



Study Of Upper Gastrointestinal Endoscopic Patterns Among Patients Who Underwent Esophagogastroduodenoscopy In Sohag University Hospital

Ali Hussein Mohammed¹, Amr M Zaghloul², Malak, Mohamed¹

1-Department of Internal Medicine, Faculty of Medicine, Sohag University, Egypt

2-Department of Tropical Medicine and Gastroenterology, Faculty of Medicine, Sohag University, Egypt.

Abstract:

Esophagogastroduodenoscopy (EGD) is a valuable diagnostic procedure for evaluating and managing a wide range of upper gastrointestinal disorders, providing real-time imaging and therapeutic interventions. This study aimed to explore the upper gastrointestinal endoscopic patterns among patients who underwent EGD and to determine the prevalence and clinical significance of abnormalities in the esophagus, stomach, and duodenum.

Methods

This retrospective cross-sectional study was conducted at Sohag University Hospital and included patients who underwent EGD between March 2018 and April 2019. Data collection involved comprehensive medical history reviews, clinical examinations, and laboratory investigations. Statistical analysis was performed using SPSS version 25, utilizing descriptive statistics and appropriate tests to analyze the data.

Results: In this study involving 928 participants, the socio-demographic characteristics showed a relatively balanced distribution of sex, with 57.8% males and 42.2% females, the majority of patients falling within the 40-60 age range (50.3%). The most common indication for endoscopy was epigastric pain 38.9%, and the prevalence of various endoscopic findings included 25.3% for H. pylori infection, 18.4% for gastroesophageal reflux, 10.77% for esophageal varices, 3.3% for gastric varices, and 4.3% for malignancy. Complications during endoscopy were rare, with allergic reactions (0.1%), apnea (0.1%), bleeding incidents (0.3%), bradycardia (0.1%), and hypotension (0.2%) reported.

Conclusion: The findings demonstrate that certain abnormalities, including esophageal varices, gastric varices, portal hypertensive gastropathy, benign gastric ulcers, duodenal ulcers, and malignancy, exhibit variations in prevalence across different age groups. These age-related patterns highlight the significance of considering age-specific factors when diagnosing and managing upper gastrointestinal disorders.

Keywords: Esophagogastroduodenoscopy; Upper gastrointestinal disorders; Age-related variation; Epigastric pain; Portal hypertensive gastropathy.

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Corresponding Author: Ali Hussein Mohammed

E.mail: ahussein79@yahoo.com

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Introduction

Esophagogastroduodenoscopy (EGD), or upper gastrointestinal endoscopy, is a valuable diagnostic procedure for visualizing and evaluating the upper gastrointestinal tract.^(1,2) It involves inserting a flexible endoscope through the mouth to visualize the esophagus, stomach, and duodenum directly.⁽³⁾ EGD is crucial in diagnosing, managing, and monitoring a wide range of upper gastrointestinal disorders by providing real-time imaging of these structures.⁽³⁻⁵⁾ Examining upper gastrointestinal endoscopic patterns among patients who underwent EGD is a topic of significant interest and research.⁽⁶⁾

EGD reveals significant variation in findings across different communities, influenced by dietary, genetic, and environmental factors. This diversity highlights the importance of understanding prevalent upper gastrointestinal pathologies within specific populations to enhance diagnostic accuracy and therapeutic approaches.^(7,8) Common findings range from gastritis and peptic ulcers to esophageal varices and malignancies, underscoring the technique's utility in detecting a broad spectrum of conditions.^(9,11) Integrating knowledge of these variations into clinical practice improves patient care by tailoring prevention, screening, and management strategies to address the most prevalent conditions encountered.^(12,13)

Moreover, recognizing these patterns aids in the early detection of diseases, potentially reducing morbidity and mortality associated with upper gastrointestinal disorders.⁽³⁾ As we delve into the nuances of upper endoscopy findings across different communities, it becomes evident that this diagnostic method is indispensable not only for its direct clinical applications but also for its role in guiding public health interventions and research priorities in gastroenterology.^(14,15)

However, EGD is not without limitations and potential disadvantages. Rare but potential complications include bleeding, gastrointestinal tract perforation, adverse reactions to sedation, and infection.⁽³⁾ Patients may experience discomfort and gagging during the insertion of the endoscope, and temporary side effects like a sore throat or bloating can be observed afterward.⁽¹³⁾ Performing EGD requires specialized training and equipment, which may restrict its availability in certain healthcare settings.

This study aimed to investigate the upper gastrointestinal endoscopic patterns among patients who underwent Esophagogastroduodenoscopy. By conducting a comprehensive analysis of endoscopic findings, we aimed to determine the prevalence, distribution, and clinical significance of various abnormalities in the esophagus, stomach, and duodenum.

Methods

Study Design and Participants:

This retrospective cross-sectional study included all patients who fulfilled the inclusion criteria and were referred to the Endoscopy Unit in Sohag University Hospital for diagnostic and therapeutic purposes. The study included both in-patients and out-patients who underwent EGD between March 2018 and April 2019. Ethical approval was obtained from the local ethics committee of Sohag University Hospital (IRB: Soh-Med-23-02-26). Written informed consent was obtained from all patients. Patient confidentiality and privacy were strictly maintained throughout the study. The study was conducted in accordance with the ethical guidelines and principles outlined in the Declaration of Helsinki.⁽¹⁶⁾

Inclusion Criteria and exclusion criteria

The study included patients who underwent EGD for various indications during the specified time period. The indications for EGD encompassed diagnostic evaluation for upper gastrointestinal (GI) disease symptoms such as dyspepsia, dysphagia, non-cardiac chest pain, or recurrent emesis. Additionally, surveillance for upper GI cancer in high-risk settings and biopsy for known or suspected upper GI disease were considered. The study also included patients who underwent therapeutic interventions during EGD, such as foreign body removal, stricture dilatation, hemorrhage control, neoplasm ablation, or gastrostomy placement.

Patients who exhibited contraindications for EGD were excluded from the study. This included individuals with an increased risk of perforation, perforated viscera, or peritonitis. Medically unstable patients, those on anticoagulant therapy, individuals with pharyngeal diverticulum or recent head and neck surgery, and patients with thrombocytopenia were excluded. Failure to obtain informed written consent, inadequate fasting or

preparation, and diagnostic EGD in patients on anticoagulants without adjustment were additional exclusion criteria.

Data Collection:

Data collection involved a comprehensive medical history review, thorough clinical examination, and laboratory investigations, including complete blood count, random blood sugar, renal function tests, and liver function tests. Informed consent for the endoscopic procedure was obtained from all participants.

Endoscopic Procedure and Equipment:

EGD was performed using Pentax EG-3440 and Pentax EG-2985 endoscopes. The technique involved the insertion of the endoscope through the oral cavity into the esophagus, stomach, and duodenum, allowing for visual examination and potential therapeutic interventions.

Drugs and Medications:

Propofol and midazolam ampoules were utilized as premedications during the endoscopic procedures to ensure patient comfort and sedation.

Statistical Analysis:

Data coding and entry were performed using SPSS version 25. Descriptive statistics, including frequencies, percentages, means, standard deviations, medians, and interquartile ranges, were used to summarize the data. The Chi-square test was used to assess the association between studied groups and outcomes. A p-value less than or equal to 0.05 was considered statistically significant.

Results

Socio-demographic characteristics:

A total of 928 participants were included in the study, with a mean age of 46.16 ± 14.7 years. Approximately 57.8% were males, and 42.2% were females. Regarding the indications for endoscopy, epigastric pain was the most common indication (38.9%), followed by vomiting (16.7%), hematemesis (12.9%), and weight loss (9.3%). Other indications included anorexia, dysphagia, melena, screening, foreign body removal, and anemia. Regarding premedications, the majority of cases (68.6%) received midazolam ampoule, while a smaller portion (31.4%) received propofol injection. **Table 1.**

Table 1: Socio-demographic characteristics of the study group, (n=928).

Variables	Frequency (N.)	Percentage (%)
Sex		
Male	536	57.8
Female	392	42.2
Age in years: (mean$\pm$SD)	46.16 $\pm$ 14.7	
Age groups		
less than 20 years	53	5.7
20-40 years	230	24.8
40-60 years	467	50.3
More than 60 years	178	19.2
Indications for endoscopy		
Anemia	13	1.4
Anorexia	78	8.4
Dysphagia	16	1.7
Epigastric pain	361	38.9
Foreign body removal	2	0.2
Follow-up	37	3.98
Hematemesis	120	12.9
Melena	41	4.4
Screening	18	1.9
Vomiting	155	16.7
Weight loss	87	9.3
Premedication		
Midazolam	637	68.6
Propofol	291	31.3

The clinical patterns of endoscopic findings:

Among the endoscopic findings, normal findings were reported in (9.9%) of the cases. Esophageal varices were observed in (10.7%) of the participants, with the majority being classified as F1 (2.4%), followed by F2 (1.2%) and F3 (7.1%) varices. Gastric varices were present in (3.3%) of the cases.

Portal hypertensive gastropathy was present in (10.9%) of the participants. Gastroesophageal reflux was a common finding (18.4%), with varying severity. Subtypes A, B, C, and D were identified, (3.77%), (5.06%), (3.1%), and (6.5%), of the cases, respectively. Hiatus hernia was present in

(13.4%) of the participants. Non-specific gastritis and *H. pylori* gastritis were present in (14.2%) and (25.3%) of the cases, respectively.

Other notable findings included erosions (14.9%), benign gastric ulcers (5.7%), duodenal ulcers (8.4%), and malignancy (4.3%). Additionally, various less frequent findings were reported as others (4.4%), including achalasia, angiodysplasia, benign esophageal stricture, Barrett's esophagus, esophageal candida, Mallory Weiss syndrome, and polyps, with prevalence ranging from (0.2%) to (1.07%). **Table 2 .**

Table 2: Clinical pattern of endoscopic findings. (n=928)

Patterns	Frequency (N.)	Percentage (%)
Normal	92	9.9
Esophageal varices	100	10.7
F1	23	2.4
F2	11	1.2
F3	66	7.1
Gastric varices	31	3.3
Portal hypertensive gastropathy	102	10.9
Gastroesophageal reflux	171	18.4
A	35	3.77
B	47	5.06
C	60	6.5
D	29	3.1
Hiatus hernia	125	13.4
Non-specific gastritis	132	14.2
H.pylori gastritis	235	25.3
Erosions	139	14.9
Benign gastric ulcer	53	5.7
Duodenal ulcer	78	8.4
Malignancy	40	4.3
Others	41	4.4
-Achalasia.	6	0.6
-Angiodysplasia.	10	1.07
-Benign esophageal stricture.	4	0.4
-Barrett's esophagus.	5	0.5
-Esophageal candida.	2	0.2
-Mallory Weiss.	6	0.6
-Polyps	8	0.8

Age groups variations and clinical findings:

The presence of normal endoscopic findings showed a significant variation across age groups ($P < 0.001$). The young age group (up to 40 years) had the highest proportion of normal findings (26.2%), while the older age groups had lower percentages. Esophageal varices also varied significantly by age group ($P < 0.001$). The 40-60 age group had the highest prevalence (9.4%), followed by the more than 60 age group (10.7%).

Gastric varices were significantly associated with age groups ($P = 0.006$). The 40-60 age group had the highest percentage of gastric varices (5.1%). The presence of portal hypertensive gastropathy, a condition involving changes in the stomach lining due to increased pressure in the portal vein, showed a significant variation across age groups ($p < 0.001$). The 40-60 age group had the highest proportion (15.4%).

Regarding gastroesophageal reflux, the distribution of subtypes A, B, C, and D showed variations across the age groups. In the "Less than 20 years" group, (7.5%) of participants had subtype A, (5.7%) had subtype B, and (7.5%) had subtype C, with no occurrence of subtype D. In the "20-40 years" group, (3.9%) had subtype A, (8.3%) had subtype B, and (6.5%) had subtype C, with no occurrence of subtype D. Similarly, the "40-60 years" group exhibited the following distribution: (4.7%) for subtype A, (3.6%) for subtype B, (5.6%) for subtype C, and (2.4%) for subtype D. In the "More than 60 years" group, none of the participants had subtype A, (4.5%) had subtype B, (8.4%) had subtype C, and (10.1%) had subtype D. The prevalence of hiatus hernia was (15.1%) in the "Less than 20 years" group, (11.3%) in the "20-40 years" group, (12%) in the "40-60 years" group, and (19.7%) in the "More than 60 years" group. However, the differences in prevalence across age groups were not statistically significant ($P = 0.051$). Similarly, for non-specific gastritis, H. pylori gastritis, and erosions, no statistically significant differences were observed in the prevalence across age groups ($P > 0.05$).

Regarding the prevalence of benign gastric ulcers shows a significant increase with age. In the "Less than 20 years" and "20-40 years" groups, the prevalence was 0% and (0.9%) respectively, but it increased to (7.5%) in the "40-60 years" group and (9.0%) in the "More than 60 years" group ($P < 0.001$). **Table 3.**

Similarly, the prevalence of duodenal ulcers varied across different age groups, with statistically significant differences ($P = 0.038$). The prevalence was (7.5%) in the "Less than 20 years" group, (10.4%) in the "20-40 years" group, (6.0%) in the "40-60 years" group, and (12.4%) in the "More than 60 years" group.

Malignancy also exhibited a significant increase with age. No cases were reported in the "Less than 20 years" and "20-40 years" groups, but the prevalence increased to (2.8%) in the "40-60 years" group and (15.2%) in the "More than 60 years" group ($P < 0.001$).

Regarding other findings (achalasia, angiodysplasia, benign esophageal stricture, Barrett esophagus, esophageal candida, gastric polyp, Mallory Weiss syndrome, and polyp), significant differences were observed in their prevalence across age groups ($P < 0.001$). **Table 3**

Table 3: Age group variations and clinical findings.

Findings	Age groups				P * value
	Less than 20 yr (n=53)	20-40yr(n=230)	40-60 yr (n=467)	More than 60 yr (n=178)	
Normal	4 (7.5%)	43 (18.7%)	44 (9.4%)	1 (0.6%)	<0.001
Esophageal varices					<0.001 **
F1	0 (0%)	0 (0%)	17 (3.6%)	6 (3.4%)	
F2	0 (0%)	2 (0.9%)	9 (1.9%)	0 (0%)	
F3	0 (0%)	3 (1.3%)	44 (9.4%)	19 (10.7%)	
Gastric varices	0 (0%)	1 (0.4%)	24 (5.1%)	6 (3.4%)	0.006
Portal hypertensive gastropathy	0 (0%)	5 (2.2%)	72 (15.4%)	25 (14%)	<0.001
Gastroesophageal reflux					<0.001 **
A	4 (7.5%)	9 (3.9%)	22 (4.7%)	0 (0%)	
B	3 (5.7%)	19 (8.3%)	17 (3.6%)	8 (4.5%)	
C	4 (7.5%)	15 (6.5%)	26 (5.6%)	15 (8.4%)	
D	0 (0%)	0 (0%)	11 (2.4%)	18 (10.1%)	
Hiatus hernia	8 (15.1%)	26 (11.3%)	56 (12%)	35 (19.7%)	0.051
Non-specific gastritis	13 (24.5%)	38 (16.5%)	61 (13.1%)	20 (11.2%)	0.059
H. pylori gastritis	17 (32.1%)	68 (29.6%)	114 (24.4%)	36 (20.2%)	0.106
Erosions	6 (11.3%)	31 (13.5%)	82 (17.6%)	20 (11.2%)	0.147
Benign gastric ulcer	0 (0%)	2 (0.9%)	35 (7.5%)	16 (9.0%)	<0.001
Doudenal ulcer	4 (7.5%)	24 (10.4%)	28 (6.0%)	22 (12.4%)	0.038
Malignancy	0 (0%)	0 (0%)	13 (2.8%)	27 (15.2%)	<0.001
Others					<0.001 **
-Achalasia.	0 (0%)	0 (0%)	6 (1.3%)	0 (0%)	
-Angiodysplasia.	2 (3.8%)	2 (0.9%)	6 (1.3%)	0 (0%)	
-Benign esophageal stricture.	0 (0%)	0 (0%)	1 (0.2%)	3 (1.7%)	
-Barrett esophagus.	0 (0%)	0 (0%)	5 (1.1%)	0 (0%)	
-Esophageal candida.	0 (0%)	0 (0%)	0 (0%)	2 (1.1%)	
-Mallory Weiss.	5 (9.4%)	1 (0.4%)	0 (0%)	0 (0%)	
-Polyps	0 (0%)	0 (0%)	8 (1.7%)	0 (0%)	

*: Chi-square test. **: Fisher's exact test.

Complications occurred during endoscopy:

Within the participant group, one patient (0.1%) had an allergic reaction during the endoscopy procedure. Similarly, one case (0.1%) experienced

apnea, while three cases (0.3%) encountered bleeding incidents during or after the procedure. Additionally, one case (0.1%) exhibited bradycardia, and two (0.2%) experienced hypotension. **Table 4.**

Table (4): Complications occurred during endoscopy. (n=928)

Complications	Frequency (N.)	Percentage (%)
Allergy	1	0.1
Apnea	1	0.1
Bleeding	3	0.3
Bradycardia	1	0.1
Hypotension	2	0.2

Discussion:

The study included 928 participants and examined the socio-demographic characteristics and endoscopic findings among patients who underwent EGD. The participants had a relatively balanced distribution of sex, with 57.8% males and 42.2% females. The average age of the participants was 46.16 years, with the majority falling within the 40-60 age range (50.3%). The most common indication for EGD was epigastric pain (38.9%), followed by vomiting (16.7%), hematemesis (12.9%), and weight loss (9.3%).

The study investigated upper gastrointestinal endoscopic findings in patients who underwent EGD and explored the variations in these findings across different age groups. Among the endoscopic findings, normal findings were reported in 9.9% of cases, while esophageal varices were observed in 10.7% of participants, predominantly classified as F3 varices. Gastric varices were present in 3.3% of cases, and portal hypertensive gastropathy was found in 10.9% of participants. Gastroesophageal reflux was a common finding in 18.4% of cases with varying severity.

The prevalence of specific endoscopic findings varied across age groups. The young age group (up to 40 years) had the highest proportion of normal findings, while older age groups had lower percentages. Esophageal varices were more prevalent in the 40-60 age group, and gastric varices were also associated with this age group. Portal hypertensive gastropathy was most prevalent in the 40-60 age group. Benign gastric and duodenal ulcers showed increased prevalence with age, while malignancy significantly increased in the older age group.

Complications during endoscopy, such as allergic reactions, apnea, bleeding incidents, bradycardia,

and hypotension, were reported in a small percentage of cases. Similarly, previous studies reported that complications during the endoscopy procedure were rare, with a small percentage of cases experiencing allergic reactions, apnea, bleeding incidents, bradycardia, and hypotension. ^(7,17)

Comparing our findings with previous similar studies regarding socio-demographic characteristics, we observed that the average age of the participants in our study was 46.16 years.

These were consistent with the findings reported by Younis et al that showed the most common age group was 41-60 years (37.6%), with a nearly equal male-to-female ratio. The primary indication for endoscopy was epigastric pain and heartburn, accounting for 31.9% of cases. The most frequent endoscopic findings were related to peptic ulcer disease, including gastritis, erosive gastritis, duodenitis, and both duodenal and gastric ulcers. This underscores the significance of early diagnosis and appropriate management of upper GI symptoms to prevent severe complications. ⁽⁷⁾ Similarly, Hassan et al., compared endoscopic findings between Egyptian and Indian patients, including 7107 participants (5527 from India and 1580 from Egypt) undergoing esophagogastroduodenoscopy in 2016. Key findings include that Indian patients were more likely to present with normal findings (54.6%) compared to Egyptian patients (22.7%), while Egyptian patients showed a higher prevalence of varices (49.5% vs. 15.9% in Indian patients). Additionally, gastritis was more common among Indian patients (67.2% vs. 35.2% in Egyptian patients). These results highlight significant differences in endoscopic findings between the two populations, suggesting the influence of geographic or genetic factors. ⁽¹⁷⁾

However, Scheidl et al. (2020) reported a younger average age in their study.⁽¹⁸⁾

Regarding the indications for EGD, epigastric pain was the most common indication (38.9%). These findings were consistent with previous studies, which reported abdominal pain as the most common indication, ranging from (30%) to (40%).^(19,25)

In terms of endoscopic findings, the study reported various patterns. Esophageal varices were observed in (10.77%) of participants, with the majority classified as F1 varices (10.9%). Esophageal varices in previous studies were reported and ranged between (25.6%) and (12.7%)^(20-22,26-29). In contrast, Obayo et al. (2015) showed that esophageal varices were the least commonly observed findings in South-western Uganda, with a prevalence of only 1.1%. In contrast, the study by Mohammad et al. (2019) reported a much higher prevalence of esophageal varices in Pakistan, found in 65% of the cases.^(24,30) The discrepancies in the prevalence of esophageal varices could be attributed to several causes, including the demographics, comorbidities, and level of healthcare in the country.

Regarding the complications of EGD, we found only minor complications, including allergic reactions, apnea, bradycardia, and hypotension. Only three patients experienced bleeding incidents. It was reported that the risk of bleeding during EGD is 0.3%, which echoes our findings.⁽³⁾ These findings indicate that EGD is safe; however, measures should be taken to minimize the risk of bleeding.

The findings of this study have important implications for clinical practice. Age-related variations in upper gastrointestinal endoscopic findings emphasize the need to consider age when diagnosing and managing gastrointestinal disorders. The high prevalence of esophageal and gastric varices highlights the importance of screening and management in at-risk patients. Age-specific screening protocols should be considered for benign gastric ulcers, duodenal ulcers, and malignancy. Common indications for endoscopy, such as epigastric pain and gastroesophageal reflux, call for a comprehensive approach to evaluation and management. Complications during endoscopy underscore the need for vigilant monitoring and prompt management.

This study has several strengths. One notable strength is the large sample size of 928 participants, which increases the reliability and applicability of the findings to a broader population. Including a substantial number of participants allows for a more comprehensive evaluation of various endoscopic findings and complications related to upper gastrointestinal pathology. The study design, being retrospective and cross-sectional, facilitated efficient data collection from medical records, making it a cost-effective and convenient approach.

However, it is important to acknowledge several limitations of the study. The findings may not be fully generalizable to other populations or healthcare settings since the study was conducted at a single tertiary care center. The study's retrospective nature relied on the accuracy and availability of medical records, which may have been subject to incomplete documentation or missing data, potentially introducing bias. Finally, the study did not provide information on long-term outcomes or treatment responses, which could have provided further insights into the clinical implications of the observed endoscopic findings. In conclusion, this study provides valuable insights into the patterns observed during upper gastrointestinal endoscopy in patients who underwent EGD. The results demonstrate that certain findings, such as esophageal varices, gastric varices, portal hypertensive gastropathy, benign gastric ulcers, duodenal ulcers, and malignancy, vary in prevalence based on age. These variations can be attributed to physiological changes and the cumulative effects of aging-related risk factors. The findings emphasize the importance of considering age-related factors when diagnosing, managing, and monitoring upper gastrointestinal disorders.

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