difference between *Helicobacter* positive and *Helicobacter* negative gastritis. Of the 200 biopsies examined only 10% showed atrophic changes and 5% showed intestinal metaplasia. The identification of atrophic changes and intestinal metaplasia could be improved if a biopsy from incisura angularis is also included. Maximum degrees of atrophy and intestinal metaplasia are consistently found in the region of incisura angularis.<sup>24-6</sup> It is also the site most likely to reveal premalignant dysplasia.<sup>27,28</sup> The demonstration of intestinal metaplasia can also be enhanced by using special stains such as Alcian-blue/periodic acid Schiff (PAS) stain.<sup>10</sup>

## CONCLUSIONS

*H pylori* is the most important etiologic factor in chronic gastritis. *H pylori* colonization is under-reported in our setup. The detection of *H pylori* can be enhanced

by taking adequate biopsy sample, supplemented by special/immunological stains. Prior treatment with proton pump inhibitors before gastric biopsy leads to disappearance of *H pylori* from gastric antrum.

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