



HISTOPATHOLOGICAL CHANGES ASSOCIATED WITH HELICOBACTER PYLORI INFECTION IN GASTRIC BIOPSIES IN A TERTIARY CARE HOSPITAL IN SOUTHERN INDIA

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ABSTRACT

Introduction: Helicobacter pylori (H. pylori) infections are prevalent worldwide, affecting over half the global population. This study aims to investigate histopathological changes associated with H. pylori in gastric biopsies and to compare endoscopic and histopathological findings. **Aims and objectives:** To study the morphological changes associated with H. pylori infection in gastric biopsies. To compare endoscopic findings and histopathological findings in cases of H. pylori infections. To find out the prevalence of H. pylori infection in patients undergoing gastric biopsies. **Materials and methods:** A sample size of 380 was calculated based on a prevalence of H. pylori of 44.44% globally. A retrospective analysis of 420 gastric mucosal biopsies from a tertiary care hospital was conducted, covering 2012-2022. Endoscopic and histopathological findings of gastric mucosal changes in H. pylori infection were compared, and the sensitivity and specificity of various findings were assessed against histopathology. **Result:** Of the 420 cases, 43.10% (181) were positive for H. pylori. Significant histopathological findings included intestinal metaplasia, neutrophilic activity and low grade dysplasia. Significant endoscopic changes included erythema, atrophy, and ulceration. The sensitivity and specificity of endoscopic findings were found to be significant for certain indicators like erythema and atrophy. **Conclusion:** The study findings suggest that endoscopy must be combined by histopathological examination for accurately diagnosing H. pylori infection and related changes.

KEYWORDS :

INTRODUCTION

Warren and Hastings first discovered H. pylori in the early 1980s, and since then the research on it has been extensive. It is widely recognized as one of the most prevalent chronic bacterial infections, affecting nearly two-thirds of the global population.^{1,2} The most probable transmission routes are through fecal-oral and oral-oral routes. In developing countries, contaminated water is a potential source of infection.³ H. pylori shows a strong association with duodenal ulcers, gastric ulcers, gastric atrophy, intestinal metaplasia, and dysplasia, ultimately leading to the progression to gastric adenocarcinoma. It is also widely recognized as a causative factor in the development of mucosa-associated lymphoid tissue (MALT) lymphoma.³⁻⁵ The risk of gastric cancer can be mitigated by timely and precise diagnosis of H. pylori infection. Currently, there are both invasive and non-invasive testing methods available for diagnosing H. pylori infection,⁶ which includes rapid urease test (RUT), urea breath test, culture, PCR, serological tests, and histopathological methods.⁷ One of the potent diagnostic tools for upper gastrointestinal tract diseases is conventional endoscopy, which provides essential visualization of the mucosal lining of the stomach and duodenum.⁷ Additionally, gastric biopsy samples can be collected from areas suspicious for H. pylori during endoscopy,⁸ and are considered the optimal specimens for isolating H. pylori.⁷ The Kyoto classification, introduced in Japan in 2014, marked a significant shift in the understanding and management of gastritis caused by Helicobacter pylori (H. pylori) infection. This classification system allows for the diagnosis of H. pylori gastritis and facilitates the evaluation of gastric cancer risk during endoscopic examinations, however, endoscopic findings can vary depending on the geographic location and the ethnic background of patients.⁹ Histopathological examination of the biopsy sample continue to be the predominant method of detection of H. pylori. It also provides valuable insights into the severity of inflammation and related conditions like gastric cancer, intestinal metaplasia, and gastritis.⁴ Some of the widely used staining techniques in clinical practice for detection of H. pylori are Hematoxylin and eosin (H&E) staining, Giemsa staining, H. pylori silver staining, and immunohistochemistry.^{10,11} Histopathology demonstrates high

sensitivity and specificity, particularly when combined with specialized staining techniques.¹² Prevalence of H. pylori infection in India is high, but the morphological changes in stomach associated with the infection has not been extensively studied in the South Indian population. This study was aimed to determine the prevalence of Helicobacter pylori infection and focuses on the diverse histopathological features observed in gastric biopsies.

Objectives

1. To study the morphological changes associated with h.pylori infection in gastric biopsies.
2. To compare endoscopic findings and histopathological findings in cases of H. pylori infections.
3. To find out the prevalence of H. pylori infection in patients undergoing gastric biopsies.

MATERIALS AND METHODS

This is an analytical study on histopathological slides of gastric mucosal biopsies from the archives of the Department of Pathology in a tertiary care hospital, between 2012 and 2022. The clinical and endoscopic findings were taken from the electronic records and compared to the histopathological findings. As the prevalence of H. pylori infection in gastric biopsies is 44.44%, a minimum sample size of 380 was taken, with a 95% confidence level.¹³ The cases were selected using simple random sampling. Exclusion criteria included gastric resection specimens, faded or poorly oriented biopsies. The upper gastrointestinal endoscopic findings were recorded from the electronic records. These biopsies were examined for the presence of H. pylori using Giemsa stain. The tissues were also studied for neutrophilic activity, atrophy, dysplasia, intestinal metaplasia and dysplasia. Statistical analysis including sensitivity and specificity was done using PSPP software.

RESULTS

The study involved analysis of 420 cases and found that 43.10% (181 cases) of the biopsies were positive for H. pylori.

Prevalence and Gender Distribution: Out of 181 cases, 107 were male and 74 were females. The prevalence of H. pylori

was 43.10%, with males representing 59.1% and females 40.9% of the cases.

Table1. Correlation of Histopathological Findings with positivity of H.pylori

Histopathological Findings	Sensitivity	Specificity	p-value
Activity	62.43%	70.11%	0.001
Chronic Gastritis	59.12%	68.75%	0.004
Intestinal Metaplasia	25.74%	85.92%	0.032
Atrophy	34.75%	82.14%	0.016
Reactive Atypia	18.92%	91.54%	0.046
Dysplasia	12.41%	94.87%	0.002

Intestinal metaplasia, atrophy, reactive atypia and dysplasia had high specificities but their sensitivities were low when compared to H.pylori positivity with Geimsa stain. Neutrophilic activity and chronic gastritis showed reasonably good sensitivity and specificity with a good p-value.

Table2. Correlation of Endoscopic Findings in cases where H.pylori was positive histopathologically

Endoscopic Findings	Sensitivity	Specificity	p-value
Erythema	5.52%	94.98%	0.048
Erosion	49.17%	77.82%	0.002
Mucosal Swelling	3.31%	90.38%	0.073
Nodular Swelling	3.87%	94.98%	0.061
Atrophy	6.63%	94.14%	0.041
Ulceration	16.02%	69.87%	0.035

Erosion was the most commonly seen endoscopic finding in cases of H. pylori infection, although it is not sensitive enough. Mucosal swelling and nodular swelling were not statistically significant.

DISCUSSION

Hooi et al. (2017) performed a comprehensive meta-analysis indicating that the global prevalence of H. pylori infection is around 44.3%.¹⁴ Our study's finding of a 43.10% prevalence in southern India aligns closely with this global estimate. A study by Kate et al. (1998) reported similar prevalence rates in South India, showing that H.pylori infection is endemic in this region.¹⁵

Our study found an association between H. pylori infection and endoscopic changes, especially erosion. Banik et al. (2020) also reported significant correlations between endoscopic findings and histopathological changes.¹⁶ Garg et al. (2012) highlighted similar alterations in chronic gastritis, including atrophy and mucosal changes, consistent with the findings of this study.¹⁷ Tanni et al. (2022) found that endoscopic and histopathological findings in dyspeptic patients in Dhaka, Bangladesh, were closely associated with H. pylori infection.¹⁸

In contrast, studies such as Langenberg et al. (1984) in Western populations found lower prevalence rates and less severe histopathological changes associated with H. pylori infection.¹⁹ This discrepancy highlights the potential influence of environmental and genetic factors on the manifestation and severity of H. pylori-associated gastric disease.

CONCLUSION

In conclusion, the comparison with other studies highlights a consistent global and regional pattern of H. pylori infection's impact on gastric pathology. In clinical practice, relying solely on endoscopic findings for diagnosing H. pylori might not be sufficient due to the varying sensitivity and specificity. A combination of histopathological confirmation and clinical findings is essential for accurate diagnosis.

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