


Esophagogastroduodenoscopy Findings at Divine Mercy Hospital-Father Bash Foundation, South Western Uganda: A 6 Years Retrospective Analysis

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Abstract

Background: Esophagogastroduodenoscopy (EGD) is a procedure in which the health worker (endoscopist) uses a long flexible tube with a camera (endoscope) to pass through the mouth in order to visualize the mucosal surface of the esophagus, stomach and duodenum. It is a key investigation required for screening and diagnosis of several disease conditions involving the gastrointestinal tract such as gastroesophageal reflux disease, esophageal candidiasis, esophageal varices, esophageal cancer, gastritis, duodenitis and gastric cancer, among others. Symptoms attributed to such pathologies include: epigastric pain, heartburn, dysphagia, odynophagia, bloating, early satiety, postprandial vomiting, hematemesis and melena. These conditions are associated with significant morbidity and mortality in various health facilities and the population at large. This study aimed at documenting the various indications and endoscopy findings in patients who underwent upper gastrointestinal endoscopy at Divine Mercy Hospital in south western Uganda. **Methods:** We conducted a 6-year retrospective review of endoscopy reports for patients who underwent EGD at DMH from October, 2018 to September, 2024. The data extracted included patient's name, gender, indications for the EGD, findings at endoscopy and histology result where applicable. We used Stata 17 to analyse the data and it was summarized in frequency tables, means and standard deviation. A chi square p-value < 0.05 was considered significant. The study was approved by Mbarara University of Science and Technology Research Ethics committee and administrative clearance was obtained from DMH to access hospital records. **Results:** Endoscopy reports of 1,854 patients who underwent EGD were retrieved. The mean age of participants was 55.4 (\pm 18.5) years. Majority were

males (56.6%). The most common indications for endoscopy were epigastric pain (n = 1249, 67.4%) and dysphagia (n = 397, 21.4%). Benign findings in the esophagus included GERD (n = 628, 33.9%), candidiasis (n = 172, 9.3%), benign esophageal stricture (n = 22, 1.2%), hiatus hernia (n = 21, 1.1%) and esophageal varices (n = 13, 0.7%). Esophageal tumors (n = 364, 19.6%) were found mainly in the mid esophagus (55.8%) and distal esopagus (36.8%). Squamous cell carcinoma was the most common histological variant in the esophagus (n = 251, 79.2%). In the stomach, gastritis was the most common finding (n = 1167, 62.9%) followed by gastric ulcers (n = 48, 2.6%) and gastric outlet obstruction without any visible tumor (n = 40, 2.2%). 49 patients had confirmed gastric cancer and these were mainly intestinal type adenocarcinomas located in the antrum/pylorus. The duodenum was grossly normal in majority of patients who did not have any proximal obstructive lesions. **Conclusion:** In south western Uganda, the most common indication for EGD was epigastric pain followed by dysphagia. Gastritis and GERD were the main benign findings at endoscopy. Esophageal malignancies were more common in the mid esophagus and majority were SCC. Gastric tumors were more common in the distal half of the stomach and they were mainly intestinal type adenocarcinomas.

Keywords

Esophagogastroduodenoscopy, Gastrointestinal Tract, Tumors

1. Background

Esophagogastroduodenoscopy (EGD), also referred to as upper gastrointestinal endoscopy, is a procedure in which the health worker (endoscopist) uses a long flexible tube with a camera (endoscope) to pass through the mouth in order to visualize the mucosal surface of the esophagus, stomach and duodenum [1]. It is a key investigation required for screening and diagnosis of several disease conditions involving the gastrointestinal tract such as gastroesophageal reflux disease (GERD), esophageal candidiasis, esophageal varices, esophageal cancer, gastritis, duodenitis and gastric cancer, among others [2]-[4]. Symptoms attributed to such pathologies include: epigastric pain, heartburn, dysphagia, odynophagia, bloating, early satiety, postprandial vomiting, hematemesis and melena [5]. These conditions are associated with significant morbidity and mortality in various health facilities and the population at large [6].

In many African countries, endoscopy services can only be accessed in a few health facilities [7]-[9] and many patients are treated empirically while others are referred to urban centres where the service can be accessed [10]. Nationwide surveys have demonstrated severely limited gastrointestinal capacity in sub-Saharan Africa when compared to the developed world [11]. This is attributed to few trained health personnel to handle these procedures, lack of equipment and inadequate infrastructure [12] [13]. Endoscopy is quite pivotal in the care, prevention

and treatment of GI related malignancies because it allows one to take biopsies and therapeutic interventions can also be done when necessary [11]. In a recent population-based survey that looked at the cancer spectrum in Uganda, the most common cancers in females were cervical cancer (43%), breast cancer (22%), esophageal cancer (5.6%), ovarian cancer (5.2%) and Kaposi's Sarcoma (4.7%) while in males, the most common cancers were those of the prostate (25%), esophagus (15.1%), KS (12.4%), liver (8.8) and stomach (4.8%) [14]. Since esophageal and gastric cancers are among the top five cancers, there is need for regular screening for these GI malignancies and several studies have highlighted individual experiences in endoscopy among health workers in sub-Saharan Africa [2] [4] [11].

Whereas EGD is considered an invasive procedure that may be associated with some discomfort and a slight risk of morbidity or mortality, the introduction of modern equipment and better endoscopy practices have greatly minimised such drawbacks [15]. Thus, the procedure is safe and it can be performed on an outpatient basis [16]. EGD is the gold standard for patients who present with upper GI bleeding [17].

Worldwide, a number of different endoscopy machines are under use and these include Ethicon Endo-Surgery, Olympus, Medtronic, Boston Scientific, Stryker, Smith and Nephew, Pentax, Karl Storz, Fujifilm, Hoya and Cook Medical, among others. Divine Mercy Hospital uses Olympus which is one of the best companies in the endoscopy devices market because of its high image quality and compatibility with a wide range of endotherapy devices [18].

This study aimed at documenting the various indications and endoscopy findings in patients who underwent upper gastrointestinal endoscopy at Divine Mercy Hospital in south western Uganda.

2. Methods

2.1. Study Setting and Design

We conducted a 6-year retrospective record review of endoscopy reports for patients who underwent EGD at DMH from October, 2018 to September, 2024. DMH is located at plot 2 - 4 Kitunzi road, Kamukuzi division, Mbarara city, south western Uganda. The hospital operates under Father Bash Foundation which is an establishment under the patronage and directorship of Reverend Father John Baptist Bashobora. The foundation was set out to help the young, needy and orphaned children to access basic education, healthcare and vocational training but the general population can access health services from the hospital at a subsidised cost. DMH offers a wide range of specialized healthcare services. There is a complete set of endoscopy equipment of the Olympus type and about 25 to 30 upper GI endoscopy procedures are done every month. The procedures are done by a trained endoscopist who is also a general surgeon. The hospital keeps record of all endoscopy reports. Samples obtained during endoscopy are analysed by lancet laboratory which is one of the reputable laboratories in Mbarara.

2.2. Study Population

Endoscopy reports for patients who underwent EGD at DMH during the study period constituted our study population.

2.3. Study Procedure

We used two theatre nurses, who take care of the endoscopy equipment at DMH, as our research assistants. In December 2024, they retrieved all endoscopy reports for patients done EGD from October, 2018 to September, 2024. From these reports, the study variables that were extracted included: patients age, gender, indication for EGD, findings at endoscopy and histology results where applicable. The location of esophageal strictures/tumors was stratified into three; proximal esophagus (seen at a distance of less than or equal to 23cm from the incisors), mid esophagus (between 24-32cm from the incisors) and distal esophagus (between 33-40cm). Tumors in the stomach were stratified into proximal (seen in the proximal half of the stomach and distal tumors (seen in the distal half of the stomach, predominantly in the antrum and pylorus). We were also able to retrieve histology results for patients who had biopsy samples taken during endoscopy and these reports indicated that the samples were processed by lancet laboratory.

This study was approved by Mbarara University of Science and Technology Research Ethics Committee (MUST REC) and administrative clearance was also obtained from DMH administration.

2.4. Data Analysis

The research assistants identified the study variables which were entered in Microsoft Excel spread sheet. The Principal Investigator confirmed correct entry of the data which was then analysed using Stata version 17 (StataCorp. 2021. Stata: Release 17. Statistical Software. College Station, TX: StataCorp LLC). Categorical variables like gender, indication for EGD, endoscopy findings and histology results were summarised as proportions (percentages). Age was the continuous variable that was normally distributed and it was summarised using mean and standard deviation. We then made a cross tabulation to compare independent variables (age, gender, indication) and the occurrence of malignancies. A chi square p-value < 0.05 for categorical variables was considered significant. The results were presented in frequency tables.

In this study, the methods employed during data collection and analysis were similar to what was done in our earlier publication on colonoscopy findings at DMH [19].

3. Results

3.1. Patient Characteristics and Indications for Endoscopy

Reports of 1,854 patients who underwent EGD were retrieved. The mean age of participants was 55.4 (\pm 18.5) years. Majority were males (56.6%). The most com-

mon indications for endoscopy were epigastric pain (n = 1249, 67.4%) and dysphagia (n = 397, 21.4%) as shown in **Table 1**.

Table 1. Showing baseline characteristics and indications for endoscopy.

Variable	Frequency	Percentage
Mean age (SD)	55.4 (18.5)	
Age category		
< 50 Years	670	(36.1%)
≥ 50years	1,184	(63.9%)
Gender		
Female	805	(43.4%)
Male	1,049	(56.6%)
Indications		
Recurrent anemia	20	(1.1%)
Dysphagia	397	(21.4%)
Epigastric pain	1,249	(67.4%)
Failed NGT removal	1	(0.1%)
Odynophagia	47	(2.5%)
Upper GI bleeding	87	(4.7%)
Vomiting	53	(2.9%)

3.2. Endoscopy Findings

Endoscopic findings in the esophagus, stomach and duodenum were recorded as shown in **Table 2**. Whereas 632 patients (34.1%) had normal esophageal findings, the single most common abnormal finding was gastroesophageal reflux disease (n = 628, 33.9%). In the esophagus, tumors were observed in 364 patients (19.6%). These comprised of 27 tumors (7.4%) in the proximal esophagus, 203 tumors (55.8%) in the mid esophagus while 134 tumors (36.8%) were in the distal part of the esophagus. Benign esophageal strictures were only observed in 22 patients (1.2%) and sliding hiatus hernia in 21 patients (1.1%).

In the stomach, 274 participants had normal findings whereas 286 participants (15.4%) had no assessment due to obstruction in the esophagus. The most common abnormal finding in the stomach was gastritis (n = 1167, 62.9%). Tumors were observed in 30 patients, mainly in the distal half (n = 25). In the duodenum, majority of the participants had normal findings (n = 1337, 72.1%) while 25.3% of the participants had no duodenal assessment due to proximal obstruction. Duodenal mass was observed in 0.5% of the participants (n = 9).

Table 2. Showing endoscopy findings.

Findings in esophagus	Frequency	Percentage
Candidiasis	172	(9.3%)

Continued

Benign esophageal stricture	22	(1.2%)
Esophageal tumors	364	(19.6%)
Esophageal varices	13	(0.7%)
Esophageal polyp	1	(0.1%)
Gastroesophageal reflux disease	628	(33.9%)
Hiatus hernia	21	(1.1%)
Nasogastric tube in situ	1	(0.1%)
Normal	632	(34.1%)
Findings in stomach		
Gastritis	1,167	(62.9%)
Gastric outlet obstruction (no visible gastric tumor)	40	(2.2%)
Gastric polyp	9	(0.5%)
Gastric ulcer	48	(2.6%)
Proximal gastric tumor	5	(0.3%)
Tumor at antrum	25	(1.3%)
Normal	274	(14.8%)
Not assessed	286	(15.4%)
Findings in duodenum		
Duodenal mass	9	(0.5%)
Duodenal ulcer	11	(0.6%)
Duodenitis	28	(1.5%)
Normal	1,337	(72.1%)
Not assessed	469	(25.3%)

3.3. Histology Findings

Biopsy was picked from 710 participants who underwent endoscopy (380 samples from the esophagus, 316 samples from the stomach and 14 samples from the duodenum). Of the 710 patients who had a biopsy removed at the time of endoscopy, 78% had results available in their records. 366 patients had malignancy confirmed on histological examination. Squamous cell carcinoma, Adenocarcinoma, Adeno-squamous carcinoma and Small round blue cell tumor were found in 257 patients (36.2%), 106 patients (14.9%), 2 patients (0.3%) and 1 patient (0.1%) respectively. Other participants had benign lesions as summarized in **Table 3**.

Table 3. Showing histology findings.

Histological findings (N = 710)		
Adeno squamous carcinoma	2	(0.3%)
Adenocarcinoma	106	(14.9%)

Continued

Duodenal ulcer	4	(0.6%)
Esophageal papillomatosis with mild dysplasia	2	(0.3%)
Gastritis	129	(18.2%)
Inconclusive	43	(6.1%)
Mucosal associated lymphoid tissue	3	(0.4%)
Polyp	7	(1.0%)
SCC	257	(36.2%)
Small round blue cell tumor	1	(0.1%)
Missing results	156	(22.0%)

3.4. Tumor Location for the Histology Findings

Three hundred sixty-six participants had malignant lesions. Majority of the cancers were in the esophagus (n = 317, 88.7%). The most common histological type for esophageal cancers was squamous cell carcinoma while adenocarcinoma was the most predominant histological type for gastric cancers. Among the 42 patients with gastric adenocarcinomas, 30 (71.4%) were intestinal subtype, according to Lauren's Criteria. 30 patients had overt features of gastric tumors seen at endoscopy while the other cases of gastric cancer were obtained from biopsy samples of patients who had irregular erythematous gastric mucosal lining and they were presumed to have chronic gastritis but histology results turned out to be malignant. None of the samples taken from the duodenum yielded malignancy (Table 4).

Table 4. Showing tumor location for the histology findings.

Location	Histological findings	Frequency (N = 366)	Percentage
Esophagus (n = 317)	Adeno squamous carcinoma	1	0.3%
	Adenocarcinoma	64	20.2%
	Squamous cell carcinoma	251	79.2%
	Small round blue cell tumor	1	0.3%
Stomach (n = 49)	Adeno squamous carcinoma	1	2.0%
	Adenocarcinoma	42	85.7%
	Squamous cell carcinoma	6	12.2%

3.5. Characteristics of Patients with Cancer on Biopsy

The table (Table 5) below shows the differences in characteristics of participants with and without histological diagnosis of malignancy. When compared to those without malignancy, the participants with malignancy were likely to be older (p-value = 0.005), male gender (p-value = 0.001) and with dysphagia (p-value < 0.001).

Table 5. Showing Characteristics of participants with cancer on Biopsy (N = 710).

Variable	Malignancy (n = 366)	No malignancy (n = 344)	p-value
Age			
< 50 years	52 (14.2%)	77 (22.4%)	0.005*
≥ 50 years	314 (85.8%)	267 (77.6%)	
Gender			
Male	275 (75.1%)	218 (63.4%)	0.001*
Female	91 (24.9%)	126 (36.6%)	
Indication for endoscopy			
Upper GI bleeding	5 (1.4%)	21 (6.1%)	< 0.001*
Dysphagia	308 (84.2%)	60 (17.4%)	
Epigastric pain	30 (8.2%)	219 (63.7%)	
Others	23 (6.3%)	44 (12.8%)	

3.6. Distribution of Histopathological Types of Malignancy by Age and Gender (N = 366)

The table below (**Table 6**) stratifies the various histopathological types by age and gender. There was no statistical difference in the proportions of the histological types of cancers by age group and gender (p-value > 0.05).

Table 6. Distribution of histopathological types of malignancy by age and gender (N = 366).

Variable	Adenocarcinoma (n = 106)	Squamous cell carcinoma (n = 257)	Adenosquamous carcinoma (n = 2)	Small round blue cell tumor (n = 1)	p-value
Age					0.884
< 50 years	14 (13.2%)	38 (14.8%)	0 (0%)	0 (0%)	
≥ 50 years	81 (76.4%)	219 (85.2%)	2 (100%)	1 (100%)	
Gender					0.591
Female	23 (21.7%)	68 (26.5%)	0 (0%)	0 (0%)	
Male	83 (78.3%)	189 (73.5%)	2 (100%)	1 (100%)	

4. Discussion

Majority of our patients (56.6%) were males with a mean age of 55.4 (\pm 18.5) years. Similar studies in Uganda have also demonstrated male predominance in Mbarara at 59.8% [2] and Mbale at 56.9% [5] but there was a female predominance among patient who underwent endoscopy in one of the hospitals in the eastern region of Ghana [3]. However, the reason for this occurrence remains unclear. These two related studies in Uganda also reported a mean age of 53.5 years at Mbarara Regional Referral Hospital and 54.8 years at Mbale Regional Referral Hospital. These figures are comparable to the mean age that was seen in our study.

In this study, the main indication for EGD was epigastric pain followed by dysphagia. A number of other studies also reported epigastric pain as the main indication for EGD [2] [20]. Agyei-Nkansah *et al.*, reported dyspepsia as the commonest indication for endoscopy at 76% followed by upper GI bleeding [3]. In a large study that was done in Ethiopia, Argaw *et al.*, also reported dyspepsia as the commonest indication for EGD [21]. Dyspepsia is a symptom of postprandial distress, early satiation or epigastric pain or discomfort, or indigestion or bloating [22]. Thus, all these studies essentially reported the same symptom of epigastric pain as the main indication for endoscopy, but with a slight variation in nomenclature. Doe *et al.*, reported dysphagia as the main indication for endoscopy at Mbale Regional Referral Hospital and this was closely followed by epigastric pain [5]. Summing up all the above studies, the most common indications for endoscopy are epigastric pain, dysphagia and upper GI bleeding.

Gastroesophageal reflux disease and esophageal tumors were the most common findings in the esophagus while gastritis and gastric tumors were predominant in the stomach. Duodenitis was also seen in the duodenum in 1.5% of the cases. Similar findings were also reported in Mbale [5], Ethiopia [21] and Ghana [3]. Esophageal candidiasis was the sole diagnosis identified in 9.3% of all patients done EGD. Majority of esophageal tumors were located in the mid esophagus (55.8%), followed by distal esophagus (36.8%) and about half of the patients with esophageal cancer also had esophageal candidiasis but the primary diagnosis captured was the esophageal tumors because these patients had EGD done with the main indication being dysphagia. Our findings were similar to a study done in Tanzania by Mchembe *et al.*, who reported that the middle third esophagus was the most common anatomical site for esophageal cancers at 58.5% followed by the lower third at 27.4% [23].

In literature, there are two major histological types of esophageal cancer namely: Squamous Cell Carcinoma (SCC) and adenocarcinoma but SCC is the predominant type worldwide [24]. In our study, SCC was predominant at 79.2%. However, Schlansky *et al.*, reported adenocarcinoma as the most common histological subtype in Philadelphia [25]. In our study, esophageal cancer was more common among males above 50 years of age. Worldwide, a higher incidence of esophageal cancer has been reported among males in the 6th and 7th decade of life [24] [25]. A study done, in Tanzania reported that esophageal cancer contributed 25.3% of all malignant gastrointestinal tumors and SCC of the esophagus accounted for 96% of all esophageal cancer and the risk factors attributed to this high figure were smoking, alcohol consumption and family history of the esophageal cancer [23]. Similar studies also reported that esophageal cancer contributed 13.3 % of all GI malignancies in Nigeria [26] and 32.5% in Adis Ababa [27].

In the stomach, majority of the tumors had a histological diagnosis of adenocarcinoma accounting for 85.7% and these tumors were predominantly in the distal half of the stomach. Most of our patients were males above 50 years of age. In Yemen, Kassim *et al.*, also reported adenocarcinoma as the most common

histological variant among patients with gastric cancer accounting for 92.4%, with a mean age of 64.98 ± 15.15 years, and the male to female ratio was 2.5:1 [28]. Another study in Nigeria also showed similar findings with gastric adenocarcinomas being more common among males aged 50 to 60 years and the tumor location was predominantly in the antrum/pylorus [29]. Similar findings were also reported in Rwanda [30], Ethiopia [31] and Kenya [32]. The histologic classification of gastric cancer is largely based on Lauren's classification, in which intestinal type and diffuse type adenocarcinomas are the two major histologic subtypes [33]. Majority of our patients had intestinal type adenocarcinoma which was in line with other studies in literature [28] [29] [34]-[36]. Whereas Borrmann's classification can be used as a valuable factor to predict overall survival among patients with gastric cancer [37], the findings at endoscopy that were reported for patients with gastric tumors did not indicate the Borrmann's type. Our study did not report any case of malignancy in the duodenum, and this is not surprising since duodenal cancers are generally rare, accounting for less than 1% of all gastrointestinal tumors [38] [39]. The available histology results for the samples taken from the duodenum only revealed duodenitis. Although the clinical stage of esophageal and gastric cancers at the time of presentation significantly affects patient outcomes; cancer staging, therapeutic interventions and treatment outcomes were beyond the scope of our study and therefore, they are not discussed here.

5. Conclusion

In south western Uganda, the most common indication for EGD was epigastric pain followed by dysphagia. Gastritis and GERD were the main benign findings at endoscopy. Esophageal malignancies were more common in the mid esophagus and majority were SCC. Gastric tumors were more common in the distal half of the stomach and they were mainly intestinal type adenocarcinomas.

6. Recommendation

Patients with recurrent upper GI symptoms need EGD for screening and early detection of upper GI malignancies.

7. Limitations

The main source of information for our study was the endoscopy reports. They had limited information about patient demographics and clinical presentation. Any possible risk factors for occurrence of our findings were completely missing. We also had some missing histology results because the reports could not be traced. Thus, our analysis was limited to the available study variables.

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Conflicts of Interest

The authors in this study declare no conflict of interest.

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