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Endoscopic correlation with histological findings in upper gastrointestinal biopsies

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Abstract
Endoscopic examination of the upper GI tract often suggests potential issues, but definitive diagnosis requires histopathological confirmation. Histopathology plays a crucial role in complementing endoscopic findings, with both techniques increasingly integrated in clinical practice. This prospective observational study spanned two years (April 2022 to March 2024) and included 100 cases. Data were collected from the Hospital Information System (SOLACE) and the Laboratory Information System. Statistical analysis was conducted using STATA 14.2, with results assessed through both quantitative and qualitative variables.
The study revealed that the stomach was the most frequently affected site (51%). Neoplastic lesions were more common (55%) than non-neoplastic ones (45%), with a higher prevalence in males (Male: Female = 1.5:1) and most cases occurring in individuals aged 50-60 years. Among esophageal lesions, neoplastic conditions were predominant, with squamous cell carcinoma being the most frequently observed malignancy. The concordance rate between endoscopic and histopathological diagnoses for neoplastic lesions was 97.3%.
For stomach lesions, in non-neoplastic conditions, chronic atrophic gastritis was more common, with adenocarcinoma being the predominant neoplastic lesion, and there was 100% concordance between endoscopic and histological diagnoses. In duodenal lesions, non-neoplastic lesions like duodenitis were most common, also showing 100% concordance. Despite endoscopy's ability to visually assess the upper GI tract, certain conditions such as Barrett's esophagus, hyperplasia, and dysplasia require histopathological examination for confirmation. While endoscopy provides an initial assessment, histopathology offers definitive tissue analysis, making both essential for accurate diagnosis and effective patient management.

Keywords: Gastrointestinal tract, endoscopy, histopathology, concordance, patient management

Introduction
The Human Gastrointestinal (GI) tract is long, tortuous, and a common site for various lesions, including congenital, inflammatory, and neoplastic conditions. These lesions contribute significantly to morbidity and mortality. Endoscopic biopsies play a vital role not only in diagnosing diseases but also in monitoring their progression, assessing their extent, evaluating treatment response, and detecting complications at an early stage. While endoscopic findings may strongly suggest a diagnosis, histopathological confirmation is essential, as histopathology serves as a crucial complement to endoscopic examination. With advancements in both endoscopy and histopathology, these diagnostic modalities are becoming increasingly integrated.
This research aims to analyze the histomorphological spectrum of upper gastrointestinal lesions obtained through endoscopic biopsies and to correlate these findings with endoscopic observations. Additionally, it seeks to determine the frequency distribution of various lesions based on age, sex, and anatomical site in patients at a tertiary care centre.

Materials and Methods
The present study was a prospective observational study over a period of 2 years from April 2022 to March 2024.
A descriptive analysis of data was done according to quantitative and qualitative variables in terms of percentage and frequency by using STATA 14.2 version.
Inclusion criteria: All endoscopic biopsies of upper gastrointestinal tract that were received in the Surgical Pathology department at Shree Krishna Hospital, Karamsad.

Exclusion criteria

- All biopsies which are inadequate for opinion.
- All biopsies of oral cavity and pharynx.
- Resection specimens.

Methodology

Total of 100 cases were included in the study. Tissue processing was done as per standard procedure. Data on demographics, clinical history and endoscopy findings were collected from the patient case records and Hospital Information System (SOLACE) and Laboratory information system.

Results

The first approach was to divide the lesions by anatomic location.

Figure 1, Distribution of Lesions Based on their Anatomical Location

Table 1, Age-Wise Distribution of Upper Gastrointestinal Lesions (N=100)

The study revealed the age distribution of lesions, revealing a clear trend of increasing prevalence with age, particularly for esophageal and gastric lesions. The highest incidence of esophageal lesions was observed in the 51–60 age group (26.67%). Stomach lesions were most common in the 51–60 age group (29.42%). In the duodenum, the highest incidence was recorded in individuals over 60 years of age (50%).

Figure 2, Gender-Wise Distribution of Upper Gastrointestinal Lesions

The study observed a male predominance across all anatomical regions. The male-to-female ratio was 2.2:1 for the esophagus, 1.04:1 for the stomach, and 3:1 for the duodenum.

Figure 3, Distribution of upper GIT lesions

In our study, 45% of cases were non-neoplastic while 55% were neoplastic, which was a little bit higher, which may be because our institute has an oncology centre.

Figure 4, Distribution of Non-Neoplastic and Neoplastic Lesions by Anatomical Site

In the present study, 86.67% of the esophageal lesions were neoplastic, whereas 13.33% of lesions were non-neoplastic. Just 9% of stomach lesions were neoplastic, while 91% of cases were non-neoplastic, whereas 75% non-neoplastic cases and 25% of neoplastic cases of duodenal lesions reported in the present study.

Table 2, Histopathological Diagnosis of Esophageal Endoscopic Biopsies (N=45)

In the present study, squamous cell carcinoma (77.77%) was the most common malignant neoplastic lesion, followed by adenocarcinoma (8.88%), dysplasia (6.66%), hyperplasia (4.44%) and metaplasia (2.22%).

Table 3, Histopathological Diagnosis of Stomach Endoscopic Biopsies (N=51)

In the present study, 90% of stomach patients were diagnosed with gastritis; in our study, chronic atrophic gastritis accounted for the majority of cases (60.78%), followed by gastritis due to H. pylori (15.68%), chronic gastritis (11.76%), and one instance of fundic gland polyp (1.96%). Adenocarcinoma (5.88%) was the most common malignant neoplastic lesion followed by signet ring cell adenocarcinoma (3.92%).

Table 4, Histopathological Diagnosis of Duodenal Endoscopic Biopsies (N=04)

Concordance between endoscopic and histopathological findings

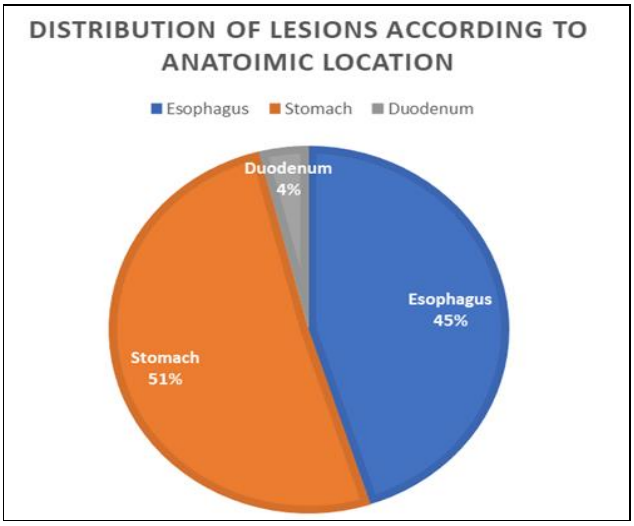
Out of 45 cases of esophageal lesions, 37 cases were endoscopically recognized as growths, 36 cases were confirmed as carcinoma on histopathological examination and 1 case was diagnosed as metaplasia (Barrett's esophagus). This indicates 97.3% concordance rate between endoscopic and histopathological findings in growths. 8 cases endoscopically diagnosed as ulcers, but histopathological examination revealed: 2 cases of hyperplasia, 3 cases of dysplasia and 3 cases of carcinoma. This discordance in diagnoses was attributed to the fact that biopsies were not taken from representative areas of the ulcer.

Table 5, Endoscopic and histological findings of stomach lesions (N=51)

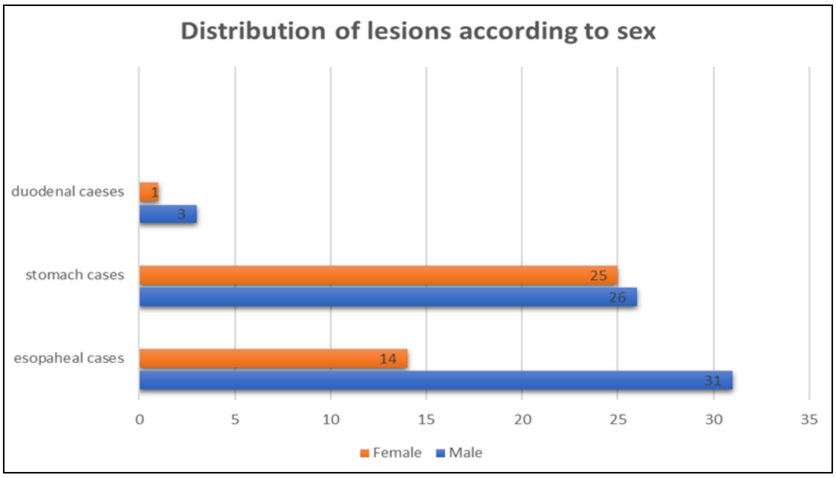
In the present study, of 45 cases with endoscopic findings of chronic antral gastritis, 37 were diagnosed as H. pylori negative and 8 cases as H. pylori positive gastritis. Of the five cases with endoscopic diagnosis of growth, all five were histopathologically diagnosed as carcinomas, while one, initially identified as a polypoidal growth, was found to be a fundic gland polyp. There was 100% concordance between endoscopic and histological findings in stomach lesions.

Table 6, Endoscopic and histological findings of duodenal lesions (N=04)

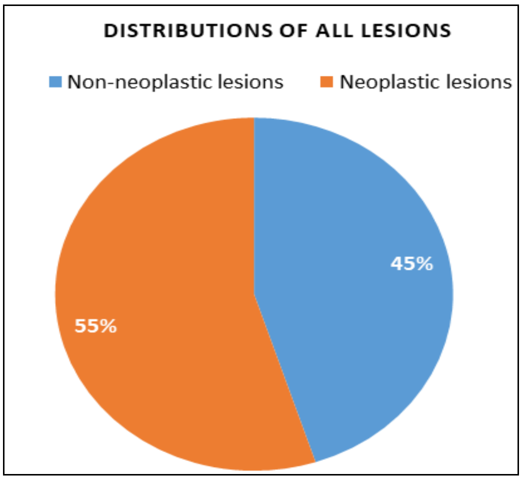
In the present study, two cases with endoscopic findings of erythema were diagnosed as duodenitis on histopathology. One case diagnosed as a polypoidal growth endoscopically was found to be a benign spindle cell tumour histopathologically. Additionally, a case with scalloping of the mucosa on endoscopically was confirmed as celiac disease on histopathology. There was 100% concordance between endoscopic and histological findings in duodenal lesions.



Graph 1: Distribution of Lesions Based on their Anatomical Location



Graph 2: Gender-wise distribution of upper gastrointestinal lesions



Graph 3: Distribution of upper GIT lesions

Discussion

Table 7, Comparison of cases of Upper Gastrointestinal Tract lesions with previous studies

The present study showed that the stomach is the most commonly affected site followed by the esophagus and duodenum, which is consistent with other studies.

Table 8, Comparison of M: F Ratio and the Most Frequently Affected Age Group with Previous Studies

The male-to-female ratio is found to be 1.5:1 in the present study, which is consistent with other studies showing that males are more likely to develop upper GI lesions.

The most frequently affected age group is 51-60 years, also consistent with studies by Jonnalagadda K *et al.* [6] and Somani N *et al.* [3] Although some studies, such as those by Pailoor K *et al.* [4] shows a higher incidence in the 61-70 age range.

Table 9, Comparison of Distribution of Neoplastic and Non-neoplastic Lesions of Esophagus with Previous Studies

The majority of esophageal lesions in the present study are neoplastic, which is consistent with findings from studies by Somani N *et al.*, [3] Pailoor K *et al.* [4], Rani D *et al.* [5] and Mohan B *et al.* [7] In contrast, non-neoplastic lesions are more common in the study by Jonnalagadda K *et al.* [6] This could be due to the patient demographics and the presence of an oncology centre in our institute.

In the present study, squamous cell carcinoma is the most common type of esophageal cancer, consistent with other studies.

Most patients are in their 6th to 7th decades of life, as observed in previous studies, but a slightly earlier presentation in the 5th to 6th decade is noted. This may be due to the esophagus' lack of serosa and its distensibility, which delays symptom onset until the cancer is more advanced.

The study has found a male preponderance (68.87%), which aligns with other studies, likely due to higher prevalence of risk factors such as smoking and alcohol consumption among men.

Table 10, Comparison of Distribution of Neoplastic and Non-neoplastic Lesions of Stomach with Previous Studies

91% of stomach lesions are non-neoplastic with chronic gastritis being the most common, which is consistent with studies by Somani N *et al.* [3] and Jonnalagadda K *et al.* [6] 9% of stomach lesions are neoplastic, with adenocarcinoma being the most common neoplastic lesion, consistent with studies by Pailoor K *et al.* **[4]** and Mohan B *et al.***[7]** These discrepancies in the prevalence of non-neoplastic and neoplastic lesions across different studies may be attributed to variations in patient demographics and underlying risk factors.

The most common non-neoplastic lesion in the present study is chronic gastritis, consistent with other studies. However, studies by Rani D *et al.* [5] and Mohan B *et al.* [7] reported a higher prevalence of H. pylori gastritis. This discrepancy may be due to the low biopsy yield in chronic H. pylori cases, which may require multiple biopsies for detection. Additionally, H. pylori-negative chronic active gastritis could result from prior use of proton pump inhibitors or failure to detect the organism in tissue samples

In the present study, adenocarcinoma is the most common neoplastic lesion, consistent with findings from other studies. Stomach carcinoma is most prevalent in the 5th to 6th decades of life consistent with study done by Somani N *et al.* [3] While Jonnalagadda K, *et al.* [6] reported the most prevalent in the 6th decade. This increase in incidence with age is attributed to accumulated DNA damage over time.

The study has found a male preponderance in stomach neoplasms, similar to other studies, which is likely due to lifestyle factors such as diet, smoking, and alcohol consumption, as well as biological differences. Additionally, growing evidence suggests that estrogen may offer some protection against gastric cancer, particularly cancers caused by infection with H. pylori. Thus, women with delayed menopause and increased fertility may be at lower risk.

Table 11, Comparison of Distribution of Lesions of Duodenum with Previous Studies

Non-neoplastic lesions are more common than neoplastic lesions in the duodenum, consistent with other studies. Chronic non-specific duodenitis is the most prevalent non-neoplastic finding, as also observed by Somani N *et al.* [3] This is likely due to the duodenum's rapidly regenerating epithelial lining, which is susceptible to inflammatory damage.

Table 12, Comparison of Correlation between Endoscopic and Histological findings in Esophageal Lesions

In the present study, there is 97.3% concordance in neoplastic lesions of the esophagus. These findings are comparable to those in studies by Patel J *et al.* [9] and Mohan B *et al.* [7] While Begum S *et al.* [10] shows 60% concordance in neoplastic lesions. In non-neoplastic cases, there is 75% concordance in the present study, which is comparable with findings of studies by Patel J *et al.* [9] and Begum S *et al.* [10] While Mohan B *et al.* [7] shows 66.6% concordance in non-neoplastic lesions.

Table 13, Comparison of Correlation between Endoscopic and Histological findings in Lesions of Stomach.

In the present study, endoscopy of the stomach revealed findings of chronic gastritis, demonstrating 100% concordance as they are confirmed on histopathology in non-neoplastic lesions of the stomach. These findings are comparable with studies by Patel J *et al.* [9] While studies by Mohan B *et al.* [7] and Begum S *et al.* [10] show concordance of 70% and 73.3% respectively.

Furthermore, in the present study, the concordance between endoscopic findings and histological findings for malignant lesions of the stomach is 100%. This result is comparable with the studies by Patel J *et al.* [9] While Mohan B *et al.* [7] and Begum S *et al.* [10] studies show concordance of 70% and 73.3%, respectively.

Table 14: Comparison of Correlation between Endoscopic and Histological findings in Duodenal Lesions

In the present study, there is 100% concordance between endoscopic and histological findings in both neoplastic and non-neoplastic lesions of the duodenum, which is comparable to the findings in the studies by Patel J *et al.* [9] and Begum S *et al.* [10]

In conclusion, endoscopy and histopathology are complementary diagnostic tools. While endoscopy provides a visual assessment of the upper gastrointestinal tract, histopathology examines tissue samples under a microscope to provide definitive tissue diagnosis. For optimal patient management, both endoscopy and histopathology, along with other ancillary tests, are essential for reaching a definitive diagnosis.

Table1: Age-wise distribution of upper gastrointestinal lesions (n=100)

Age	Oesophagus	Stomach	Duodenum	Total
<20	00 (00%)	02(3.92%)	00(00%)	02
21-30	01 (2.22%)	04(7.84%)	00(00%)	05
31-40	03 (6.67%)	10(19.61%)	00(00%)	13
41-50	10 (22.22%)	10(19.61%)	01(25%)	21
51-60	12 (26.67%)	15(29.42%)	00(00%)	27
61-70	10 (22.22%)	05(9.80%)	02(50%)	17
>70	09 (20%)	05(9.80%)	01(25%)	15
Total	45(100%)	51(100%)	04(100%)	100

Table 2: Histopathological diagnosis of esophageal endoscopic biopsies (n=45)

Sr. No.	Type of lesion	Number of cases	Percentage (%)
1	Hyperplasia	02	4.44%
2	Metaplasia (Barret's oesophagus)	01	2.22%
3	Dysplasia	03	6.66%
4	Squamous cell carcinoma	35	77.77%
5	Adenocarcinoma	04	8.88%

Table 3: Histopathological diagnosis of stomach endoscopic biopsies (n=51)

Sr. No.	Type of lesion	Number of cases	Percentage (%)
1	Chronic atrophic gastritis	31	60.78%
2	Chronic gastritis	06	11.76%
3	H. pylori gastritis	08	15.68%
4	Fundic gland polyp	01	1.96%
5	Signet ring cell adenocarcinoma	02	3.92%
6	Adenocarcinoma	03	5.88%
7	Total	51	100%

Table 4: Histopathological diagnosis of duodenal endoscopic biopsies (n=04)

Sr. No.	Types of Lesions	Number of cases	Percentage (%)
1	Chronic duodenitis	02	50%
2	Celiac disease	01	25%
3	Benign spindle cell neoplasm	01	25%

Table 5: Endoscopic and histological findings of stomach lesions (n=51)

Endoscopic findings	Histological diagnosis				
	Gastritis		Polyp	Adenocarcinoma	
	Not associated with *H. pylori*	Associated with *H. pylori*		Intestinal type	Signet ring carcinoma
Gastritis	37	08	00	00	00
Polyp	00	00	01	00	00
Growth	00	00	00	03	02

Table 6: Endoscopic and histological findings of duodenal lesions (n=04)

Endoscopic findings	Histological diagnosis		
	Duodenitis	Celiac disease	Spindle cell neoplasm
Erythema	**02**	**00**	**00**
Scalloping of mucosa	00	01	00
Growth	00	00	01

Table 7: Comparison of cases of upper gastrointestinal tract lesions with previous studies

Sr. No.	Author	No of cases	Site of lesions		
			Esophagus	Stomach	Duodenum
1.	Somani N *et al.* [3]	100	39%	55%	06%
2	Pailoor K *et al.* [4]	100	34%	48%	18%
3	Rani D *et al.* [5]	100	30%	46%	24%
4	Jonnalagadda K *et al.* [6]	70	25.7%	50%	21.4%
5	Mohan B *et al.* [7]	106	22.6%	60.4%	17%
6	Present study	100	45%	51%	04%

Table 8: Comparison of M: F Ratio and the most frequently affected age group with previous studies

Sr. No	Author	No of cases	Age range with highest cases	M:F ratio
1	Somani N *et al.* [3]	100	51-70	2.57:1
2	Pailoor K *et al.* [4]	100	61-70	3:1
3	Rani D *et al.* [5]	100	51-70	1.5:1
4	Jonnalagadda K *et al.* [6]	70	51-60	1.59:1
5	Mohan B *et al.* [7]	106	41-60	1.6:1
6	Present study	100	51-60	1.5:1

Table 9: Comparison of distribution of neoplastic and non-neoplastic lesions of esophagus with previous studies

Sr. No	Author	No of cases	Neoplastic	Non-neoplastic
1	Somani N *et al.* [3]	27	69.20%	30.80%
2	Pailoor K *et al.* [4]	38	71.05%	28.95%
3	Rani D *et al.* [5]	30	93.3%	6.7%
4	Jonnalagadda K *et al.* [6]	18	38.9%	61.1%
5	Mohan B *et al.* [7]	24	70.8%	29.2%
6	Present study	45	86.67%	13.33%

Table 10: Comparison of distribution of neoplastic and non-neoplastic lesions of stomach with previous studies

Sr. No	Author	No of cases	Neoplastic	Non-neoplastic
1	Somani N *et al.* [3]	55	38.18%	61.82%
2	Pailoor K *et al.* [4]	52	55.76%	44.23%
3	Rani D *et al.* [5]	46	30.4%	69.6%
4	Jonnalagadda K *et al.* [6]	35	28.6%	71.4%
5	Mohan B *et al.* [7]	64	56.3%	43.7%
6	Mishra R *et al.* [8]	38	76.31%	23.68%
7	Present study	51	9%	91%

Table 11: Comparison of distribution of lesions of duodenum with previous studies

Sr. No	Author	No of cases	Neoplastic	Non-neoplastic
1	Somani N *et al.* [3]	06	00%	100%
2	Pailoor K *et al.* [4]	04	00%	100%
3	Rani D *et al.* [5]	24	16.7%	83.3%
4	Jonnalagadda K *et al.* [6]	15	33.3%	66.7%
5	Mohan B *et al.* [7]	18	11.1%	88.9%
7	Present study	04	25%	75%

Table 12: Comparison of Correlation between endoscopic and histological findings in esophageal lesions

	Concordance in neoplastic lesions	Concordance in non-neoplastic lesions
Mohan B *et al.* [7]	88.2%	66.6%
Patel J *et al.* [9]	93.5%	80%
Begum S *et al.* [10]	60%	100%
Present study	97.3%	75%

Table 13: Comparison of correlation between endoscopic and histological findings in lesions of stomach

	Concordance in neoplastic lesions	Concordance in non-neoplastic lesions
Mohan B *et al.* [7]	78%	70%
Patel J *et al.* [9]	76.9%	87.43%
Begum S *et al.* [10]	91%	73.3%
Present study	100%	100%

Table 14: Comparison of correlation between endoscopic and histological findings in duodenal lesions

	Concordance in neoplastic lesions	Concordance in non-neoplastic lesions
Patel J *et al.* [9]	100%	84.21%
Begum S *et al.* [10]	100%	84.61%
Present study	100%	100%

Conclusion

Endoscopy and histopathology are complementary diagnostic tools. While endoscopy provides a visual assessment of the upper gastrointestinal tract, histopathology examines tissue samples under a microscope to provide definitive tissue diagnosis. For optimal patient management, both endoscopy and histopathology, along with other ancillary tests, are essential for reaching a definitive diagnosis.

Conflict of Interest

Not available

Financial Support

Not available

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