Abstract: Gastritis is an inflammation of the lining of the gastric mucosa and submucosal. The Sydney system classified gastritis with three combination histological division: etiology, topography, and morphology. The aim of this study to show the histopathologic profile in dyspepsia patient who went esophagogastroduodenoscopy in Wangaya Hospital with Sydney System. This descriptive study conducted on 200 patient with dyspepsia syndrome between January 2018 and June 2018 who doesn’t respond with PPI therapy for 4 weeks. All patient underwent esophagogastroduodenoscopy and biopsies were taken on antrum, and corpus using Hematoxylin and Eosin, and Giemsa stain for grading of various parameters and for detection of HP. Our research show that H. Pylori can be one of the cause of dyspepsia in 27 patient (13.5%), which antrum is the most 24 patients (88%). The most common age group affected by H Pylori was 41-50 years constituting 29.6% of cases. The majority (67.56%) of the biopsies showed marked inflammation; 28.2% had moderate inflammation and there is no atrophy process in this study (0%). In H Pylori infection correlated to marked inflammation, high activity of neutrophil and no atrophy process. The esophagogastroduodenoscopy needs to be done in patients with dyspepsia symptoms that untreatable with PPI therapy.

Keywords: Esophagogastroduodenoscopy, Sydney System, Helicobacter Pylori, Dyspepsia, Histopathology

1. Introduction

Dyspepsia defined as any symptomps referable to the upper gastrointestinal tract such as epigastric fullness, nausea, vomiting or heartburn. Dyspepsia may be classified as: organic dyspepsia, functional dyspepsia, drug related dyspepsia and dyspepsia from extraintestinal systemic disease. Dyspepsia can be related to chronic gastritis.

Gastritis is classified into acute and chronic gastritis. Chronic gastritis is divided into nonatrophic chronic gastritis, usually caused by Helicobacter pylori infection, and atrophic gastritis composed of autoimmune and multifocal atrophic gastritis caused by Hp or dietary factors, as well as special forms of gastritis composed of reactive (chemical, reflux), radiation, lymphocytic, non-infectious granulomatous, eosinophilic and other infectious gastritides. Chronic gastritis is an inflammatory condition of the gastric mucosa characterized by elementary lesions whose extent and distribution are related to their etiology and host responses. Infection with Helicobacter pylori is by far the most common cause of chronic active gastritis worldwide; chemical agents and autoimmune phenomena account for a small proportion of chronic, usually nonactive gastritides. Chronic gastritis is epidemiologically and biologically linked to the development of gastric cancer and H pylori is listed as a class I carcinogen.

2. Material and Method

2.1 Patient selection

The sample was taken on January 2018 to June 2018, 200 patients were selected from esophagogastroduodenoscopy clinic, Wangaya Hospital, Denpasar, Bali. These patients had symptomatic dyspepsia who doesn’t respond with PPI therapy for 4 weeks. The patients were examined clinically, and various routine laboratory investigations were done, including complete blood count, liver and renal function tests, and bleeding and coagulation assessment. Then, the patients underwent esophagogastroduodenoscopy. All the patients gave signed informed consent for biopsies.

2.2 Esophagogastroduodenoscopy

EGD was performed in all our patients in the esophagogastroduodenoscopy section using Fujifilm (Fujinon EPX - 2500, and colonoscope type EG – 530 NW). A minimum two gastric mucosal tissue biopsies (1 each from the antrum and corpus) were taken. All the patients were examined for findings suggestive of endoscopic gastritis, such as erythema, hyperemia, atrophy, and mucosal nodularity according to the criteria of the Sydney grading system. Additionally, they were examined for the presence of gastric erosion and ulceration. Also, they were evaluated for the anatomical location of gastritis, including antrum, antrum predominant pangastritis, and corpus predominant gastritis.

2.3 Histopathology

Gastric biopsies from the antrum and corpus were paraffin embedded, sectioned at 2 mm and stained with haematoxylin and eosin. Giemsa stained slides used to see density of H. pylori colonization. The grades of the major morphological variables [H. pylori density, neutrophil activity, mononuclear cells (MNC) infiltration, IM, and glandular atrophy] were determined using the semi-quantitative method of scoring according scored 0-3 (absent, mild, moderate or marked) to each morphological variable. All biopsies was examined by one pathologist doctor.

The following histological features were examined on each slide: density of H pylori, neutrophil activity, chronic...
inflammation, atrophy, and intestinal metaplasia. According to the histological criteria of the updated Sydney system, activity of chronic inflammation were scored by using a scale from normal or absent (score 0), to slight (score 1), moderate (score 2) and severe (score 3) change or increase. Atrophy was scored as absent (score 0), slight (score 1), moderate (score 2) and severe (score 3). The presence of neutrophil was scored as absent (score 0), slight (score 1), moderate (score 2) and severe (score 3). The presence and severity of intraepithelial neoplasia (dysplasia) were assessed as absent (score 0), mild (score 1), moderate (score 2) and severe (score 3).

H. Pylori density were scored by using a scale as absent (score 0), mild (single cell dropouts present; score 1), moderate (dropouts of several cells; score 2) or true erosions (score 3).

2.4 Statistical Analysis

This study is using the descriptive study.

3. Results

3.1 Clinicoeosscopic finding

The patient’s age ranged from 20 years to 80 years with an average of 48 years old, 93 patients were male and 107 were female. All patient had heartburn, nausea and epigastric pain, which did not respond to normal treatment. EGD revealed features of endoscopic gastritis in 200 patient. We analyzed 200 cases of gastric endoscopic biopsies. The result was from 200 dyspepsia patient who underwent EGD. 27 person (13.5%) was infected by H.Pylori. There were 13 (48%) female and 14 (51%) male patients with only a slight predominance of male patients showing a ratio of 1.077 : 1. The most common age group affected by H Pylori was 41–50 years constituting 29.6 % of cases, followed by 22.2% cases in 61-70 years, and 18.5% in 51 – 60 years. Chronic gastritis was widely distributed among age group ranging from 20-82 years with a mean age of 50 years.

Table 1: Age of the patients and their H. pylori status in chronic gastritis

<table>
<thead>
<tr>
<th>Age group(years)</th>
<th>H.pylori positive (n)</th>
<th>H.pylori negative (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11–20</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>21–30</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>31–40</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>41–50</td>
<td>8</td>
<td>46</td>
</tr>
<tr>
<td>51–60</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>61–70</td>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>71–80</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>81–90</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>173</td>
</tr>
</tbody>
</table>

3.2 Histopathological finding

Table 2: Histopathological grading of chronic gastritis according Sydney Grading System

<table>
<thead>
<tr>
<th>Histological Variables</th>
<th>None (n)</th>
<th>Mild (n)</th>
<th>Moderate (n)</th>
<th>Severe (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Inflammation</td>
<td>26 (13%)</td>
<td>45 (22.5%)</td>
<td>92 (46%)</td>
<td>37 (18.5%)</td>
</tr>
<tr>
<td>Neutrophilic infiltrate</td>
<td>167 (83.5%)</td>
<td>23 (11.5%)</td>
<td>10 (5%)</td>
<td>-</td>
</tr>
<tr>
<td>Atrophy</td>
<td>200 (100%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Intestinal metaplasia</td>
<td>198 (99%)</td>
<td>1 (0.5%)</td>
<td>1 (0.5%)</td>
<td>-</td>
</tr>
<tr>
<td>HP Density</td>
<td>173 (86.5%)</td>
<td>26 (13%)</td>
<td>1 (0.5%)</td>
<td>-</td>
</tr>
</tbody>
</table>

Endoscopic findings H Pylori were available in 27 (13.5%) cases. Antrum was the most common site, comprising 23 (85.1%) cases among which 1 (3.7%) cases were affected in corpus. One (3.7%) lesions were found in antrum and corpus, 2 lesion (7.4%) cases had detected in gaster.

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

<table>
<thead>
<tr>
<th>Chronic Inflammation</th>
<th>No. of cases</th>
<th>HP positive</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>45</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Moderate</td>
<td>92</td>
<td>2</td>
<td>2.17</td>
</tr>
<tr>
<td>Severe</td>
<td>37</td>
<td>25</td>
<td>67.56</td>
</tr>
</tbody>
</table>

Association HP with degree of chronic inflammation has found 2.17% of cases with moderate chronic inflammation, and 67.56% of cases with severe chronic inflammation.

Table 4: Association of HP and degree of neutrophil activity in chronic gastritis

<table>
<thead>
<tr>
<th>Neutrophil Activity</th>
<th>No. of cases</th>
<th>HP positive</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>22</td>
<td>18</td>
<td>81.8</td>
</tr>
<tr>
<td>Moderate</td>
<td>10</td>
<td>9</td>
<td>90</td>
</tr>
<tr>
<td>Severe</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

H. pylori was detected in 81.8% of cases with mild neutrophilic activity, and 90% of cases with moderate neutrophilic activity.

Figure 1: Photomicrograph of gastric biopsy showing Helicobacter pylori (Giemsa stain). Magnification 1000x
4.1. Non-atrophic gastritis

4.1.1. Antral-predominant non-atrophic gastritis
This pattern is the most common expression of H pylori gastritis. It is characterized by absence of atrophy, a moderately to severely inflamed antrum and a normal to mildly inflamed corpus. This condition is associated with either normal or increased acid secretion. Most patients with antrum-predominant gastritis experience no symptoms; they do, however, have an estimated lifetime risk of duodenal ulcer of ~20%, and possibly a minimally increased risk of adenocarcinoma of the distal stomach when compared to the noninfected population.

4.1.2. Nonatrophic pangastritis
In some subjects infected with H pylori, marked inflammation is distributed throughout the stomach, with little or no difference between antrum and corpus. Particularly frequent in poorly sanitized areas where H pylori is highly endemic, pangastritis is widely believed to be the background on which atrophy eventually develops. Although this hypothesis is founded on reasonable grounds, we are not aware of any studies that substantiate this proposition.

4.2. Atrophic chronic gastritis
Gastric mucosal atrophy is defined as the loss of appropriate glands. This loss occurs when glands damaged by inflammation are replaced either by connective tissue (scarring) or by glandular structures inappropriate for location (metaplasia). Most often, the metaplastic transformation assumes the phenotype of the glands lined by intestinal-type epithelium (IM), but in the oxyntic mucosa, it may also take the form of mucin-secreting antral glands (pseudopyloric metaplasia). The histological criteria for scoring atrophic-metaplastic changes in both the antral and oxyntic mucosa have been extensively described, and visual analogue scales have been proposed as a reference standard.

4.2.1. Antrum-restricted atrophic gastritis
In the Western world, when atrophy is detected in biopsy specimens from dyspeptic patients, it is most frequently located in the antral biopsy samples. In such patients, atrophic-metaplastic changes are the consequence of current (or past) H pylori infection. The biopsy set will show patchy metaplastic atrophy restricted to the distal mucin-secreting mucosa (including the incisura angularis) coexisting with moderate to severe inflammation and a normal or mildly inflamed corpus, with no atrophic changes.

4.2.2. Corpus-restricted (corpus-predominant) atrophic gastritis
In the oxyntic mucosa, atrophic-metaplastic changes can be detected in the absence of any coexisting atrophic changes of the distal stomach or in association with atrophic foci of the antral mucosa. The former condition is considered virtually pathognomonic of an autoimmune etiology and it is associated with an increased cancer risk.

4.2.3. Multifocal atrophic gastritis
Multifocal atrophic gastritis (MAG) is most prevalent in populations that are (or have been until recently) living in

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**Figure 2:** Photomicrograph of gastric biopsy showing lymphoid aggregates and polymorphonuclear intra epitel. Maginification 400X (H&E)

**Figure 3:** Photomicrograph of gastric biopsy showing no focal atrophy and intestinal metaplasia. Maginification 200X (H&E)

**Figure 4:** Photomicrograph of gastric biopsy showing aggregated lymphoid 200X (H&E)

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4. Discussion

*The phenotypes of gastritis*\(^{18}\)
Chronic gastritis can be atrophic or nonatrophic. Each of these two main categories encompasses several clinicopathologic entities with different patterns of inflammatory and epithelial alterations.
suboptimal sanitary conditions, including much of southern and eastern Asia, Latin America, and several parts of central, eastern, and southern Europe. Socioeconomic factors may be a surrogate for other unknown agents or biological situations that modulate the evolution of gastritis, because there are notable epidemiological exceptions to this association. Atrophic gastritis is a risk factor for gastric noninvasive neoplasia (dysplasia) and intestinal-type adenocarcinoma. It also predisposes to gastric ulcer. In MAG, biopsy specimens show foci of atrophic-metaplastic changes in both antral and corpus mucosa. In contrast to antrum-restricted atrophic gastritis, MAG may display severe inflammation in the oxyntic mucosa, and acid secretion may be reduced, suggesting a more advanced disease.

4.2.4. Atrophic pangastritis

Atrophic pangastritis is likely to represent an advanced stage of MAG, with which it shares the epidemiological characteristics. Atrophic pangastritis is the most prevalent setting for both noninvasive and invasive gastric neoplasia.

The Sydney System

The Sydney system is a novel classification and grading of gastritis that was devised by a group of experts at the 9th World Congress of Gastroenterology in Sydney, Australia in 1990. This system is combining topographical, morphological and etiological information for the diagnostic evaluation of gastritis. The Topography of the gastritis was considered the core of the classification. This classified gastritis restricted to the antrum, corpus, or a pangastritis. The etiology of gastritis, if known, was to be added as a prefix (e.g. H. pylori antral gastritis; autoimmune corpus gastritis, etc.). As suffix, phrases any of five key graded characteristics. Atrophic pangastritis is likely to represent an advanced stage of MAG, which is not really severe, each successive grade to represent an increase in severity of approximately one third.

The System provided a clear picture of the extent and topography of the gastritis and also its severity. In clinical diagnostic practice by adopting etiological prefix phrases, the core topography and morphological suffix phrases the histology report conveyed in a compact standard style the key data for that biopsy episode with a semi-quantitative format for future comparative episodes or studies

**Table 5: Grading criteria of gastric antral biopsies according to Sydney System**

<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrophy</td>
<td>mild</td>
<td>no evidence of gland loss</td>
</tr>
<tr>
<td>-</td>
<td>moderate</td>
<td>some areas with chronic inflammatory cells</td>
</tr>
<tr>
<td>-</td>
<td>severe</td>
<td>diffuse infiltration with dense chronic inflammatory cells</td>
</tr>
</tbody>
</table>

**Figure 5: The chart of the histological division of the original Sydney System**

The guidelines recommended these five parameters were recorded separately for both antrum and corpus with at least two random biopsies to be taken from each site. Furthermore, it was recommended these parameters were to be semi-quantitatively graded as absent, mild, moderate or severe, each successive grade to represent an increase in severity of approximately one third.

Esophagogastroduodenoscopy

Esophagogastroduodenoscopy is an examination to evaluate upper gastrointestinal tract. It can be used to perform diagnostic & therapeutic procedures, like biopsy. Should be reserved for patients who have little or no response to therapy after 7-10 days or for patients whose symptoms have not resolved after 6-8 wk. If upper GI esophagogastroduodenoscopy is unremarkable, patients w/ persistent symptoms or alarm features should be evaluated further for other diagnosis. For patients >55 yr (>40 yr in areas w/ high prevalence of gastric cancer), consider esophagogastroduodenoscopy when symptoms persist despite H. pylori testing/treatment & acid suppression therapy and when patient has one or more of: Previous gastric ulcer or surgery, continuing need for NSAID treatment, raised risk of gastric cancer, anxiety about cancer

**Figure 6: Suggested approach to the assessment and management of dyspepsia**

The most common age group affected by chronic gastritis in this study was 50-60 years with a mean age of 50 years, which is not really different with Udoh et al. also observed chronic gastritis in younger age group with mean age of 48.6 years. However, Garg et al. and Aydin et al. also reported chronic gastritis in relatively younger age group with a mean age of 47 years. We detected none cases of chronic gastritis below or at the age of 20 years and both
the cases were negative for H. pylori colonization. However, the study of chronic gastritis among children in Colombia showed H. pylori infection being common, affecting 59% of total children.

The rate of gastric colonization of H. pylori increased with increasing age in the present study, similar to the findings of other studies. We observed a slight higher incidence rate of chronic gastritis in male with a M:F ratio of 1.07:1. Similarly, the other study from Nepal observed a higher incidence in males with a M:F ratio of 1.6:1. Chen et al., Garg et al., and Pruthi et al. also had a higher incidence rate in males with a M:F ratio of 1.8:1, 2.1:1, 2.3:1 and 2.8:1 respectively. H. pylori colonization was detected more in male patients.

Antrum (85.1%) was the most common site in our study. Similarly, common biopsy location was from antrum in other studies. In the study by Dhakhwa et al., Garg et al. and Park et al. tissue was obtained from antrum only. H. pylori colonization was more in the antrum than in the corpus.

Our study demonstrated H. pylori in 13.5% of cases of chronic gastritis. Dhakhwa et al. and Pruthi et al. had detected 44% and 47% of cases of chronic gastritis with H. pylori colonization respectively, which is more than in our study. The incidence rate of H. pylori in different studies is subject to the accuracy of biopsy techniques. Thus, multiple biopsies are to be taken to improve the yield. The lower incidence of H. pylori in our study could be due to the use of proton pump inhibitors or antimicrobial agents by the patients prior to endoscopic biopsies or not following the proper guidelines to obtain mucosal biopsies.

The majority (67.56%) of the biopsies showed marked inflammation; 28.2% had moderate inflammation. Likewise, Archila et al., Park et al., and Whitteman et al. observed. However, Garg et al. found mild inflammation in most of the cases. The density of H. pylori colonization increased with severity of chronic inflammation in our study. This finding was compatible to other studies. In contrast, there was no statistical significant relationship between the density of H. pylori infection and the grade of chronic inflammation in the study conducted by Udoh et al.

In the present study neutrophilic activity was present in 16% of cases. Dhakhwa et al. and Park et al. had higher incidence of neutrophilic activity than in our study comprising 50% and 78.7% of cases, respectively. Neutrophilic activity was present in all H. pylori positive cases. H. pylori was not demonstrated in 86.5% of cases. 90% of cases with moderate neutrophilic activity have H. Pylori infection. There was a significant association between neutrophilic activity with H. pylori concentration in the present study as discussed elsewhere. However, Park et al. observed no statistical significance between neutrophilic activity and H. pylori concentration.

Atrophy was absent in our studies. Similarity had reported rare incidence of atrophic gastritis. Other studies had shown increase of atrophy with increasing age. The other study from Nepal and Garg et al. observed atrophy in 10% and 12.33% of cases respectively which is higher than in the present study.

5. Conclusion

The present study found that H. pylori infection has more found in male than female patient with the most case at age 41 - 50. H Pylori infection more be found in gastric biopsies in antrum with neutrophilic activity mononuclear cell infiltrate, and no atrophy process. The esophagogastroduodenoscopy needs to be done in a population with a severe form of gastritis to find accurate treatment for the type of gastritis.

We agreed with other authors that histology is the goal standard and mandatory for accurate diagnosis of gastritis in all cases.

References


