

## Endoscopic and Histopathological Interpretation of Gastritis in Nineveh Province

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### ABSTRACT

**Objectives:** To assess the diagnostic value of endoscopic findings compared to histopathological diagnosis, to delineate the relative frequency and pattern of different types of gastritis and their association with H. pylori and intestinal metaplasia in our locality, and to compare the results of this study with those of others.

**Methods:** In a cross sectional study 150 selected patients with different upper gastrointestinal symptoms have been examined at endoscopy units in Ibn-Sina teaching hospital and Al-Jamhori teaching hospital in Mosul city, from the first of June 2013 to the first of March 2014, all were assessed endoscopically and biopsies from both antral and body mucosa were taken for histopathological examination.

**Results:** This study has revealed gastritis histopathologically in 96.6% of cases, and the agreement between endoscopic and histopathological diagnosis was 88%. The chronic superficial gastritis represented the highest relative frequency in this histopathologically diagnosed gastritis, where it was seen in 61.3% of the cases and its relative frequency decreased with advance age, while chronic atrophic gastritis was diagnosed in 30% of the cases and its relative frequency increased with advanced age, while gastric atrophy wasn't detected in any case. Acute gastritis was detected in only 5.3% of the cases.

Helicobacter pylori was detected in 67% of cases. A significant association was detected between chronic gastritis and Helicobacter pylori infection, and its frequency decreased with increased severity of glandular atrophy. Follicular gastritis was diagnosed in 51% of chronic atrophic gastritis and 91.3% of them were Helicobacter pylori positive cases. By the use of the special stain AB/PAS pH (2.5), intestinal metaplasia has been diagnosed in 23% of cases and its relative frequency increased with advanced age.

**Conclusion:** There is a high rate of concordance (88%) between endoscopic findings and histopathological diagnosis of gastritis. Among gastritis chronic variety was the commonest. H. pylori had a significant association with chronic gastritis (chronic superficial gastritis and chronic atrophic gastritis). Intestinal metaplasia has been detected mainly in chronic atrophic gastritis and its frequency increased with advanced age.

**Keywords:** Endoscopic, histopathological, gastritis, H.pylori, intestinal metaplasia.

### التفسير الناضوري والنسيج المرضي لإلتهاب المعدة في محافظة نينوى

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#### الخلاصة

**الأهداف:** تهدف هذه الدراسة الى تحديد القيمة التشخيصية لنتائج الفحص الناضوري مقارنة بالتشخيص النسيجي المرضي وتحديد التكرار النسبي ونمط الأنواع المختلفة من إلهاب المعدة وإرتباطهم بالبكتريا الحلزونية والتنسج المعوي ألغدي والنمو الشاذ للنسيج ومقارنة نتائج هذه الدراسة مع دراسات أخرى سابقة.

**الحالات والطرق:** أجريت هذه الدراسة لمائة وخمسون مريضاً مصابين بمختلف أعراض الجهاز الهضمي العلوي تم فحصهم ناظورياً في وحدتي الناظور في مستشفى ابن سينا التعليمي ومستشفى الزهراوي التعليمي في مدينة الموصل، خلال الفترة الممتدة ما بين الأول من حزيران 2013 ولغاية الأول من آذار 2014 وتم أخذ الخزاع لبطانة المعدة من منطقتي البوابية والبدنية لغرض الفحص النسيجي المرضي.

**النتائج:** كشفت هذه الدراسة بأن 96.6% من حالات إتهاب المعدة تم تشخيصها بالفحص النسيجي المرضي وكان التوافق بين التشخيص الناظوري والتشخيص النسيجي المرضي 88% في إتهاب المعدة المشخص نسيجياً كون إتهاب المعدة المزمن السطحي أعلى نسبة مئوية حيث تم تشخيصه في 61.3% من الحالات وقلت نسبته المئوية مع تقدم العمر، تم الكشف عن البكتريا الحلزونية في 67% من الحالات، هذه الدراسة كشفت عن علاقة جيدة بين إتهاب المعدة المزمن والبكتريا الحلزونية قلت مع زيادة حدة الضمور، إتهاب المعدة الجريبي قد شخص في 51% من حالات إتهاب المعدة المزمن الضموري وأن 91.3% من هذه الحالات كانت تحتوي على البكتريا الحلزونية، تم الكشف عن التنسج المعوي الغدي في 23% من الحالات باستخدام الصبغة (PAS/AB pH 2.5) والنسبة المئوية لها تزداد مع تقدم العمر.

**الاستنتاج : 1.** هناك نسبة عالية من التوافق (88%) بين نتائج تنظير المعدة والفحص النسيجي المرضي.

2. إتهاب المعدة المزمن هو الأكثر شيوعاً بين أنواع إتهابات المعدة الأخرى.

3. توجد علاقة كبيرة بين وجود البكتريا الحلزونية وإتهاب المعدة المزمن (السطحي والضموري).

4. تم تشخيص التنسج الضموري المعدي فقط في إتهاب المعدة الضموري وتزداد نسبته مع تقدم العمر.

5. لم يتم الكشف عن أي نمو شاذ للنسيج في هذه الدراسة.

**الكلمات المفتاحية:** الناظوري، النسيج المرضي، إتهاب المعدة، البكتريا الحلزونية، التنسج الضموري المعدي.

## INTRODUCTION

The term gastritis has a broad histopathological and topographical spectrum lead to different concepts of what gastritis is. <sup>1</sup> Some think of it as a symptom complex, while others as a description of the endoscopic appearance of the stomach, however, it is best defined in histopathological arm as an acute (AG) or chronic inflammation of the gastric mucosa. Chronic gastritis (CG) is distinguishable into three main categories, i.e. chronic superficial gastritis (CSG), chronic atrophic gastritis (CAG) and gastric atrophy (GA).<sup>2</sup> There are several etiological types of gastritis, their different etiology being related to different clinical manifestation and pathological features.<sup>3, 4</sup> H. pylori has been established as a major etiological factor in the pathogenesis of chronic gastritis and gastric atrophy.<sup>5</sup>

An accurate diagnosis of inflammation of the stomach, can rarely be made clinically, or even on direct visualization through a gastroscope of fiberopic tube, but it is only reliable when histopathology is available. <sup>6</sup> There is a paucity of reports about the clinico-pathological interpretation of gastritis in Nineveh province. This study aims to assess the diagnostic value of endoscopic findings compared to histopathological diagnosis, to delineate the relative frequency and pattern of

different types of gastritis and their association with H. pylori and intestinal metaplasia (IM).

## PATIENTS AND METHODS

This study was reviewed and approved by the Medical Research Ethics Committee (MREC), college of Medicine, University of Mosul. With the co-operation of the medical and nursing staffs of endoscopy units in Mosul city, 150 symptomatic patients (81 males and 69 females) were selected randomly over a period of nine months started from the first of June 2013 to the first of March 2014, from endoscopy units in Ibn- Sina teaching hospital and Al- Jamhori teaching hospital. Those patients were referred to the upper GIT endoscopic units for one or more of the following symptoms; epigastric pain, dyspepsia, nausea, vomiting, and upper-gastrointestinal bleeding presenting as hematemesis and/ or malena.

Their ages ranged from 15 to 74 years, with a mean± SD of (39.5 ± 10.01).

The data collected from every patient included:

- Name, age, sex, chief complaint and duration.

An endoscopic examination was performed after an overnight fast. All endoscopies were carried out using Olympus GIFQ- 40, under local xylocain spray

of the throat. The findings of gastric inspection were recorded for all patients.

Gastritis was diagnosed endoscopically when there were erythematous granular erosive changes or flattening out of mucosal folds and visible submucosal vessels. Two to four biopsies were obtained in all patients from both the antrum and the body of the stomach, each measuring approximately 1-2 mm. They were collected on filter paper and immersed in a separate labeled container, fixed by 10% formalin and routinely embedded in paraffin wax. Serial sections of 4µm thickness were cut and stained by:

- 1- Hematoxylin and Eosin (H&E) for histopathological assessment.
- 2- Modified Giemsa stain for detection of *H. pylori*, which was stained blue to purple.
- 3- Special stain which is a combined of Alcian Blue /Periodic Acid Schiff (AB/PAS) pH (2.5), was used to identify neutral and acidic mucin (sulfomucins and sialomucins) for the detection of IM, which was stained blue (AB positive and PAS negative) while the normal gastric mucosal glands were stained magenta (PAS Positive and AB negative).

The histopathological findings in the gastric biopsies were classified into: Normal, Acute Gastritis or Chronic Gastritis.

Grading of chronic gastritis was assessed by the criteria of Whitehead *et al* of chronic gastritis (CG) as chronic superficial gastritis (CSG), chronic atrophic gastritis (CAG) and gastric atrophy (GA).<sup>4</sup> The clinical and pathological data of the studied patients were reviewed and entered into a computerized database. The statistical analysis included the mean ( $\bar{x}$ ),  $\pm$  SD, range, and Chi-square test. <sup>7</sup> P value equal or less than 0.05 was considered significant.

## RESULTS

Among the 150 symptomatic patients, there were 81 (54%) males with a mean age  $\pm$ SD of (39  $\pm$  5.5) years, and 69 (46%) females with a mean age  $\pm$ SD of (40  $\pm$  5.08) years. The peak age was at the 6<sup>th</sup> decade.

The endoscopic examination revealed normal gastric mucosa in 13 (9%) patients out of the total 150 patients. The histopathological findings of these 13 patient revealed that 4 (30%) patients showed antral gastritis, 1 (8%) patients showed body

gastritis, and the remaining 8 (62%) exhibited both antral and body gastritis.

The remaining 137 (91%) patients showed abnormal gastric mucosa (gastritis) on endoscopic examination. On histopathological examination, 5 (4%) patients showed normal gastric mucosa, 10 (7%) patients showed antral gastritis, 4 (3%) patients revealed body gastritis, while the remaining 118 (86%) patients showed both antral and body gastritis.

Among the 145 (96.6%) patients with gastritis histopathologically, acute gastritis as shown in (Fig. 1) was diagnosed in 8 (5.3%) of them and there was no significant association (P value 0.19) in different age groups. CSG as shown in (Fig. 2 and 3) was detected in 92 (61.3%) of the patients, which represented the highest relative frequency and it declined with advanced age. CAG as shown in (Fig. 4) was found in 45 (30%) of the patients and the relative frequency increased with advanced age as shown in (Fig. 5). While GA wasn't detected in any case.

By the use of modified Giemsa stain *H. pylori* as shown in (Fig. 6) was detected in 101 (67%) of the patients, and the relative frequency of this distribution increased with advanced age.

*H. pylori* was detected in one (20%) patient with normal gastric biopsy, in 3 (38%) patients with acute gastritis, and the highest relative frequency was found in patients with CSG and CAG, where it was found in 73 (79%) and 24 (53%) patients respectively.

The frequency of *H. pylori* decreased with the increased severity of gastric atrophy as shown in (Table 1) with P value (0.04).

*H. pylori* was detected in 97 (71%) of patients with CG, while acute on chronic gastritis as shown in (Fig. 7) was diagnosed in 58 (60%) of *H. pylori* positive patients.

By the use of the special stain AB/PAS pH (2.5), IM as shown in (Fig. 8) was encountered in 34 (23%) of all patients. The relative frequency of IM was increased with increasing age and the peak frequency was found among patients in the age group (71- 80) with P value (0.03).

The current study showed that the highest relative frequency of IM 32 (94%) was found in CAG, while only 2 (6%) of cases with IM was found in CSG. IM was not found in AG and normal gastric biopsies.

Follicular Gastritis was diagnosed in 23 (51%) patients with CAG. Twenty- one (91.3%) patients were *H. pylori* positive, while only 2 (8.7%) patients were *H. pylori* negative.

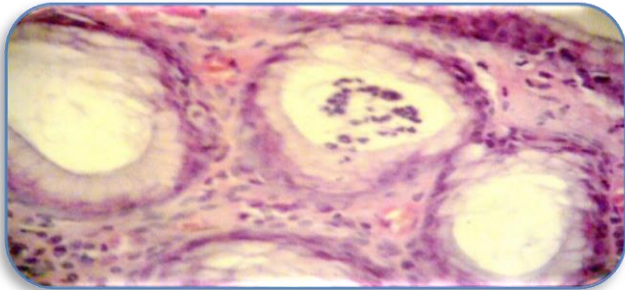


Figure 1: Acute gastritis with crypt abscess (H&E x400).

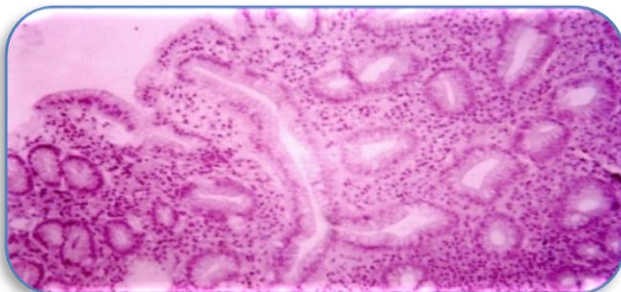


Figure 2: Chronic superficial gastritis (antrum) (H&E x100).

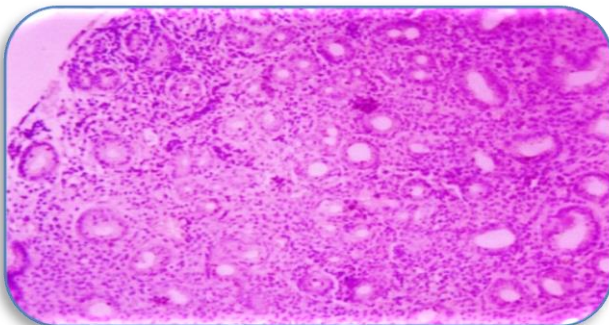


Figure 3: Chronic superficial gastritis (body) (H&E x100).

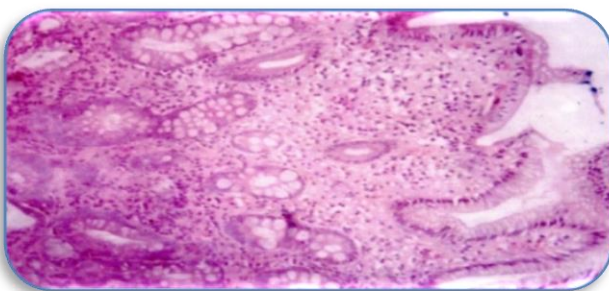


Figure 4: Chronic atrophic gastritis with intestinal metaplasia (H&E x100).

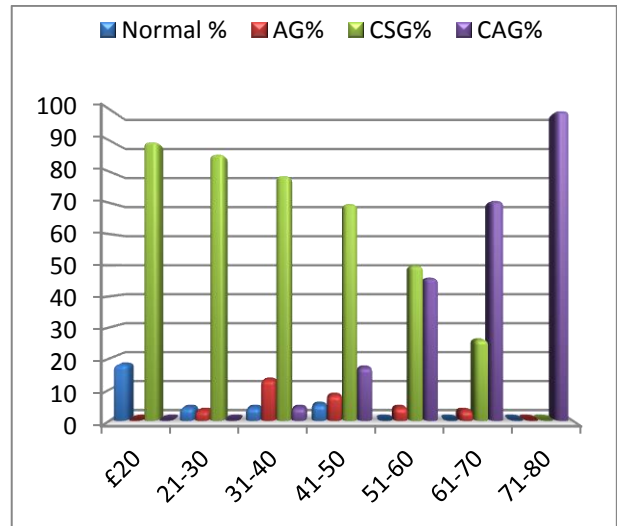


Figure 5: Frequency of different types of gastritis in relation to age groups.

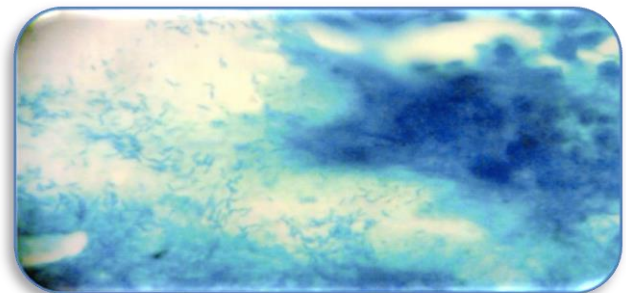


Figure 6: Helicobacter pylori (Giemsa stain x1000)

Table 1: The frequency of *H. pylori* according to severity of gastric atrophy in chronic atrophic gastritis.

Grading of Gastric Atrophy	No.	%	H. pylori + ve	
			No.	%
Mild	29	64	17	38
Moderate	12	27	6	13
Severe	4	9	1	2
Total	45	100	24	53

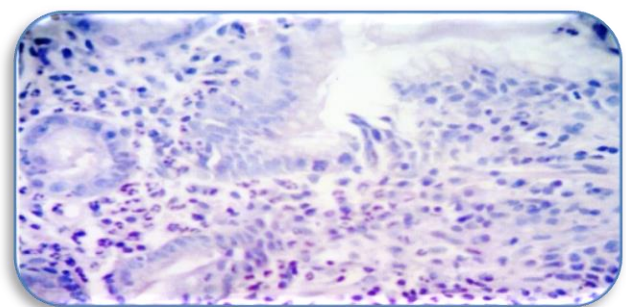
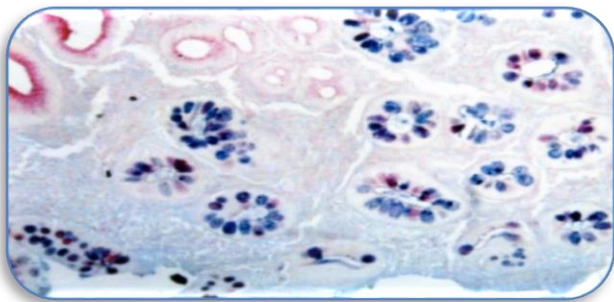


Figure 7: Acute on chronic gastritis (H&E x400).



**Figure 8:** Intestinal metaplasia, showing goblet cells containing acidic mucin is stained blue (AB+ve) and normal gastric mucosa containing neutral mucin is stained magenta (PAS +ve.). (AB/PAS stain pH 2.5  $\times$ 400).

## DISCUSSION

Gastritis is common endoscopic finding, however, reports on the value of endoscopy alone for the diagnosis of gastritis is still controversial.<sup>5,6</sup> It is a very common lesion even in normal population but its real prevalence is difficult to be estimated precisely because so many are asymptomatic and may not come under medical attention.<sup>6</sup> On the other hand, it is definitely diagnosed only through histopathological examination of gastric biopsy which is an invasive and not an easy technique.<sup>8,9</sup> In this study gastritis was diagnosed histopathologically in 96.6% of the sampled patients. Acute gastritis was diagnosed in 5.3%, while CG was diagnosed in 91.3% of the cases. These results are comparable with those in study done by Asa'ad<sup>9</sup> where gastritis was diagnosed in 96% of cases; 4% were AG and 92% were CG. But not with Al-Hadithi and Al-Hadithi,<sup>6</sup> who diagnosed CG histopathologically in 70% of the cases and Susana *et al*<sup>10</sup> where acute gastritis diagnosed in 73.38% while, 26.62% diagnosed as CG.

In the present study, 9% of histopathologically diagnosed gastritis had normal endoscopic finding. The concordance between the endoscopic and the histopathological diagnoses was 88% which is comparable to the results obtained by AL Hamadani *et al*<sup>11</sup>, Hamodi and Rasheed,<sup>12</sup> and by Awaad *et al*<sup>13</sup>, where their results was (86%), (91.7%) and (90.2%) respectively. However, this figure is higher than the 76.4% reported by Hassan.<sup>5</sup> and 40% reported by Poudel *et al*<sup>3</sup>. The reasons for this lack of correlation between the endoscopic and the histopathological diagnosis of gastritis, which were observed in different comparative studies of gastritis are unclear. The variations in the endoscopic

interpretation of gastric biopsy may be partly responsible. In addition, the patchy distribution of the inflammatory conditions of the gastric mucosa may add further difficulties in their recognition. This would necessitate proper site biopsies, and multiple sections for their histopathological interpretation<sup>14</sup>.

According to the anatomical distribution of the histopathological findings, antral gastritis was diagnosed in 9.3% of the cases body gastritis in 3.3%, and both antral and body gastritis in 84% of the cases. These results, are relatively similar to the results obtained from the study of Asa'ad,<sup>9</sup> where antral gastritis had been found in 10%, body gastritis in 4%, and both antral and body gastritis in 82% of the cases. On the other hand, these results are quite different from those of Awwad *et al*<sup>13</sup>, where gastritis was mainly present in the antral mucosa in 63%, followed by antral predominant pan gastritis in 13% and corpus predominant gastritis in 7%.

Different types of gastritis were diagnosed histopathologically. CSG is the commonest type, where it was diagnosed in 61.3% of patient, CAG was encountered in 30% of patients. While AG was found in 5.3% of the cases. These findings are relatively similar to those of other studies done in Iraq including Hamodi S and Rasheed NW<sup>12</sup> and Poudel *et al*<sup>3</sup> where CSG in 58% and AG in 9.3%.

In this study, it has been found that the relative frequency of CSG declines with advanced age. Similar results were also obtained by Asa'ad<sup>9</sup>. This may be due to the fact that if CSG did not regress to normal by treatment, it may progress to CAG over a period of decades<sup>15</sup>.

In this study there is no significant association with p value 0.07 between sex distribution and gastritis, which is similar to what was found by Asa'ad SK<sup>9</sup>.

*H. pylori* is a common bacterial infection of the gastric mucosa all over the world.<sup>16-32</sup> It is known to cause gastritis and plays a significant role in the development of active chronic gastritis.<sup>19</sup> Chronic infection with *H. pylori* may lead to glandular atrophy and IM.<sup>16,18,24, 25,33-41</sup>

It had been shown that the frequency of *H. Pylori* infection increased with advanced age.<sup>19,20</sup> This in agreement with the result of this study, where the number of *H. Pylori* positive case increased with advanced age also. This finding was also revealed

by Asa'ad <sup>9</sup> and Latif and Azadeh , <sup>21</sup> while it different from Khan.<sup>22</sup>

In this study there is no significant association between H. pylori infection and sex distribution with p value 0.063, which is similar to the results of Asa'ad <sup>9</sup> and Khan. <sup>22</sup> And differ from that reported by Ibrahim ,<sup>23</sup> who found that H. Pylori is more predominant in male.

The relative frequency of both CAG and H. pylori infection increased with advanced age, as in this study which is comparable with that result obtained from Asa'ad .<sup>9</sup> This supports the fact that H. pylori acts as a critical factor leading to progression of CSG to CAG with advanced age.<sup>24</sup> This might explain the high frequency of CAG in this study which was 30% compared to only 9.3% and 14.9% reported by Poudel *et al*<sup>8</sup> and Susana <sup>10</sup> respectively.

The relative frequency of H. pylori infection in this study was 67% which is within the range of the results of most studies which we compared with as shown in (Table1).

In all these studies different diagnostic methods were used for the diagnosis of H. pylori. These included (histopathological diagnosis with different staining methods, urease test, serology, and culture), and they were either used in combination or separately. Each test has a different sensitivity and specificity.

In addition ,Yokoi *et al*<sup>27</sup> had found that the use of filter paper will decrease the sensitivity (or increase the rate of false negative result for diagnosis of H. pylori) because the use of filter papers for gastric biopsy collection may result in the entrapment of H. pylori in their substance. <sup>27</sup>

In the present study, a significant association was revealed between CG and H. pylori infection where H. pylori has statistically a significant association with CSG and CAG (p value 0.001 and 0.01) respectively. The highest relative frequency of H. pylori infection was found in patients with CSG (79%) and CAG (53%). The same results were reported by Abdul Jabbar <sup>26</sup>.This indicates that H. pylori is the major cause of inflammation in the gastric mucosa.

**Table 1.** The reported frequency of H. Pylori infection by different diagnostic methods.

AUTHOR	YEAR	NO. OF PATIENS	FREQUENCY OF H. PYLORI	DIAGNOSTIC METHODS
Mohamed AE <i>et al</i> <sup>(41)</sup>	1994	382	61.64%	H. p antrum Giemsa stain
Ibrahim BH <i>et al</i> <sup>(38)</sup>	1995	286	81.7%	H. p antrum Hand E
Abdul Jabbar B <i>et al</i> <sup>(26)</sup>	1997	81	75.3%	H. p (antrum ) different stain
Asa'ad SK <i>et al</i> <sup>(9)</sup>	2000	50	84%	H. p antrum and body Giemsa stain
Mansoor J <sup>(40)</sup>	2001	540	66.6%	H.p (antrum) different stain
Latif A and Azadeh A <sup>(21)</sup>	2002	574	77%	H. p (antrum) UT and Giemsa stain
Susana MK <sup>(10)</sup>	2009	154	23.37%	H. p (antrum and corpus) Giemsa and silver stains
Poudel A. <i>et al</i> <sup>(3)</sup>	2013	43	41.9%	H. p (antrum and body) Giemsa stain
Awwad K A <i>et al</i> <sup>(13)</sup>	2014	100	92%	H. p (antrum and body) Giemsa stain H. P (antrum and body) H and E, serology, culture and immunohistoc hemistry.
Myint T <i>et al</i> <sup>(25)</sup>	2015	252	48%	H. p (antrum and body) Giemsa stain
Hassan TMM <sup>(5)</sup>	2016	157	93.7%	H. p (antrum and body) Giemsa stain
Elsawaf ZM <i>et al</i> <sup>(28)</sup>	2017	1236	32.5%	H. p(antrum and body) Giemsa stain
Present study	2018	150	67%	H. p (antrum and body) Giemsa stain

H. pylori is diagnosed in 38% of patients with AG, a figure similar to 37.7% that obtained from the study of Asa'ad <sup>9</sup> and higher than 0.9 % which observed by ELsawaf *et al*<sup>8</sup>. This may be behind the fact that the initial infection could be followed by AG.

Infection with H. pylori is thought to lead to the development of CAG and the mechanism by which the inflammation leads to atrophy is that florid inflammatory response may lead to continuing destruction of the epithelial glandular structure and

damage to the generative zone which may result in selective loss of regenerative capabilities for the glandular compartments.<sup>15</sup>

Some investigators reported that the frequency and density of *H. pylori* in CAG decrease significantly with the increases in the grade of glandular atrophy.<sup>1,29</sup> This finding is in accordance with the result of this study, where the frequency of *H. pylori* infection decreased with the increase of the severity of the glandular atrophy as *H. pylori* was found to be present in 38% of mild CAG, 13% of moderate CAG, and in only 2% of severe CAG with p value (0.04).

The neutrophil infiltration (acute gastritis) is seen predominantly in areas where the *H. pylori* organisms are most abundant and most readily identified.<sup>37</sup>

In this study acute on chronic gastritis was seen in (60%) of *H. pylori* positive patients which is relatively similar to the figure of (59.8%) that has been reported by Ibrahim *et al*,<sup>38</sup> but lower than (82.5%), and (73.5%) reported by Elsawaf *et al*<sup>28</sup> and Susana *et al*<sup>10</sup> respectively, and higher than 33% reported by Garg *et al*.<sup>30</sup> These differences in the results may be due to the fact that in *H. pylori* associated gastritis, polymorphonuclear cells are predominantly within the lamina propria and at the base of the gastric pits rather than within the surface epithelial layer. This reflects the small number of polymorphonuclear cells on the surface epithelium, and only polymorphs lying strictly within the surface epithelial layer were counted, while those lying deeper were not counted.<sup>31</sup>

Follicular Gastritis is present in almost 100% of *H. pylori* positive cases if sufficient number of biopsies were taken.<sup>32</sup> In this study follicular gastritis was diagnosed in (51%) of CAG; (91.3%) were *H. pylori* positive. The reason for the *H. pylori* negative cases, is suggested to as such; either the organism has been missed (overlooked or not present), or that the infection has been cleared.<sup>1</sup>

Intestinal Metaplasia results from faulty regeneration of a mucosa repeatedly damaged by gastritis.<sup>33</sup> It represents a protective change to chronic infection by *H. pylori* because epithelial cells look in their genetic background for the possibility to exclude the infection.<sup>34</sup>

In the present study IM has been diagnosed by the use of special stain AB/PAS pH (2.5) in (23%) of all patients. This is near to the frequency of (21.3%)

reported by Olajirinde *et al*,<sup>35</sup> and higher than 16.23 % reported by Suzana *et al*<sup>10</sup> and 15 % reported by Hassawi *et al*.<sup>6</sup>

A significant association was found in this study between the relative frequency of IM and the increase with advanced age. This finding is consistent with a study done by Craanen *et al*,<sup>39</sup> with the fact that IM is an age related phenomenon and its prevalence is higher in older subjects<sup>4</sup>.

## CONCLUSION

There is a high rate of concordance (88%) between endoscopic and histopathological findings. Among gastritis chronic variety was the commonest. *H. pylori* had a significant association with chronic gastritis (CSG and CAG). Intestinal metaplasia has been detected mainly in CAG and its frequency increased with advanced age.

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