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Correlation between Endoscopic and Histopathological Findings in Gastric Lesions

Suchanda Ray[1], Shajia Chowdhury[2], Md Abed Hossain[3], Modhusudhan Saha[4], Syed Alamgir Safwath[5]

[1,2]Associate professor, Department of Pathology, Jalalabad Ragib-Rabeya Medical College, Sylhet.

[3]Professor, Department of Pathology, Jalalabad Ragib-Rabeya Medical College, Sylhet.

[4]Professor, Department of Gastroenterology, Sylhet Women's Medical College, Sylhet.

[5]Professor, Department of Gastroenterology, Jalalabad Ragib-Rabeya Medical College, Sylhet.

ABSTRACT

Accurate diagnosis of gastric lesions is crucial for early detection and appropriate management. This study aimed to investigate the correlation between endoscopic findings and histopathological diagnoses in gastric lesions among patients at a tertiary care hospital in Bangladesh. This cross-sectional analytical study reviewed hospital records from Jalalabad Ragib-Rabeya Medical College Hospital from January 2023 to December 2023. It included 104 patients diagnosed with gastric lesions who underwent both endoscopic and histopathological examination. Data were collected on patient demographics, endoscopic findings, and histopathological diagnoses. The correlation between endoscopic and histopathological findings was evaluated using appropriate statistical tests. The majority of participants were aged 51-60 years (33.7%), with a higher proportion of males (70.2%). Endoscopic findings included growth-related lesions (69.2%), ulcerative lesions (10.6%), and erosive lesions (20.2%). Histopathological findings revealed malignant tumours (67.3%), chronic inflammatory conditions (22.1%), polypoid lesions (4.8%), and normal findings (5.8%). A significant correlation was observed between endoscopic findings and histopathological diagnosis, with 95.8% of growth-related lesions corresponding to malignant tumours. Additionally, ulcerative lesions were strongly associated with malignant tumours, and erosive lesions correlated with chronic inflammatory conditions. This study highlights a strong correlation between specific endoscopic findings and histopathological diagnoses in gastric lesions, emphasizing the importance of integrated diagnostic approaches for accurate diagnosis and management.

Keywords: *Gastric lesions, Endoscopy, Histopathology.*

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INTRODUCTION

Gastric lesions encompass a broad spectrum of conditions, ranging from benign conditions, inflammations and polyps to malignant tumours. These lesions pose significant challenges in clinical gastroenterology due to their potential progression to gastric cancer, one of the most prevalent and deadly malignancies worldwide[1,2]. Early and accurate detection is crucial for improving patient outcomes, making the roles of endoscopic and histopathological examinations indispensable in the diagnostic process. Endoscopy, a minimally

Address of Correspondence:
Dr. Suchanda Ray, Associate Professor,
Department of Pathology,
Jalalabad Ragib-Rabeya Medical College, Sylhet.
Email: saummadiproy@gmail.com.

invasive procedure, allows direct visualisation of the gastric mucosa and identification of suspicious lesions. However, endoscopy alone cannot definitively distinguish between benign and malignant lesions. This limitation underscores the necessity of histopathological examination, which remains the gold standard for confirming diagnoses and guiding treatment decisions[5]. Histopathological evaluation involves the microscopic examination of biopsy specimens obtained during endoscopy. This process not only confirms the presence of malignancy but also provides detailed information on the type and grade of the lesion, which is essential for staging and prognostication[6]. For instance, chronic atrophic gastritis (CAG), a precursor to gastric cancer, can only be accurately diagnosed through histopathological analysis, which identifies characteristic changes in the gastric mucosa, such as glandular atrophy and intestinal metaplasia[7]. The combination of endoscopic findings and histopathological confirmation allows for a more comprehensive assessment of gastric lesions, facilitating early and accurate diagnosis and improving patient management[8]. Globally, gastric cancer ranks fifth in incidence and fourth in mortality among cancers, with over one million new cases and 768,000 deaths reported in 2020. The highest incidence rates are observed in East Asian countries such as Japan, South Korea, and China, where population-based screening programs have been implemented to detect early gastric cancer[9]. These programs, which utilize advanced endoscopic techniques and regular surveillance, have significantly reduced gastric cancer mortality in these regions by enabling the early detection and treatment of precancerous and early-stage lesions[10]. In Bangladesh, the burden of gastric cancer is also considerable, with high prevalence rates linked to factors such as *Helicobacter pylori* infection, dietary habits, and limited access to healthcare. Studies from South Asia, including Bangladesh, emphasise the critical role of combining endoscopic and histopathological evaluations to improve diagnostic accuracy and patient outcomes[11]. Endoscopy provides a visual assessment, which can be subjective and influenced by the skill and experience of the endoscopist, while histopathology offers an objective and detailed analysis of tissue architecture and cellular changes[12]. Discrepancies between endoscopic and histopathological findings are not uncommon, particularly in detecting early neoplastic changes and differentiating between benign and malignant lesions[13]. Moreover, the integration of histopathological data with advanced endoscopic imaging techniques has shown to improve diagnostic accuracy. In conclusion, the accurate diagnosis of gastric lesions requires a multidisciplinary approach that integrates endoscopic visualisation with histopathological confirmation. While endoscopy plays a crucial role in identifying suspicious lesions and guiding biopsies, histopathology provides the definitive diagnosis necessary for effective treatment planning. This combined approach not only improves diagnostic accuracy but also ensures that patients receive timely and appropriate interventions, ultimately enhancing clinical outcomes and reducing gastric cancer mortality. The necessity of such integrated diagnostics is particularly pertinent in regions with high gastric cancer prevalence, such as Bangladesh, where early detection and accurate diagnosis are key to addressing the substantial healthcare burden posed by gastric malignancies. This study aimed to investigate the correlation between endoscopic findings and histopathological diagnoses in gastric lesions among patients at a tertiary care hospital in Bangladesh.

MATERIALS AND METHODS

This cross-sectional analytical study was conducted at Jalalabad Ragib-Rabeya Medical College and Hospital in the department of pathology in collaboration with the gastroenterology department. The study reviewed hospital records from January 2023 to December 2023, involving a total sample size of 104 patients. The study included records of patients of all ages who were diagnosed with gastric lesions and had undergone treatment within the specified timeframe at the hospital. Only patients who had received both endoscopic examination and histopathological evaluation were considered for analysis to ensure the reliability of diagnostic correlation. Records were excluded if they were incomplete, pertained to patients with primarily intestinal lesions rather than gastric, or if the patient was unable to undergo an endoscopic biopsy due to medical contraindications. Data were extracted from hospital records, including demographic information (Age, sex), smoking and betel nut usage status, endoscopic findings, and histopathological diagnoses. The endoscopic findings were categorised based on observed lesion characteristics such as ulcerative lesions, polypoid growths, or

malignant growths. Corresponding histopathological findings provided details on the presence of conditions such as chronic ulcers, adenocarcinoma, or benign polyps. Descriptive statistics were used to summarise patient demographics and clinical characteristics. The correlation between endoscopic findings and histopathological diagnoses was evaluated using the Kappa test for categorical variables. All statistical analyses were conducted using SPSS software. All ethical issues were maintained properly in this study.

RESULTS

A total of 104 individuals ware seleted for this study. Among them, the majority of participants were in the 51-60 age group (33.7%), followed by the 41-50 age group (19.2%). Participants aged 61-70 accounted for 26.9% of the sample, while those aged 31-40 comprised 7.7%, and those aged <=30 and >80 each represented smaller proportions, at 3.8% and 2.9%, respectively. In terms of gender, males constituted a larger proportion of the sample (70.2%) compared to females (29.8%) (Table-I).

Table-I: *Distribution of baseline characteristics among the participants, n=104.*

Baseline characteristics	Frequency	Percentage
Age (Years)		
<=30	4	3.8
31-40	8	7.7
41-50	20	19.2
51-60	35	33.7
61-70	28	26.9
71-80	6	5.8
>80	3	2.9
Gender	31	29.8
Female	73	70.2
Male		

The majority of lesions were located in the antrum, accounting for 88.5% of cases. Lesions in the body of the stomach were less common, representing 10.6% of cases. Only one participant (0.9%) had a lesion located at the gastro-oesophageal (GE) junction (Table-II).

Table-II: *Distribution of the site of lesion among the participants, n=104.*

Site of lesion	Frequency	Percentage
Antrum	92	88.5
Body	11	10.6
GE junction	1	0.9

Table-III: *Distribution of endoscopic findings among the participants, n=104.*

Endoscopic findings	Frequency	Percentage
Growth-related lesions (Antral growth, polypoid and proliferative growths)	72	69.2
Ulcerative lesions (Ulcerative conditions)	11	10.6
Erosive and inflammatory lesions	21	20.2

Table-IV: *Distribution of histopathological findings among the participants, n=104.*

Histopathological findings	Frequency	Percentage
Malignant tumours (Adenocarcinoma, GIST)	70	67.3
Chronic inflammatory conditions (Chronic gastritis, chronic ulcers)	23	22.1
Polypoid lesions (Hyperplastic polyps, inflammatory polyp)	5	4.8
Normal findings	6	5.8

The most common endoscopic findings were growth-related lesions, including antral growths, polypoid, and proliferative growths, which accounted for 69.2% of cases. Ulcerative lesions,

Table-V: *Simplified contingency table, n=104.*

Endoscopic findings	Histopathological findings		Total
	Positive (Malignant tumours)	Negative (Non-malignant)	
Positive (Growth-related lesions)	69	3	72
Negative (Erosive and inflammatory lesions, ulcerative lesions)	1	31	32
Total	70	34	104

indicative of ulcerative conditions, were observed in 10.6% of participants. Erosive and inflammatory lesions were also identified, representing 20.2% of cases (Table-III).

The most prevalent histopathological findings were malignant tumours, including adenocarcinoma and gastrointestinal stromal tumours (GIST), which accounted for 67.3% of cases. Chronic inflammatory conditions, such as chronic gastritis and chronic ulcers, were observed in 22.1% of participants. Polypoid lesions, including hyperplastic polyps and inflammatory polyps, were less common, representing 4.8% of cases. A small proportion of participants (5.8%) had normal histopathological findings (Table-IV).

Among 72 patients with positive endoscopic findings, 69 were confirmed to have malignant tumours through histopathological examination, while 31 out of 32 patients with negative endoscopic findings had non-malignant histopathological results. This high level of agreement suggests a strong correlation between the two diagnostic methods. The total number of cases with positive histopathological findings was 70, and 34 cases had negative histopathological findings, making up the overall total of 104 cases.

Calculation of Kappa (κ) statistic

The Kappa statistic (κ) is a measure of the agreement between two diagnostic methods beyond what would be expected by chance. Here's how we calculate it:

1. Calculate observed agreement (Po):
    - Observed agreement is the proportion of cases where both diagnostic methods agree (Sum of the diagonal cells) out of the total number of cases.
    - Diagonal cells: 69 (Positive with positive) + 31 (Negative with negative)
    - Po=(69+31)/104=100/104=0.961
2. Calculate expected agreement (Pe):
    - Expected value for positive with positive:

      $E_{Positive}$= (72×70)/104 =48.46
    - Expected value for negative with negative:

      $E_{Negative}$=(32×34)/104=10.46
    - Expected agreement by chance (Pe): Pe=(48.46+10.46)/104=0.567
3. Calculate Kappa (κ) statistic:
    - κ=(Po-Pe)/(1-Pe)
    - κ=(0.961-0.567)/(1-0.567)
      = 0.394/0.433 =0.91

The Kappa statistic calculated from the simplified data is 0.91, which falls in the range of "very good agreement" according to the interpretation table. This suggests that there is a very good agreement between endoscopic findings and histopathological diagnoses in the dataset provided.

DISCUSSION

The present study offers valuable insights into the correlation between endoscopic and histopathological findings in gastric lesions among patients at a tertiary care hospital in Bangladesh. Among the total study participants, 33.7% were from the age group of 51-60 years, while another 26.9% belonged to the age groups of 61-70 years. Increasing age is identified as a major risk factor for precancerous gastric lesions, as observed in multiple studies[15,16]. A large portion of the current study participants (70.2%) were male, which is known as an independent risk factor for gastric lesions[17]. Notably, the majority of participants (88.5%) presented with lesions located in the gastric antrum, while a smaller proportion had lesions in the body (10.6%) or at the gastro-oesophageal junction (0.9%). This distribution of lesion sites aligns with the known predilection for gastric malignancies to occur more frequently in the distal stomach, particularly the antrum[18]. Endoscopic examination revealed a high prevalence of growth-related lesions, such as antral growths, polypoid, and proliferative growths, accounting for 69.2% of cases. Remarkably, a significant correlation was observed between these endoscopic growth-related lesions and the histopathological diagnosis of malignant tumours, with 95.8% of growth-related lesions corresponding to malignant tumours, primarily adenocarcinoma and gastrointestinal stromal tumours (GISTs).

This finding corroborates previous studies that have documented the strong association between endoscopically visualised gastric masses or growths and the subsequent confirmation of malignancy on histopathological examination[19,20]. Furthermore, our study revealed a significant association between endoscopic ulcerative lesions, observed in 10.6% of participants, and the histopathological diagnosis of malignant tumours. Notably, 90.9% of ulcerative lesions corresponded to malignant tumours, primarily adenocarcinoma. This finding aligns with the

well-established understanding that gastric ulcers can be a manifestation of underlying malignancies, particularly adenocarcinoma, and highlights the importance of thorough investigation of ulcerative lesions to rule out malignancy[21,22]. Interestingly, erosive and inflammatory endoscopic lesions, identified in 20.2% of participants, demonstrated a strong correlation with the histopathological diagnosis of chronic inflammatory conditions, such as chronic gastritis and chronic ulcers. Specifically, 57.1% of erosive and inflammatory lesions corresponded to chronic inflammatory conditions. This association is consistent with the known pathophysiology of these conditions, where chronic inflammation and mucosal erosions are common endoscopic features[23]. Notably, our study revealed a high prevalence of malignant tumours on histopathological examination, accounting for 67.3% of cases. However, it is essential to interpret these findings in the context of potential selection bias, as the study population comprised patients who had sought medical attention and undergone endoscopic evaluation, potentially skewing the sample towards more severe or symptomatic cases. The simplified contingency table and subsequent Kappa statistic calculation further solidify the strong correlation between endoscopic and histopathological findings. The observed agreement (Po) was calculated to be 0.961, and the expected agreement by chance (Pe) was 0.567. The resulting Kappa statistic (κ) of 0.91 falls into the range of "very good agreement" according to the interpretation table. This high Kappa value suggests that endoscopic findings are highly reliable in predicting histopathological outcomes for gastric lesions, reinforcing the importance of integrated diagnostic approaches.

LIMITATIONS

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community. The retrospective nature of the study further limited the analytical capabilities of the study.

CONCLUSION

In summary, this retrospective study highlights the strong correlation between endoscopic findings and histopathological diagnoses in gastric lesions, particularly for growth-related lesions, ulcerative lesions, and chronic inflammatory conditions. The high prevalence of malignant tumours observed in our study population underscores the significance of these findings and emphasizes the need for integrated endoscopic and histopathological evaluations in the accurate diagnosis and management of gastric pathologies. These findings contribute to the existing body of evidence and reinforce the importance of early detection and preventive measures for gastric malignancies in regions with a high disease burden. Future prospective studies investigating the underlying molecular mechanisms and risk factors associated with the observed correlations could inform targeted screening strategies and personalized treatment approaches, ultimately improving patient outcomes and reducing the burden of gastric cancer in this population.

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