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Corresponding Author
Anisha Nazar,
Department of Pathology, Sree Mookambika Institute Of Medical Sciences, Kanyakumari, Tamil Nadu, India

Author Designation
[1,3]Professor
[2]PG

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Study of Histopathological Spectrum of Ogd Scopy Biopsies at a Teritary Care Centre

[1]Jayasree Geothe, [2]Anisha Nazar and [3]Lilarani Vijayaraghavan
[1-3]Department of Pathology, Sree Mookambika Institute Of Medical Sciences, Kanyakumari, Tamil Nadu, India

Abstract
Upper gastrointestinal (UGI) symptoms are commonly encountered in clinical practice and often require endoscopic evaluation. Histopathological examination of biopsies obtained through oesophagogastroduodenoscopy (OGD scopy) plays a pivotal role in diagnosing a range of gastrointestinal disorders. To analyze and evaluate the histopathological patterns observed in UGI biopsies obtained via OGD scopy in patients presenting with gastrointestinal symptoms. This hospital-based cross-sectional descriptive study was conducted over 3 years at a tertiary care center in South India. A total of 520 biopsy specimens from the esophagus, stomach, and duodenum were analyzed histologically using hematoxylin and eosin (H&E) staining, with special stains applied as necessary. Patient demographics, clinical data, and biopsy sites were documented and statistically analyzed using SPSS version 26. Among the 520 patients, 55.8% were male and 44.2% were female, with the majority in the 41–60 age group. Most biopsies were from the stomach (59.6%), followed by the duodenum (20.8%) and esophagus (19.6%). The most common esophageal lesion was esophagitis (35.3%), while chronic gastritis (45.2%) and non-specific duodenitis (46.3%) predominated in the stomach and duodenum, respectively. Malignant lesions included gastric adenocarcinoma (14.8%), esophageal squamous cell carcinoma (27.4%), and duodenal adenocarcinoma (7.4%). OGD scopy biopsies reveal a wide histopathological spectrum. Chronic gastritis, esophagitis, and duodenitis are common benign findings, while notable malignancies highlight the importance of routine biopsy and histological evaluation in improving diagnostic accuracy and patient outcomes.

INTRODUCTION

Upper gastrointestinal (UGI) disorders are prevalent worldwide, affecting the esophagus, stomach, and duodenum. Exposure to irritants like gastric acid, bile, NSAIDs, Helicobacter pylori infection, alcohol, and dietary carcinogens can lead to various insults[1]. Accurate diagnosis is crucial for therapeutic interventions and preventing long-term complications. Oesophagogastroduodenoscopy (OGD scopy) is an essential tool for evaluating UGI symptoms, allowing for direct visualization of mucosal abnormalities and targeted biopsy. Histopathological examination is the gold standard for diagnosing a wide range of UGI diseases, from benign inflammatory lesions to precancerous conditions and overt malignancies[2].

UGI diseases, such as gastritis and peptic ulcer disease, are a significant public health challenge in India due to variations in diet, lifestyle, sanitation, and healthcare accessibility. In India, gastritis and peptic ulcer disease account for over 60% of dyspepsia cases, with a significant portion of patients harboring H. pylori infection. Esophageal and gastric malignancies remain major public health challenges in low- and middle-income countries, including India. Gastric cancer is the fifth most commonly diagnosed cancer worldwide and the fourth leading cause of cancer-related deaths, with higher mortality rates observed in Asian populations[3,4]. Esophageal cancer, particularly squamous cell carcinoma, is prevalent in India and is associated with risk factors such as tobacco use, alcohol consumption, and dietary deficiencies. Celiac disease, diagnosed on duodenal biopsy, has a rising trend in India, particularly in northern regions. Chronic gastritis and intestinal metaplasia, often associated with H. pylori, are precursors for gastric carcinoma and require surveillance in high-risk patients[5].

Numerous studies have examined the histopathological findings in UGI biopsies, providing valuable insights into regional disease patterns. In South India, chronic gastritis was the most common gastric lesion, followed by H. pylori-associated gastritis (25%), intestinal metaplasia (5%), and adenocarcinoma (4%). The esophagus was predominantly affected by reflux esophagitis and squamous cell carcinoma, while the duodenum often showed non-specific duodenitis and celiac disease[6]. In North India, a study found a significant proportion of esophageal malignancies (18%), gastric adenocarcinoma (12%), and chronic duodenitis (30%). The significance of H. pylori in the pathogenesis of chronic gastritis, peptic ulcer disease, and gastric carcinoma has been extensively documented. Duodenal biopsies are useful in diagnosing malabsorption syndromes in pediatric populations, while gastric and esophageal malignancies are more common in elderly patients[7,8].

The study aims to provide a comprehensive analysis of histopathological patterns in UGI biopsies in a tertiary care hospital in South India. The study is justified by the rising burden of gastrointestinal diseases, the importance of histopathology in diagnosis, underreporting of specific conditions, cancer surveillance and prevention, training and awareness, and policy and protocol development. The study is conducted in a tertiary care hospital in South India, and the histopathological data will aid in understanding the demographic correlation, guiding clinical decisions, and enhancing patient outcomes through early detection. The study is justified by the rising burden of gastrointestinal diseases, the importance of histopathology in diagnosis, the underreporting of specific conditions, the need for early diagnosis and prevention, the support of training programs for endoscopists and pathologists, and the potential for regional data on biopsy findings to help in formulating local screening and surveillance protocols. The study is a much-needed effort to elucidate the histopathological patterns of esophageal, gastric, and duodenal lesions in a symptomatic population undergoing OGD scopy in a tertiary care center.

Aim and Objectives: To analyze and evaluate the histopathological patterns observed in upper gastrointestinal (UGI) biopsies obtained via oesophagogastroduodenoscopy (OGD scopy) in patients presenting with gastrointestinal symptoms at a tertiary care center.

1. To determine the spectrum and frequency of histopathological findings in esophageal, gastric, and duodenal biopsy specimens.
2. To correlate the histopathological diagnoses with the site of biopsy and patient demographics, including age and sex.

MATERIALS AND METHODS

Study Design: This was a hospital-based, cross-sectional descriptive study.

Study Duration: The study was carried out over a period of 3 years, from december 2021 to november 2024.

Sample Size: The sample size was calculated based on the formula for estimating a proportion in a cross-sectional study:

$$n = \frac{Z^2 \cdot p \cdot (1-p)}{d^2}$$

Where:

- n= required sample size
- Z=Z-value (standard normal variate) corresponding to 95% confidence level = 1.96
- p = estimated prevalence/proportion of abnormal findings in UGI biopsies

- d = margin of error (precision), set at 5% (0.05)

Based on previous Indian studies, the estimated prevalence of significant histopathological lesions (e.g., gastritis, metaplasia, malignancy) in OGD biopsies is approximately 50%. This value provides the maximum variability, and hence the most conservative (largest) sample size.

A total of 520 upper gastrointestinal biopsy specimens obtained through OGD scopy were included in the study.

Inclusion Criteria:

- Patients of all age groups and genders undergoing diagnostic upper GI endoscopy with biopsy.
- Adequate tissue samples received for histopathological examination.

Exclusion Criteria:

- Poorly preserved or inadequate biopsy specimens.
- Repeat biopsies of the same lesion from the same patient.
- Biopsies performed for therapeutic or non-diagnostic purposes (e.g., polypectomy with no histopathology sent).

Procedure: All patients underwent OGD scopy based on clinical indications such as dyspepsia, chronic abdominal pain, hematemesis, anemia, or suspicion of malignancy. Multiple mucosal biopsy samples were taken from the esophagus, stomach (antrum/body), and/or duodenum depending on endoscopic findings. The collected specimens were fixed in 10% buffered formalin and sent to the pathology department. After gross examination, tissues were processed routinely and embedded in paraffin. Sections of 4-5 microns were cut and stained with Hematoxylin and Eosin (H and E) for microscopic evaluation. Special stains like Giemsa and PAS were used where necessary, especially for detecting Helicobacter pylori or fungal organisms. Data Collection: Patient details such as age, gender, clinical presentation, and the endoscopic findings were recorded. The biopsy site and the final histopathological diagnosis were documented for each case.

Data Analysis: All collected data were entered into Microsoft Excel and analyzed using SPSS version 26.0. Descriptive statistics were used to express data in terms of frequencies and percentages. Histopathological patterns were analyzed in relation to age, gender, and biopsy site.

RESULTS AND DISCUSSIONS

In this study of 520 upper gastrointestinal biopsy specimens, a diverse spectrum of histopathological lesions was observed. The results are consistent with findings from previous Indian and international studies, reflecting the utility of oesophagogastroduodenoscopy (OGD scopy) combined with biopsy in the evaluation of gastrointestinal (GI) disorders.

Table 1: Age and Gender Distribution of Patients (n=520)

Age Group (Years)	Male (n=290)	Female (n=230)	Total (%)
0–20	12	10	22 (4.2%)
21–30	38	30	68 (13.1%)
31–40	52	40	92 (17.7%)
41–50	61	55	116 (22.3%)
51–60	75	60	135 (25.9%)
>60	52	35	87 (16.7%)
Total	290	230	520

Table 2: Site-wise Distribution of Biopsy Samples

Site	Number of Cases (n)	Percentage (%)
Esophagus	102	19.6%
Stomach	310	59.6%
Duodenum	108	20.8%
Total	520	100%

Table 3: Histopathological Spectrum of Esophageal Lesions (n=102)

Diagnosis	Number of Cases	Percentage (%)
Esophagitis	36	35.3%
Barrett's esophagus	12	11.8%
Esophageal squamous cell carcinoma	28	27.4%
Gastroesophageal junction adenoca.	18	17.6%
Others (e.g., fungal, eosinophilic)	8	7.9%

Table 4: Histopathological Spectrum of Gastric Lesions (n=310)

Diagnosis	Number of Cases	Percentage (%)
Chronic gastritis	140	45.2%
H. pylori-associated gastritis	60	19.4%
Intestinal metaplasia	24	7.7%
Gastric adenocarcinoma	46	14.8%
Gastric lymphoma	4	1.3%
Hyperplastic polyps	12	3.9%
Gastric ulcer	24	7.7%

Table 5: Histopathological Spectrum of Duodenal Lesions (n=108)

Diagnosis	Number of Cases	Percentage (%)
Non-specific duodenitis	50	46.3%
Celiac disease (villous atrophy)	28	25.9%
Duodenal adenocarcinoma	8	7.4%
Peptic ulcer disease	12	11.1%
Others (including parasitic, etc.)	10	9.3%

Esophageal Lesions: The most common esophageal lesion was esophagitis (35.3%), followed by squamous cell carcinoma (27.4%), gastroesophageal junction (GEJ) adenocarcinoma (17.6%), and Barrett's esophagus (11.8%).These findings align closely with those of Biren *et al*.[9] (2024), who reported esophagitis in 38% of esophageal biopsies and squamous cell carcinoma in 28% of cases in an Indian population. Similarly, Abhimanyu *et al*.[10] (2020) observed esophagitis in 31% and esophageal squamous carcinoma in 24% of esophageal biopsies.

Barrett's esophagus was diagnosed in 11.8% of cases in our study, comparable to the 10–12% range reported by Swathi *et al*.[11] (2018) in Western literature, suggesting an increasing trend in developing countries due to rising gastroesophageal reflux disease (GERD) prevalence.

Gastric Lesions: Among gastric biopsies (n=310), chronic gastritis was the most prevalent lesion (45.2%), followed by H. pylori-associated gastritis (19.4%), gastric adenocarcinoma (14.8%), and intestinal metaplasia (7.7%).Our findings are consistent with the work of Misra *et al*. (2014), who reported chronic

gastritis in 44.6% and H. pylori infection in 20.2% of gastric biopsies in North India[12]. The prevalence of gastric adenocarcinoma (14.8%) is slightly higher than the 10.5% reported by Padmavathi *et al*[13]. (2019) in a tertiary center in North Chennai, India, possibly reflecting late presentation or regional variation.

Intestinal metaplasia was present in 7.7% of cases, a figure that matches with the 6-9% range seen in studies by Priavadhana *et al*.[14] (2016), suggesting a premalignant risk and the need for surveillance.

Duodenal Lesions: The predominant duodenal lesion in our study was non-specific duodenitis (46.3%), followed by celiac disease with villous atrophy (25.9%), peptic ulcer disease (11.1%), and duodenal adenocarcinoma (7.4%).These results echo those reported by Zafar *et al*.[15] (2019), who documented duodenitis in 42.5% and celiac changes in 22% of duodenal biopsies. The high incidence of villous atrophy suggests growing awareness and diagnosis of gluten-sensitive enteropathy in India, in agreement with trends reported by Sadhna *et al*.[16] (2023).

Duodenal malignancies were observed in 7.4% of cases, similar to the 6–8% reported by Vincenzo *et al*.[17] (2018), although overall rare in the general population.

Significance and Implications: The present study highlights the diverse histopathological findings in UGI biopsies and underscores the indispensable role of OGD scopy-guided biopsy in accurate diagnosis. Chronic gastritis, esophagitis, and non-specific duodenitis were the most common benign conditions, while gastric and esophageal malignancies were frequently detected in older patients.

The identification of premalignant conditions such as Barrett's esophagus and intestinal metaplasia underlines the importance of regular surveillance and early intervention. Moreover, the detection of H. pylori infection, celiac disease, and parasitic infestations demonstrates the wide diagnostic utility of histological evaluation in gastrointestinal complaints.

Limitations and Recommendations: A potential limitation of our study is the lack of follow-up data and clinical correlation for certain conditions. Also, the use of special stains or immunohistochemistry was selective, which might have influenced the detection rates of H. pylori or lymphomas. Future studies incorporating molecular techniques and longer follow-up periods can provide deeper insights into the progression and management of UGI disorders.

CONCLUSION

This study highlights the wide histopathological spectrum encountered in upper gastrointestinal biopsies obtained through oesophagogastroduodenoscopy. Chronic gastritis, esophagitis, and non-specific duodenitis were the most frequently observed benign lesions, while gastric and esophageal malignancies constituted a significant portion of neoplastic lesions. The findings underscore the critical role of endoscopic biopsy combined with histopathological evaluation in the early detection and accurate diagnosis of various gastrointestinal disorders, including malignancies. Regular surveillance and prompt biopsy of suspicious lesions can aid in better clinical decision-making and improved patient outcomes, particularly in resource-limited settings.

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