HISTOPATHOLOGICAL DIAGNOSIS OF GASTRIC BIOPSY IN CORRELATION WITH ENDOSCOPY – A STUDY IN A TERTIARY CARE CENTER

Pailoor K1, Sarpangala MK2, Naik RCN1

1. Father Muller Medical College, Mangalore, Karnataka, India
2. Kasturba Medical College, Mangalore, India

Correspondence:
Dr .Kirana Pailoor. Father Muller Medical College, Mangalore, Karnataka, India
Email: dockirana@yahoo.co.uk


ABSTRACT

This study was done to evaluate the histopathological diagnosis of gastric endoscopic biopsies and to correlate the endoscopic and histopathological diagnosis of these neoplastic and non-neoplastic gastric lesions. A total of fifty-two endoscopic biopsies were studied retrospectively. Biopsies were retrieved using flexible fibre–optic endoscope and also video-endoscope. They were transferred to a bottle containing 10% neutral formalin, processed and stained routinely with Haematoxylin and Eosin. Special stains such as Mucicarmine and Giemsa were done as and when required. Out of 52(100%) gastric endoscopic biopsies, 29(56%) were malignant and 23(44%) were benign. The correlation of endoscopic and histopathological diagnosis of these gastric lesions was 57.28%. The sensitivity was 65.96%, specificity 90.57%, positive predictive value 86.11% and negative predictive value was 75%. Endoscopic examination and biopsy is a convenient procedure for accurate objective assessment of patients with symptoms of gastrointestinal tract. Endoscopy is incomplete without biopsy and pathology is the gold standard for the diagnosis of endoscopically detected lesions.

Key words: Endoscopic biopsy, histopathology, gastric biopsy, chronic gastritis, Helicobacter pylori, gastric adenocarcinoma

INTRODUCTION

Human gastrointestinal tract is long and tortuous. To facilitate diagnosis of different gastric lesions, endoscopy and histology are complementary. Close working relationship between the gastroenterologist and the pathologist is essential. Over the years it has been realized that the endoscopic appearances are highly suggestive but are not pathognomic and they need histological confirmation. In majority of the conditions histological diagnosis is corroborative and hence for the final diagnosis a good dialogue between clinician, endoscopist, radiologist and pathologist is required1 - 2. Gastroenterologist rely
on the results of the biopsy for correct diagnosis\(^3\). Therefore, histopathology is an essential complement to endoscopic examination.

Endoscopy and histology are moving closer. Current instruments use small electronic chips (charge coupled devices) that transmit an electronic signal to a video processor and display the image on high resolution video monitors. In the last decade, new optical technologies like interaction spectroscopy, Raman spectroscopy, optical coherence tomography, light scattering spectroscopy, chromoendoscopy, confocal fluorescence endoscopy and immunofluorescence endoscopy are being developed for high resolution of mucosa and detection of early lesions\(^4\).

**MATERIALS AND METHODS**

A total number of 52 gastric biopsies received were studied retrospectively over a two year period. Patients who were clinically diagnosed with gastric lesions were taken up for endoscopy. The lesions were diagnosed on gross visualization during endoscopy. Patients of both the gender, all ages, inpatients and outpatients and those with diagnostic gastric endoscopies were included in the study. Those excluded from the study were the cases in which biopsies could not be done and also endoscopy done for therapeutic purposes.

Flexible fibre-optic Endoscope, Pentax LH-150 PC and video- endoscope, Pentax EHK 1000 were used in this study. For the study of gastric biopsies, the following points were noted:
- Type of gastric mucosa.
- Surface epithelium – normal / any change / loss
- Gastric pits.
- Gastric glands – normal / atrophy / hyperplasia.
- Presence of any intestinal metaplasia.
- H. pylori status.
- Types and extent of inflammatory cells in the lamina propria.
- Dysplastic / cellular atypia.
- Types of neoplastic cells, arrangement of neoplastic cells, mitotic activity, infiltration were noted in neoplastic conditions.
- Muscularis mucosae – normal / thickened.
- Submucosa if present.

Data was collected by purposive sampling method and analyzed for frequency, percentages, specificity and sensitivity. Kappa statistics was used to find agreement with the diagnostic tests.

**RESULTS**

A total of 52 gastric biopsies were studied retrospectively over a two year period in the Department of Pathology of our hospital.
Out of these 52 cases, there were 38 males and 14 females resulting in male to female ratio of 2.7:1. The highest occurrence of these gastric lesions was noted between 61-70 years(40%) and the lowest incidence was observed in both extremes of age, such as 21-30 years and 81-90 years with one case each(2%).
Two cases of erosive gastritis on endoscopy (Figure 1) was histologically confirmed as chronic gastritis (Figure 2). We had only one case of Helicobacter pylori induced gastritis.

Figure 1. Erosive gastritis on endoscopy.

Figure 2. Histology of chronic gastritis.
Twelve cases were diagnosed as gastritis on endoscopy. Of these, three cases had dysplasia. Eight cases (57.12%) which on endoscopy were diagnosed as benign gastric ulcer were found to be adenocarcinoma histologically. Two cases (9.7%) were noticed as gastric carcinoma on endoscopy. However, histologically they were diagnosed as chronic gastritis (Table 1). Majority (55.17%) of adenocarcinoma of stomach presented as an ulcerative growth on endoscopy (Figure 3). Erythematous mucosa was observed on endoscopy in only one case of histopathological diagnosis of adenocarcinoma of stomach (Table 2). Most of the cases of gastric adenocarcinoma were histologically of tubular type (96.5%) (Figure 4) and only one case of mucinous type (3.5%) (Figure 5) was noted. The correlation of endoscopic and histopathological diagnosis of these gastric lesions was found to be 57.28%.

Table 1. Comparison of endoscopic and histopathological diagnosis of gastric lesions.

<table>
<thead>
<tr>
<th>Endoscopic diagnosis</th>
<th>Histopathological diagnosis</th>
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<tbody>
<tr>
<td></td>
<td>Chronic gastritis</td>
</tr>
<tr>
<td>Gastritis</td>
<td>8 (66.67%)</td>
</tr>
<tr>
<td>Erosive gastritis / GERD</td>
<td>2</td>
</tr>
<tr>
<td>Benign Gastric ulcer</td>
<td>2 (14.29%)</td>
</tr>
<tr>
<td>Menetrier’s disease</td>
<td>1</td>
</tr>
<tr>
<td>Gastric Carcinoma</td>
<td>2 (9.7%)</td>
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<tr>
<td>Total</td>
<td>15</td>
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</table>

Table 2. Endoscopic and histopathological finding of gastric carcinoma.

<table>
<thead>
<tr>
<th>Endoscopic finding</th>
<th>Histopathological diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adenocarcinoma stomach</td>
</tr>
<tr>
<td>Ulcerative growth</td>
<td>16 (55.17%)</td>
</tr>
<tr>
<td>Proliferative growth</td>
<td>02 (6.90%)</td>
</tr>
<tr>
<td>Ulcero-proliferative growth</td>
<td>10 (34.48%)</td>
</tr>
<tr>
<td>Erythematous mucosa</td>
<td>01 (3.45%)</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
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</table>
Figure 3. Ulcerative growth on endoscopy.

Figure 4. Tubular type.
DISCUSSION

A. Review of the literature

Gastroscopically hypertrophic or chronic gastritis was thought to be characterized by a verrucous appearance of the gastric mucosa which Benedict and Mallory\textsuperscript{5} considered to be represented microscopically by an exaggeration of the chronic inflammatory infiltrate normally found in nearly every stomach. An inflammatory band occupying a third or more of the width of the gastric mucosa was considered pathologic except in the antrum where such a band was regarded as disease only if it involved at least half the width of the mucosa.

Superficial gastritis has been diagnosed gastroscopically by the presence of increased reddening, edema and adherent secretion. Microscopically an infiltrate of polymorphonuclear neutrophils is seen in the interstitial tissue of the upper portion of the gastric mucosa.

Atrophic gastritis or gastric atrophy, is seen gastroscopically as a pale, thin mucosa with visible blood vessels. Histologically, there is intestinal metaplasia and a variable degree of chronic inflammatory infiltrate and loss of the glandular portion of the mucosa.

Selesnick and Kinsella\textsuperscript{6} found that two third of the cases correlated histologically with hypertrophic gastritis at gastroscopy. Palmer\textsuperscript{7} and Ylvisaker et al.\textsuperscript{8} observed a poor histologic correlation with gastroscopic diagnosis of hypertrophic gastritis.
Palmer\textsuperscript{7} and Ylvisaker et al.\textsuperscript{8} concluded that the verrucous appearance of gastric mucosa represented unusual physiological state and should probably be considered as within normal limits.

Joske, Finekh and Wood\textsuperscript{9} found little correlation between gastroscopic appearance and histologic findings.

The gastroscopic–histologic correlation in acute gastritis was likewise disappointing in both the studies conducted by Selesnick, Kinsella\textsuperscript{6} and Ylvisaker et al\textsuperscript{8}.

In the series of Ylvisaker et al\textsuperscript{8}, a gastroscopic–histologic correlation in gastric atrophy was found in 14 out of 22 cases. In stomachs showing a combination of acute and chronic gastritis at gastroscopy, histologic correlation was poor.

Two hundred and thirty – nine gastroscopic biopsy specimens were studied by Atkins and Benedict\textsuperscript{10} in an attempt to correlate the gastroscopic appearance of gastritis with the microscopical lesion. In stomachs that appeared normal to the gastroscopist, there was a 13 percent chance that the pathologist would find a significant degree of some type of gastritis and 87.3% of specimens considered normal by the gastroscopist showed histologic agreement.

The gastroscopic picture of a mixed acute and chronic gastritis was found to show complete or partial microscopical correlation in about a third of cases. About half the specimens had a normal microscopical appearance. Atkins and Benedict\textsuperscript{10} concluded that gross gastroscopic appearances were not reliable and diagnostic accuracy was increased by biopsy done under direct vision using flexible gastric biopsy tube.

Fung, Papadimitrou and Matz\textsuperscript{11} studied the endoscopic and histological correlation in chronic gastritis. They noticed a significant correlation (87%) between endoscopic and histological diagnosis of gastritis.

In a study conducted by Sauerbruch et al.\textsuperscript{12}, a consideration of three gastric regions (body, transitional zone, antrum) revealed that only one macroscopic criterion (visibility of submucosal vessels) correlated significantly with the histological diagnosis (i.e atrophic gastritis). Other macroscopic criteria that correlated significantly with the histological diagnosis were observed in the gastric body. Their positive predictive value rarely exceeded 50 percent. They concluded that even with the use of modern instruments, endoscopy was of limited value for the prediction of gastritis identified by histology.

Mckenna and Appelman\textsuperscript{13} observed that there was only 50% correlation between endoscopic gastritis or erosion and its histologic confirmation on biopsy in majority of the cases. In about 25% cases, endoscopically normal mucosa yielded biopsies with histologic gastritis. They concluded that specific diagnosis are more likely to be forth coming from the pathologist when relevant clinical and endoscopic information are transmitted with the biopsy to the pathology laboratory.

Helicobacter pylori is the most common cause of non erosive non- specific gastritis\textsuperscript{14}. Robert and Weistein\textsuperscript{15} observed a very poor correlation between endoscopic appearance and the presence or severity of non erosive non-specific gastritis. In children, H. pylori gastritis may show antral nodularity and was generally associated with lymphoid hyperplasia. Lymphoid hyperplasia was not a striking feature in adults. Therefore, they concluded that biopsies must be taken within 1 to 2cm of the pylorus to sample antral gland mucosa which show the features of H. pylori gastritis.
In a study conducted by Jorde and his coworkers\textsuperscript{16}, the diagnostic accuracy for detection of cancer through specimens obtained endoscopically was 86%. Fourteen percent negative biopsy findings was because of a non representative material. The sensitivity and specificity of the gastrofiberscopic biopsy method for the detection of gastric malignancies were calculated to be 93.8\% and 99.6\% respectively, in a study done by Tatsuta et al\textsuperscript{17}. Their study showed that the overall endoscopic biopsy accuracy rate for all patients was 97.4\%. The combination of biopsy results and endoscopic findings resulted in a very high accuracy rate.

B. Discussion

The present study consisted of a total of 52(100\%) gastric biopsies out of which 23 cases(44\%) were benign and 29(56\%) were malignant. The peak incidence of these gastric lesions was in the seventh decade. The mean age was of 55.5 years which almost simulates a study conducted by Behar et al\textsuperscript{18} and Bogomeltz et al\textsuperscript{19}. The youngest patient was twenty seven year old and the oldest patient was eighty two year old. It was almost similar to a study by Bogomeltz et al\textsuperscript{19} and Lal et al\textsuperscript{20}.

Male to female ratio of these lesions in the present study was 3:1. Kumar et al.\textsuperscript{21}, Misra et al.\textsuperscript{22} and Paymaster et al.\textsuperscript{23} had a similar observation in their study. Present study was in contrast to that of a study by Leena Devi and Suvarna\textsuperscript{24}. Chronic gastritis was the commonest nonneoplastic lesion in our study and majority of the patients belonged to 51 to 60 years of age with male preponderance. Only one case of chronic gastritis with Helicobacter pylori was noted.

Gastric malignancies constituted 29 cases in the present study. Of the 29 cases, 16 cases (55.17\%) presented with an ulcerative type of growth, 10 cases (34.48\%) as ulceroproliferative type, 2(6.9\%) as proliferative type and only one case (3.45\%) with an erythematous mucosa. In a study conducted by Tatsuta et al.,\textsuperscript{(17)} early gastric cancers were classified according to their endoscopic appearance as elevated type, flat type, depressed type without converging folds and depressed type with converging folds. Each type was found to be 12.8\% 3.3\% and 4.5\% respectively except the flat type which was absent. Tatsuta et al.,\textsuperscript{(17)} applied Bormann’s classification for advanced gastric cancers and observed that there were 3.8\%, 4.8\% and 18.8\% of ulcerated, circumscribed ; ulcerated, not sharply circumscribed and diffuse, infiltrating type of tumors in his study. Out of the 14 cases diagnosed as benign gastric ulcer on endoscopy, eight were found to be malignant and two were chronic gastritis on histopathology. In the present study, the correlation of endoscopic and histopathological diagnosis gastric lesions was 57.28\%.

The sensitivity, specificity, positive predictive value and negative predictive value were 65.96\%, 90.57\%, 86.11\% and 75\% respectively (Table 3).

Table 3. Statistical analysis: gastric lesions.

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<tr>
<td>Kappa Statistics (Correlation)</td>
<td>57.28%</td>
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<tr>
<td>Sensitivity</td>
<td>65.96%</td>
</tr>
<tr>
<td>Specificity</td>
<td>90.57%</td>
</tr>
<tr>
<td>Positive Predictive Value</td>
<td>86.11%</td>
</tr>
<tr>
<td>Negative Predictive Value</td>
<td>75%</td>
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Careful evaluation of the clinical data, expertisation on the part of endoscopist in choosing the appropriate site are therefore needed, apart from the proper processing of biopsy tissue and meticulous reporting by the histopathologist for interpretation of endoscopic biopsies.

CONCLUSION

Endoscopic examination and biopsy is a convenient procedure for accurate objective assessment of patients with upper gastrointestinal symptoms. It is recommended as the first investigation in the work up of a patient with dyspeptic symptoms. Neoplastic lesions were found to be more common than the non-neoplastic lesions. The correlation of endoscopic and histopathological diagnosis of these gastric lesions was 57.28%. Endoscopy is incomplete without biopsy and histopathology is the gold standard for the diagnosis of endoscopically detected lesions. Endoscopic biopsy correlation reflects important advances in understanding the biology and pathophysiology of the disease. It provides new diagnostic information, knowledge about the recent advances and thereby assists in improving patient management.

COMPETING INTERESTS

The authors declare no competing interest.

REFERENCES

Histopathological diagnosis of gastric biopsies in correlation with endoscopy