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ANALYSIS OF HISTOPATHOLOGICAL SPECTRUM OF ENDOSCOPIC GASTRO-OESOPHAGEAL BIOPSIES

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ABSTRACT

Background: The European Society of Gastrointestinal Endoscopy (ESGE) guidelines advocate an initial diagnostic approach that emphasizes understanding the medical history and symptomatology alongside conducting a thorough physical examination. The flexible fibre optic endoscope has drastically improved the ability to observe the upper gastrointestinal tract and colon directly, significantly enhancing the diagnostic and therapeutic approaches to tumours and gastrointestinal bleeding.

Aim: The present study attempts to correlate the clinical signs and symptoms with histopathological findings of patients undergoing gastroesophageal endoscopy.

Materials and methods: Histopathological test requisition forms and paraffin blocks of gastroesophageal biopsies done at a tertiary care centre were collected from February 2022 to May 2023. The H & E sections of all 160 cases with relevant clinical history and endoscopic investigations were studied. Of the 160 cases, 98 were collected retrospectively and 62 prospectively. Observations were noted down to be further statistically analyzed.

Results: 160 endoscopy-guided gastroesophageal biopsies were received during the study period. The most affected age group was 51-70 years, predominately male. Stomach was the most common biopsy site, and epigastric pain was the most common complaint. Oesophageal biopsies and biopsies at the gastroesophageal junction showed that neoplastic lesions were predominant, while biopsies from the stomach showed a predominance of non-neoplastic lesions. The most common oesophageal lesion and lesion at the gastroesophageal junction was squamous cell carcinoma, while adenocarcinoma was predominantly encountered in gastric biopsies. Among oesophageal lesions, only one case of achalasia cardia was identified. In two cases (8.3%) from the endoscopic biopsy of the gastric lesion, a gastrointestinal stromal tumour was noted. Immunohistochemistry was done for cases of spindle cell tumours to confirm the diagnosis of gastrointestinal stromal tumours using CD117 and DOG1 markers.

Conclusion: The study found that oesophageal and gastroesophageal junction lesions are more common in males, with neoplastic lesions predominating, while gastric lesions are more frequent in females and are more often non-neoplastic. Alcohol and tobacco use were strongly associated with

oesophageal and gastroesophageal junction lesions. Correlating endoscopic findings with clinical history and histopathology is essential for early detection and treatment of gastroesophageal lesions.

Keywords: Achalasia cardia, Adenocarcinoma Gastroesophageal biopsy, Gastrointestinal stromal tumour, Squamous cell carcinoma.

INTRODUCTION

The histopathological study of endoscopic biopsies from gastroesophageal lesions permits exact diagnosis for further management. It can detect the early stages of the neoplastic lesions and prevent their progression to invasive cancer. The flexible fibre optic endoscope has drastically improved the ability to observe the upper gastrointestinal tract and colon directly, significantly enhancing the diagnostic and therapeutic approaches to tumours and gastrointestinal bleeding.[1,2]

Benign oesophageal lesions include various clinical and pathological characteristics crucial for detection, differential diagnosis, and management. These lesions are categorized based on their origin, with epithelial lesions such as glycogenic acanthosis, heterotopic gastric mucosa, and squamous papilloma being more common and subepithelial lesions like hemangioma and leiomyoma following in frequency.[3,4] The diagnosis of most benign oesophageal lesions relies on their endoscopic appearance and biopsy results, whereas submucosal lesions may require endoscopic resection for accurate identification.[3,5]

Endoscopic examination of the gastric mucosa facilitates the identification of abnormalities such as ulcers, erosions, mucosal changes, and polyps and gives information about the mucosa's colour, texture, and vascularity. However, histopathological analysis is crucial for definitive diagnosis.[6,7]

Gastroesophageal reflux disease (GERD), characterized by symptoms like heartburn and regurgitation, often leads to upper gastrointestinal endoscopy to diagnose and monitor potential complications.[8]

The objectives of the present study are to evaluate the range of histopathological findings obtained from endoscopic biopsies in gastroesophageal lesions and to establish a correlation between the clinical signs and symptoms presented by patients and the histopathological findings observed during gastroesophageal endoscopy.

MATERIALS AND METHODS

This cross-sectional study was conducted in the Department of Pathology and a teaching hospital. Over a period of two years, including both outpatient and inpatient cases, a total of 160 patients who underwent gastroesophageal biopsies were included in the study. The study population comprised all patients who had endoscopic gastroesophageal biopsies. Inclusion criteria encompassed all specimens from these biopsies, while inadequate biopsies and non-representative samples were excluded from the study.

Patient details, including signs and symptoms, were meticulously recorded. Informed consent was obtained from each patient before the endoscopic procedure, and endoscopic findings were documented.

The biopsy specimens, which were generally small, were fixed in 10% buffered formalin overnight. Due to the size of the specimens, no specific orientation procedures were followed during fixation. After fixation, the tissues were subjected to routine tissue processing, which involves dehydration, clearing, and embedding in a solid medium to provide sufficient rigidity for microtomy without causing damage to either the tissue or the knife/blade. An automated tissue processor was employed, utilizing equipment and reagents, including tissue capsules, forceps, isopropyl alcohol, xylene, and paraffin wax.

Paraffin blocks were prepared using the ISTOS tissue embedding station ES1050-1.2. Sections from these blocks were cut using rough and fine-cutting techniques, ensuring continuous ribbons of sections without breaks. The sections were then picked up on glass slides and subjected to deparaffinization by placing the slides on a hot plate for 10-20 minutes, followed by immersion in xylene twice, five

minutes each time, to remove any remaining paraffin. The slides were then air-dried and hydrated by passing through isopropyl alcohol and rinsed in tap water.
Subsequently, hematoxylin and eosin (H&E) staining was performed on the sections. Special stains, such as Periodic Acid-Schiff (PAS) for mucin, glycogen, and fungal elements, and Giemsa stain for suspected Helicobacter pylori, were used when necessary. Immunohistochemistry was employed for spindle cell tumours to confirm the diagnosis of gastrointestinal stromal tumour (GIST). Specific markers, including DOG1 and CD117 (c-KIT), were used, with reagents sourced from Dako. A block prepared from a known case of GIST served as the control for these markers.
A microscopic examination of the biopsies was conducted using a light microscope. The histopathological findings were then correlated with the clinical features of the patients to conclude the nature and extent of the gastroesophageal lesions.

RESULTS

Table 1: Sociodemographic information of study participants

Variables	Oesophageal lesions	Lesion at gastroesophageal junction	Gastric lesions
Age groups (in years)			
1-10	0 (0.0%)	0 (0.0%)	3 (3.16%)
11-20	0 (0.0%)	0 (0.0%)	3 (3.16%)
21-30	0 (0.0%)	0 (0.0%)	10 (10.52%)
31-40	1 (1.73%)	3 (42.86%)	15 (15.79%)
41-50	13 (22.41%)	0 (0.0%)	14 (14.74%)
51-60	18 (31.03%)	1 (14.28%)	20 (21.05%)
61-70	12 (20.69%)	3 (42.86%)	23 (24.21%)
71-80	9 (15.52%)	0 (0.0%)	7 (7.37%)
81-90	5 (8.62%)	0 (0.0%)	0 (0.0%)
Gender			
Male	32 (55.17%)	4 (57.14%)	35 (36.84%)
Female	26 (44.83%)	3 (42.86%)	60 (63.16%)
Neoplastic lesions	39 (67.24%)	6 (85.71%)	24 (25.26%)
Non-neoplastic lesions	19 (32.76%)	1 (14.29%)	71 (74.74%)
Alcohol consumption	46 (79.31%)	6 (85.71%)	49 (51.58%)
Tobacco consumption	45 (77.6%)	5 (71.4%)	43 (45.3%)

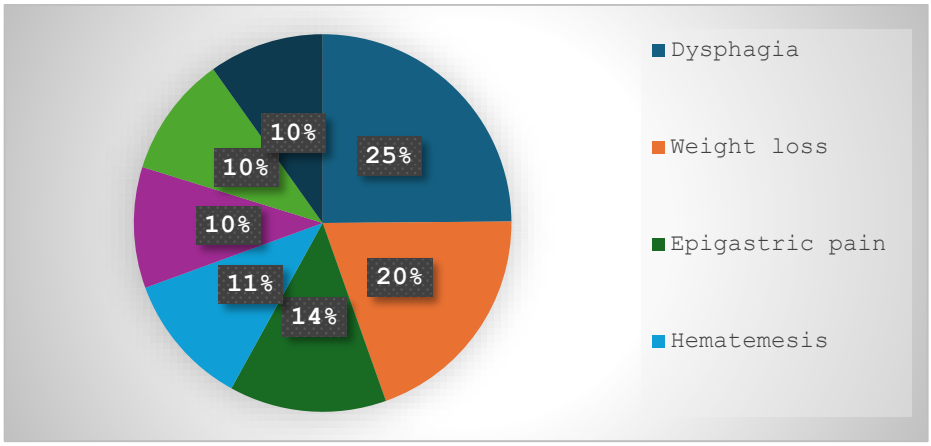
As per Table 1, most oesophageal lesions were found in the age group 51-60 years, while lesions at GE junction were observed in 31-40 years and 61-70 years. Gastric lesions are most present in the age range of 51 to 50 years. Oesophageal lesions and lesions at the gastroesophageal junction were more common in males (55.17% vs 44.83%), while gastric lesions were predominantly seen in females (63.16% vs 36.84%). Esophagogastric and GE junction lesions were higher in individuals with a history of alcohol and tobacco consumption. Lesions in the oesophagus were most observed in the upper third, with 16 cases (41.0%), followed by the middle third with 13 cases (33.3%), and the lower third with 10 cases (25.7%). Most cases were in the upper third of the oesophagus. At the gastroesophageal junction, six cases were identified. In the stomach, lesions were most frequently found in the antrum and pylorus, with 12 cases (50.0%), followed by the body with 7 cases (29.2%), and the fundus with 5 cases (20.8%). The highest number of gastric lesions occurred in the antrum and pylorus.

Table 2: Distribution of various Gastro oesophageal lesions

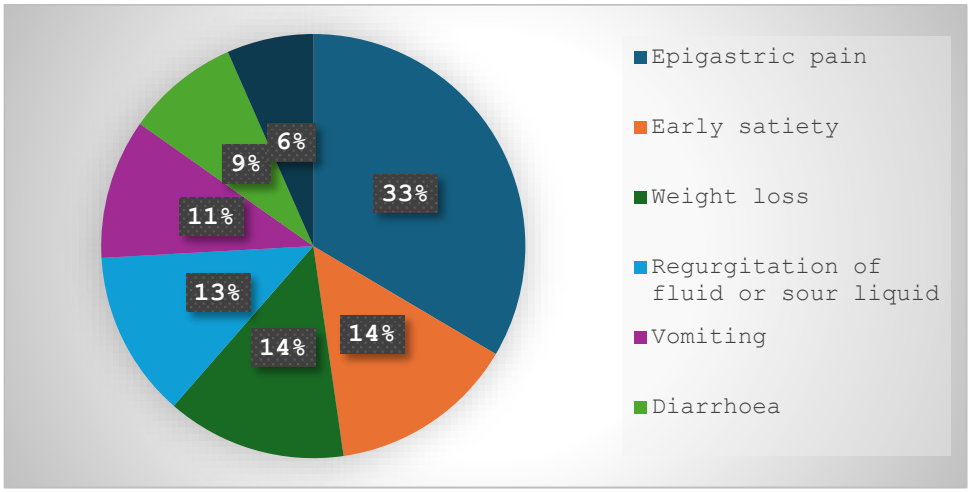
Gastro-oesophageal lesions	n(%)
Non-neoplastic lesions of the oesophagus	**n=19**
• Barrett's oesophagus	6 (31.58%)

• Barrett oesophagus with low-grade dysplasia	4 (21.05%)
• Non-specific inflammatory pathology	5 (26.32%)
• Eosinophilic oesophagitis	3 (15.79%)
• Achalasia cardia	1 (5.26%)
Neoplastic lesions of the oesophagus	**n=39**
• Well-differentiated squamous cell carcinoma	5 (12.82%)
• Moderately differentiated squamous cell carcinoma	22 (56.41%)
• Poorly differentiated squamous cell carcinoma	5 (12.82%)
• Adenocarcinoma, NOS	0 (0%)
• Well-differentiated adenocarcinoma	0 (0%)
• Moderately differentiated adenocarcinoma	1 (2.56%)
• Poorly differentiated adenocarcinoma	1 (2.56%)
• Mucin secreting adenocarcinoma	2 (5.13%)
• Moderately differentiated Adenosquamous carcinoma	2 (5.13%)
Lesions at the gastroesophageal junction	**n=7**
• Moderately differentiated squamous cell carcinoma	3 (42.86%)
• Poorly differentiated squamous cell carcinoma	1 (14.29%)
• Moderately differentiated adenocarcinoma	1 (14.29%)
• Poorly differentiated adenocarcinoma	1 (14.29%)
• Non-specific inflammatory pathology	1 (14.29%)
Non-neoplastic Lesions of Stomach	**n=71**
• Hyperplastic gastric mucosa	4 (5.63%)
• Acute gastritis	3 (4.23%)
• Chronic gastritis	12 (16.90%)
• Chronic superficial gastritis	9 (12.68%)
• Chronic atrophic gastritis	7 (9.86%)
• H. Pylori gastritis	8 (11.27%)
• Inflammatory polyp	15 (21.13%)
• Peptic ulcer	2 (2.82%)
• Peptic ulcer with candidal colonization	1 (1.41%)
• Non-specific inflammatory pathology	10 (14.08%)
Neoplastic lesions of the stomach	**n=24**
• Well-differentiated adenocarcinoma	3 (12.50%)
• Moderately differentiated adenocarcinoma	6 (25.00%)
• Poorly differentiated adenocarcinoma	8 (33.33%)
• Mucin secreting adenocarcinoma	3 (12.50%)
• Signet ring cell carcinoma	2 (8.33%)
• Gastrointestinal stromal tumor	2 (8.33%)

The most common condition among non-neoplastic oesophagus lesions was Barrett oesophagus (31.58%). Squamous cell carcinoma (56.41%) was more common than adenocarcinoma (12.82%), and maximum cases of squamous cell carcinoma showed moderate differentiation. Squamous cell carcinoma (57.15%) was the most frequently encountered malignancy at the gastroesophageal junction than adenocarcinoma, and maximum cases of squamous cell carcinoma showed moderate differentiation (42.86%). The most common condition among non-neoplastic lesions of the stomach was chronic gastritis followed by inflammatory polyp. Adenocarcinoma was predominantly found to have malignancy in gastric biopsies, and the maximum cases of adenocarcinoma showed poor differentiation. (Table 2)



Graph 1: Clinical presentation in cases of carcinoma of the oesophagus



Graph 2: Clinical presentation in cases of carcinoma of the stomach

As shown in Graph 1, Many cases of carcinoma oesophagus had multiple signs and symptoms, of which the commonest was dysphagia (25%) followed by weight loss (20%). According to Graph 2, Many cases of carcinoma stomach had multiple signs and symptoms, of which the commonest was epigastric pain (33%) followed by early satiety (14%).

Table 3: Endoscopic appearances in lesions at the gastroesophageal junction

Endoscopic appearances	Neoplastic	Non-Neoplastic	Total
Oesophagus	**n=39**	**n=19**	**n=58**
• Polypoidal mass/proliferative growth	16	0	16
• Ulceroproliferative growth	8	0	8
• Ulcerative growth	7	0	7
• Erythematous mucosa	5	3	8
• Flattening of Mucosa	2	0	2
• Normal appearance	1	16	17
Gastroesophageal	**n=6**	**n=1**	**n=7**
• Erythematous growth/Proliferative growth	5	0	5
• Ulceroproliferative growth	1	0	1
• Normal appearance	0	1	1
Stomach	**n=24**	**n=71**	**n=95**
• Ulcerative growth	8	0	8
• Polypoidal mass/Proliferative growth	5	7	12
• Erythematous growth	4	0	4
• Ulceroproliferative growth	4	0	4
• Flattening of Mucosa	3	4	7
• Erythematous mucosa	0	7	7
• Normal appearance	0	52	52
• Whitish plaque on the mucosa	0	1	1

According to Table 3, the most common endoscopic finding in oesophageal lesions was proliferative growth in neoplastic cases (41.03%) and normal appearance in non-neoplastic instances (84.21%). At the gastroesophageal junction, proliferative growth was the predominant finding in neoplastic lesions (83.33%). In gastric lesions, the most frequent endoscopic finding among neoplastic cases was ulcerative growth (33.33%), while normal appearance was most common among non-neoplastic cases (73.24%).

DISCUSSION

Accurate diagnosis is crucial for upper gastrointestinal (GI) lesions, including those in the oesophagus, stomach, and proximal duodenum, due to their varied pathological nature. Histopathology plays a vital role in detecting cellular abnormalities, inflammation, and malignancies, while endoscopic examination is essential for early detection, distinguishing between benign and malignant lesions, and tailoring treatment plans accordingly. Previous studies[9,10] reported that most gastroesophageal lesions occur in the 6th and 7th decades, a finding consistent with our present study. The gender distribution in our study aligns with earlier research, showing a higher prevalence of oesophageal and gastroesophageal junction lesions in males (44.37%), while gastric lesions were more common in females (55.63%). This pattern suggests a gender-specific predisposition to certain gastroesophageal lesions, emphasizing the need to consider gender in diagnosis and management. Regarding the nature of lesions, our study found that neoplastic lesions predominated in the oesophagus (67.24%) and gastroesophageal junction (85.71%), similar to findings by Sughanya CS et al.[11] and Mohan BH et al.[12] In contrast, the stomach exhibited a higher proportion of non-neoplastic lesions (74.74%), a trend consistent across multiple studies.

The association between lifestyle factors and gastroesophageal lesions is well-documented. Our study confirmed that both alcohol (79.31%) and tobacco (77.6%) consumption are significantly linked to an increased risk of oesophageal and gastroesophageal junction lesions. This correlation is supported by previous studies, such as those by Nandini GV et al.[13] and Ahamed MA et al., [14] reinforcing the importance of lifestyle modifications in preventing these lesions.

Clinically, dysphagia and weight loss were the most common symptoms in oesophageal malignancies, consistent with findings from studies by Mishra R et al.[9] and Somani NS et al.[15] In gastric malignancies, epigastric pain was the predominant symptom (69.47%), as also reported by previous researches[9,15] highlighting the need for vigilance in these clinical presentations.

Endoscopically, ulcerative growth was the most common finding in neoplastic lesions, particularly in the stomach, consistent with reports by Mishra R et al.[9] and Jonnalagadda K et al.[16] Most oesophageal carcinomas in our study were in the upper third, a deviation from the common finding of middle third involvement reported in other studies, potentially due to our smaller sample size.

In studying gastroesophageal junction lesions, our research found a predominance of squamous cell carcinoma, while other studies reported adenocarcinoma as the more common malignancy, indicating variability across different populations. In the stomach, adenocarcinoma was the most frequent malignancy, particularly in the antrum (50%), consistent with findings by Mohan BH et al.[12] and Naik P et al.[10] The detection of gastrointestinal stromal tumours (GIST) in our study, confirmed by immunohistochemistry, underscores the importance of thorough histopathological examination in identifying less common neoplastic conditions.

Our findings corroborate previous research while highlighting the significance of comprehensive clinical, endoscopic, and histopathological correlation in diagnosing and managing gastroesophageal lesions.

CONCLUSION

The study highlights distinct patterns in biopsy-confirmed oesophagus lesions, gastroesophageal junction, and stomach, showing variations in age, gender, and lifestyle factors. Oesophageal and gastroesophageal junction lesions were more prevalent in males, particularly neoplastic lesions, while gastric lesions were more common in females and predominantly non-neoplastic. Alcohol and tobacco use were significantly associated with oesophageal and gastroesophageal junction lesions. Dysphagia, commonly linked to malignancies, also pointed to rarer conditions like achalasia cardia in younger individuals, where normal mucosa but dilated oesophagus can be detected using jumbo forceps—a finding not commonly reported in other studies. Additionally, gastrointestinal stromal tumours were identified through similar methods. Thus, correlating endoscopic findings with clinical history and histopathology is crucial for the early detection and treatment of various gastroesophageal lesions.

REFERENCES

1. Martins BC, Moura RN, Kum AST, Matsubayashi CO, Marques SB, Safatle-Ribeiro AV. Endoscopic Imaging for the Diagnosis of Neoplastic and Pre-Neoplastic Conditions of the Stomach. Cancers (Basel). 2023;15(9):2445.
2. Tang Y, Anandasabapathy S, Richards-Kortum R. Advances in optical gastrointestinal endoscopy: a technical review. Mol Oncol. 2021;15(10):2580-2599.
3. Tsai SJ, Lin CC, Chang CW, Hung CY, Shieh TY, Wang HY, Shih SC, Chen MJ. Benign esophageal lesions: endoscopic and pathologic features. World J Gastroenterol. 2015 Jan 28;21(4):1091-8.
4. Jang KM, Lee KS, Lee SJ, Kim EA, Kim TS, Han D, Shim YM. The spectrum of benign oesophagal lesions: imaging findings. Korean J Radiol. 2002;3(3):199-210.
5. Çolak Ş, Gürbulak B, Çakar E, Bektaş H. Resection of Mucosal and Submucosal Gastrointestinal Lesions and a Double Endoscope Experience. JSLS. 2019;23(1):e2018.00096.
6. Islam RS, Patel NC, Lam-Himlin D, Nguyen CC. Gastric polyps: a review of clinical, endoscopic, and histopathologic features and management decisions. Gastroenterol Hepatol (N Y). 2013 Oct;9(10):640-51.
7. Geboes K, Geboes K, Jouret-Mouri A. Endoscopy and Histopathology [Internet]. Endoscopy. InTech; 2013. Available from: http://dx.doi.org/10.5772/52739
8. Clarrett DM, Hachem C. Gastroesophageal Reflux Disease (GERD). Mo Med. 2018;115(3):214-218.

9. Mishra R, Vahikar S, Shrivastava K, Kumari Mitra S, Mishra V. Histopathological spectrum of gastrointestinal lesions in patients undergoing gastrointestinal endoscopic biopsies- A Prospective study. Trop J Pathol Microbiol. 2022;8(1):22-28.
10. Naik P, Das M. A study of histopathological features of upper gastrointestinal tract endoscopic biopsies in a tertiary care centre. Panacea J Med Sci 2023;13(2):493-496.
11. Sughanya CS, Sarada V. Histomorphological study of malignancy through upper gastro endoscopic biopsies in a tertiary care hospital - A cross-sectional study. Innovations 2022;70(3):776-85.
12. Mohan BH, Manjunath HK, Geethamani V, Dharani VC, Sushma TA, Akshatha B. Histomorphological Analysis of Upper Gastrointestinal Endoscopic Biopsies: A Retrospective Study of 106 Cases. National Journal of Laboratory Medicine. 2019;8(4):4-7.
13. Nandini GV, Rakshitha HB, Doddikoppad MM, Thippeswamy MT. Histopathological study of endoscopic biopsies of oesophagus. Int J Clin Diagn Pathol. 2018;1(2):07-13.
14. Ahamed MA, Saroha N, Bharathi M. Histopathological study of neoplastic lesions of upper gastrointestinal tract endoscopic biopsies. Indian J Pathol Oncol 2022;9(1):43-47.
15. Somani NS, Patil P. Histopathological study of the upper gastrointestinal tract endoscopic biopsies. Ann Pathol Lab Med. 2018;5(8):A-683-7.
16. Jonnalagadda K, Karre S, Thungaturthi SR, Gorrela VDPK. Histopathological spectrum of upper gastrointestinal endoscopic biopsies. Indian J Pathol Oncol 2019;6(3):422-7.