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Research Article

The Frequency of Short and Long Segment Barrett's Esophagus in Gerd Patient – In A Tertiary Care Hospital of Bangladesh

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Abstract

Background: Gastroesophageal reflux disease (GERD) is a common GI disorder in Bangladesh. Barrett' s esophagus (BE) is a consequence of gastroesophageal reflux disease. The exact frequency of long segment BE (LSBE) (>3 cm) and short-segment BE (SSBE) (<3 cm) in patients with GERD is not known.

Objective: To find out frequency of short and long segment of Barrett's esophagus in GERD patient attending the OPD of gastroenterology of BSMMU.

Methodology: This cross-sectional study was carried out in the department of Gastroenterology, BSMMU from August 2019 to March 2021. On the basis of inclusion and exclusion criteria 106 GERD patients were enrolled as study population.

Results: The mean age was found 34.7 ± 9.9 years with range from 18 to 59 years. The mean duration of symptoms of the study population in Barrett's patients were 4.22 ± 2.16 years. Among 106 study population endoscopically suspected Barrett's esophagus (ESBE) were 20(18.87%) and remaining 86 (81.13%) had non Barrett's esophagus.

Furthermore, 13 patients of histologically proven Barrett's esophagus 8(61.5%) had short segment, 3(23.1%) had long segment and 2(15.4%) had ectopic mucosal islands.

Conclusion: From this study we can conclude that Barrett's esophagus is not uncommon and short segment Barrett's esophagus is the most prevalent type in Bangladesh. No significant association was found with socio-demographic characteristics with Barrett's esophagus.

Keywords: Gastroesophageal Reflux Disease (GERD); Bangladesh

Introduction

Gastroesophageal reflux disease (GERD) defined as "symptoms or complications resulting from the reflux of gastric contents into the esophagus or beyond, into the oral cavity" [1]. The cardinal symptoms of GERD are heartburn and regurgitation [2]. However, GERD may present with a variety of other symptoms, including water brash, chest pain or discomfort, dysphagia, belching, epigastric pain, nausea, and bloating. In addition, patients may experience extra esophageal symptoms like cough, hoarseness, wheezing, and sleep disturbances. Cross sectional and longitudinal studies report the association of GERD with a number of demographic and behavioural factors. These risk factors are age, sex, obesity and smoking have variable association with symptoms of gastroesophageal reflux [3]. GERD is a common condition in the western population. GERD symptoms occur at least once a month in

44%, once in a week in 20%, and daily in 7% of the adult US population [4]. Several factors have been implicated in the lower prevalence in Asian countries; these include low dietary fat intake, genetic factors and low body mass index [5].

Barrette's esophagus is an abnormal appearing esophageal mucosa at endoscopy and is confirmed to have intestinal metaplasia by biopsy of esophagus. According to the currently accepted definition, the diagnosis of Barrett's esophagus, either LSBE (long segment Barrett's esophagus) or SSBE (short segment Barrett's esophagus), is based on a combination of both endoscopic and histopathologic criteria [6].

Multiple risk factors for BE have been identified such as longer duration and increased frequency of GERD symptom, male gender and white race [7]. Alcohol or tobacco use, obesity and hiatal hernia found to be risk factors in some studies [8].

The studies done by Rokonuzzaman (2006) and Shahed (2006) found the prevalence of GERD (on the basis of heartburn and/or acid regurgitation once a week) in rural and urban population of Bangladesh in 19.4% and 18.1% respectively [9].

Barrett's oesophagus is relatively uncommon in Asia. The prevalence of BE was 2% of Taiwanese population undergoing endoscopy for a GERD symptoms [10]. It was as high as 19.9% in Japan, 23.6% in India (Punia., *et al*. 2006). Although in study by Dhawan., *et al*. in 2001 prevalence of BE was 6% in India. Outside Japan and India, it ranged from 0.06% to 6% [11].

To the best of our knowledge in Bangladesh no study has been carried out to see the frequency of short and long segment of Barrett's esophagus in GERD patient. Therefore, the goal of the present study is to determine the frequency of BE, and it's variant short and long segment, in patients presenting with GERD.

Methods

This was a cross-sectional study conducted in the Department of the Gastroenterology and Department of pathology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh during the period from August, 2019 to March, 2021. In this study total 106 patients with GERD attending the Gastroenterology OPD, BSMMU were selected as the study population and those with GERD symptoms detected by using a standard questionnaire validated were initially enrolled for the study, depending upon the inclusion and exclusion criteria. Then history of cigarette smoking, alcohol intake, drug intake particularly NSAIDs, H2 antagonist, and PPIs was taken as well as height weight was recorded for all patients. After proper evaluation and explanation written informed consent was obtained from the selected patients for upper GI endoscopy and biopsy. Patient was kept nil per oral for at least 4 to 6 hours before the procedure. All the patients were undergone endoscopy in the department of Gastroenterology, BSMMU by single experienced endoscopist using a forward viewing video endoscope tropical Lidocaine pump spray 10% (10 mcg/dose). After each endoscopy the endoscope were carefully cleaned and disinfected by keeping the scope immersed in 2.2-2.4% activated glutaraldehyde solution for 10 minutes and then rinsing with sterile distilled water. Biopsy forceps was also disinfected and cleaned in similar manner. The gastroesophageal junction was defined as the ''pinch" at the distal end of the esophagus, coinciding with the most proximal margin of the gastric folds. The presence of an irregular-appearing ''Z-line,'' tongues of columnar appearing mucosa, or segments of columnar-lining mucosa in the distal esophagus also was identified as columnar epithelium above gastroesophageal junction which is a reddish color and a velvety texture which can be distinguished easily from normal pale and glossy esophageal squamous epithelium. The length of CLE was estimated by subtracting the distance from incisors to the squamocolumnar junction (Z-line) from the distance from incisors to the gastroesophageal junction. Patients were classified into short-segment BE (SSBE) if the length of columnar

appearing mucosa is less than 3 cm above the gastroesophageal junction and long-segment BE (LSBE) if the length of columnar mucosa is equal to or more than 3 cm. Biopsy protocol specified that 4-quadrant biopsy specimens be obtained at intervals of 2 cm from the circumferential Barrett's epithelium in the distal esophagus. Specimen was transferred to histopathologist within 24 hours in 10% buffered formalin. The samples were stained with Hematoxylin & Eosin (H&E). The diagnosis of Barrett's esophagus was confirmed in the histopathology department of BSMMU by evidence of intestinal metaplasia based on the presence of goblet cells which is characterized by distended lateral boarder, compressed basal nucleus and basophilic apical cytoplasm in columnar epithelium. Ambulatory patients age: 18-60 years having GERD symptom and patients willing to undergo upper GI endoscopy and biopsy to be included in the study. The patients of having contraindication for performing upper GI endoscopy and esophageal biopsy, history of esophageal and gastric malignancy and evidence of upper GI bleeding; or having any major psychiatric illness or having pregnancy were excluded from the study.

Data analysis

All the necessary information and clinical data was collected from each of the study patients and was recorded systematically in a predesigned questionnaire. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 23.0 for Windows version 10. The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. Chi-Square and fisher exact test were used to analyze the categorical variables, shown with cross tabulation. Student/unpaired t-test was used for continuous variables. P values <0.05 was considered as statistically significant. The study was approved by the Ethical Review Committee of Bangabandhu Sheikh Mujib Medical University.

Results

Figure 1 shows majority 51.9% were female and 48.1% were male.

Trait	Total	Barrett's	Non-Barrett's	p-value
	N (%)	Esophagus n = 13(%)	Esophagus n = 93(%)	
Age (years)				
18-20	4 (3.8)	1(7.7)	3(3.2)	
21-30	39(36.8)	4(30.8)	35(37.6)	
31-40	34(32.1)	4(30.8)	30(32.3)	
41-50	16(15.1)	4(30.8)	12(12.9)	
>50	13(12.3)	0(0.0)	13(14.0)	
Mean ± SD	34.8 ± 10.5	34.7 ± 9.9	34.8 ± 10.7	[a]0.963[ns]
Gender				
Male	51(48.1)	5(38.5)	46(49.5)	[b]0.457[ns]
Female	55(51.9)	8(61.5)	47(50.5)	
Smoker Yes	23(21.7)	5(38.5)	18(19.4)	[b]0.117[ns]
No	83(78.3)	8(61.5)	75(80.6)	
Alcohol intake				
Yes	1(0.9)	1(7.7)	0(0.0)	
No	105(99.1)	12(92.3)	93(100.0)	[b]0.122[ns]

Table 1: Distribution of the study patients according to socio-demographic characteristics (n = 106).

ns= not significant

[a]P value reached from unpaired t-test.

[b]P value reached from Chi square test.

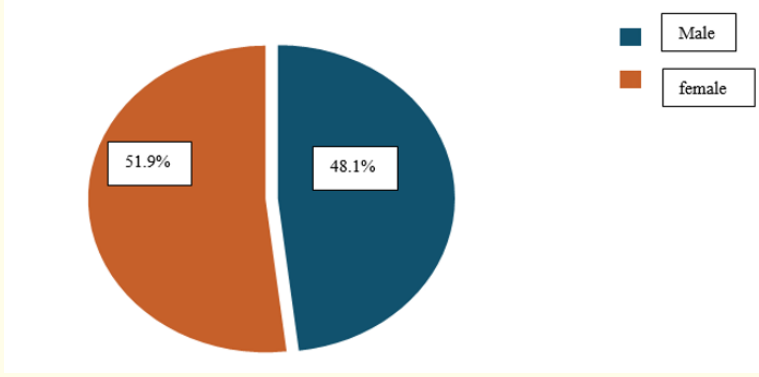

Figure 1: Pie chart showing gender distribution of the study patients (n = 106).

BMI (kg/m²)	Total N (%)	Barrett's esophagus n = 13(%)	Non-Barrett's esophagus n = 93(%)	p value
<18.5 (Underweight)	1(0.9)	0(0.0)	1(1.1)	
18.5-24.9 (Normal)	35(33.0)	1(7.7)	34(36.6)	
25.0-29.9 (Overweight)	67(63.2)	10(76.9)	57(61.3)	
≥30.0 (Obese)	3(2.8)	2(15.4)	1(1.1)	
Mean ± SD	25.2 ± 2.8	26.8 ± 2.7	25.0 ± 2.7	0.026[s]

Table 2: Association between BMI with Barrett's esophagus and non Barrett's esophagus findings (n = 106).

s = significant. P value reached from unpaired t-test.

	Duration of symptoms (years)	Barrett's esophagus n = 13(%)	Non-Barrett's esophagus n = 93(%)	p value
Range (min-max)	2-10	3-10	2-9	
Mean ± SD	4.22 ± 2.16	6.23 ± 2.13	3.94 ± 2.02	0.001[s]

Table 3: Association between duration of symptoms with Barrett's esophagus and non Barrett's esophagus findings (n=106).

s= significant, P value reached from unpaired t-test.

Duration of symptoms (years)	LSBE n = 3(%)	SSBE n = 8(%)	p value
Range (min-max)	3-10	3-7	
Mean ± SD	6.00 ± 3.61	5.75 ± 1.49	0.867[ns]

Table 4: Duration of symptoms in LSBE and SSBE (n = 11).

ns = not significant. P value reached from unpaired t-test.

Endoscopic findings	Number of patients (n)	Percentage (%)
Barrett's esophagus	20	18.87
Short segment	15	75.00
Long segment	3	15.00
Ectopic mucosal islands	2	10.00

Table 5: Distribution of the study patients according to endoscopic findings (n = 106).

Table 1 illustrated that mean age was found 34.7 ± 9.9 years in Barrett's group and 34.8 ± 10.7 years in non-Barrett's group. Eight (61.5%) patients were female in Barrett's group and 47(50.5%) in non Barrett's group. Nine (69.2%) patients were urban in Barrett's group and 59(63.4%) in non Barrett's group. Seven (53.8%) patients' monthly income <20,000 taka in Barrett's group and 51(54.8%) in non-Barrett's group. Five (38.5%) patients were found smoker in Barrett's group and 18(19.4%) in non-Barrett's group. One (7.7%) was found alcohol in Barrett's group and not found in non-Barrett's group. The difference was not statistically significant ($p > 0.05$) between two groups.

Table 2 showed more than three fourth (76.9%) patients had BMI 25.0-29.9 kg/m^2 in Barrett's group and 57(61.3%) in non-Barrett's group. Mean BMI was found 26.8 ± 2.7 kg/m^2 in Barrett's group and 25.0 ± 2.7 kg/m^2 in non-Barrett's group. Mean difference was statistically significant ($p = 0.026$) between two groups.

Table 3 resembled the mean duration of symptoms of the Barrett's and Non-Barrett's esophagus were 6.23 ± 2.13 and 3.94 ± 2.02 years respectively. That was statistically significant ($p = 0.001$).

Table 4 indicated the mean duration of symptoms were 6.00 ± 3.61 years in LSBE group and 5.75 ± 1.49 years in SSBE group. That was not statistically significant ($p = 0.867$).

Table 5 showed that 20(18.87%) patients had endoscopically suspected Barrett's esophagus (ESBE). Among them long segment Barrett's esophagus was 3(15%) and short segment Barrett's esophagus were 15(75%) and ectopic mucosal islands were 2(10.0%).

Table 6 showed that 13(12.3%) patients had histo-pathologically proven Barrett's esophagus and remaining 93(87.7%) had no Barrett's esophagus. In Barrett's esophagus 8(61.5%) patients had short segment, 3(23.1%) had long segment involvement and 2(15.4%) had ectopic mucosal islands.

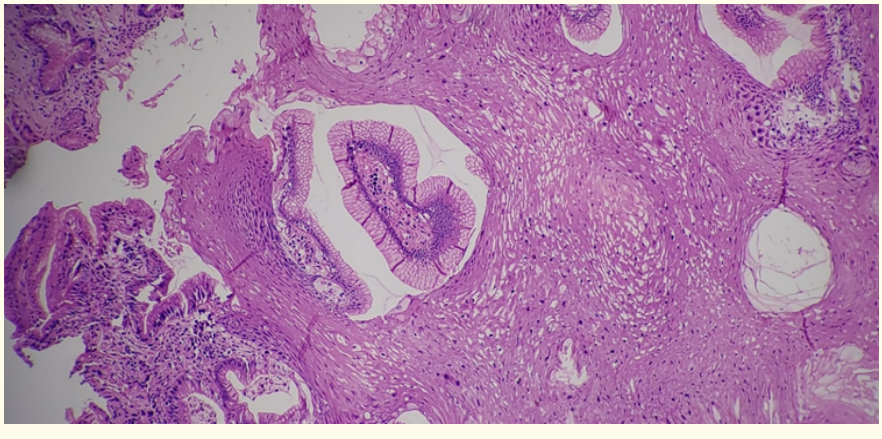

Figure 2: Barrett's Esophagus: Squamous cell has been replaced by tall columnar epithelial cells forming gland.

Discussion

Gastroesophageal reflux disease (GERD) is a common GI disorder in Bangladesh. Barrett' s esophagus (BE) is a consequence of gastroesophageal reflux disease which is a pre-malignant condition for esophageal adenocarcinoma. The incidence of esophageal adenocarcinoma is also increasing day by day. The exact frequency of long segment BE (LSBE) (>3 cm) and short- segment BE (SSBE) (<3 cm) in patients with GERD is not known. This cross-sectional study was carried out in the department of Gastroenterology, BSMMU from August 2019 to March 2021. On the basis of inclusion and exclusion criteria 106 GERD patients were enrolled in this study population.

In this study we found that the mean age of patients having Barrett's was 34.7 ± 9.9 years. Westhoff., *et al*. (2005) observed 50 patients with BE, median age was 62 years (range 29-81 years) [12]. The mean age of patients with BE in Asia ranges from 51.1 to 66.7 years [13,14]. Bhuiyan., *et al*. (2018) reported the mean age of patients having Barrett's was 34.67 ± 12.60 years [15].

In this study showed that 8(61.5%) patients were female in Barrett's group and 47(50.5%) in non- Barrett's group. Five (38.5%) patients were male in Barrett's group and 46(49.5%) in non-Barrett's group. This sex difference was not statistically significant. Bhuiyan., *et al*. (2018) found similar result. He reported female was slightly predominance, 12(16.9%) were female and 9 (16.4%) were male. But this sex difference was not statistically significant ($p > 0.05$) [9]. This observation inconsistent with studies from Asian countries which showed that men were more likely to have BE with a male/female ratio of approximately 1.93-2.09 [16,17].

We found that the mean duration of symptoms of the Barrett's and Non-Barrett's esophagus were 6.23 ± 2.13 and 3.94 ± 2.02 years respectively. That was statistically significant ($p = 0.001$) but the mean duration of symptoms of LSBE group and SSBE group were 6.00 ± 3.61 years and 5.75 ± 1.49 years which was not statistically significant ($p > 0.05$). Westhoff., *et al*. (2005) reported there were no significant differences between patients with LSBE and SSBE with GERD symptom duration. In present study we observed that more than three fourth (76.9%) patients had BMI 25.0-29.9 kg/m^2 in Barrett's group and 57(61.3%) in non-Barrett's group [15]. Mean BMI was found 26.8 ± 2.7 kg/m^2 in Barrett's group and 25.0 ± 2.7 kg/m^2 in non-Barrett's group. Mean difference was statistically significant ($p = 0.026$) between two groups.

Other studies implicated smoking as a risk factor found that alcohol was associated with both erosive esophagitis and BE. Avidan., *et al*. (2002) reported 87% patients were found smoker in Barrett's group and 76% in non-Barrett's group. The difference was statistically significant ($p < 0.05$) between two groups [18].

The current study showed that 20(18.87%) patients had found endoscopically suspected Barrett's esophagus (ESBE) and remaining 86 (81.13%) had non-Barrett's esophagus. Among 20 patients of Barrett's esophagus 15(75%) had short segment, 3(15%) were long segment and 2(10%) were ectopic mucosal islands. Westhoff., *et al*. (2005) observed of the patients with BE, overall frequency of short and long segment BE was 8.5% and 4.8% respectively. Wani., *et al*. (2014) reported that, the prevalence of endoscopically suspected BE in patients with GERD was 14.81%. They also showed that the prevalence of endoscopically suspected short and long segment BE was 8.2% and 1.85%, respectively [17,19].

The present study we noticed that out of 20 endoscopically suspected Barrett's patients, 13(12.3%) patients had histopathologically proven Barrett's esophagus and remaining 93(87.7%) were non- Barrett's esophagus. Among 13 patients of histologically proven Barrett's esophagus 8(61.5%) had short segment, 3(23.1%) had long segment and 2(15.4%) had ectopic mucosal islands. The prevalence of BE was reported to be as high as 19.9% in Japan in a series where biopsy was employed [20]. Wani., *et al*. (2014) reported among 9 patients of histologically proven Barrett's esophagus. Bhuiyan., *et al*. (2018) reported out of 21 histologically proven BE 15 had short segment, 3 had long segment and 3 had ectopic mucosal island. Chang., *et al*. (2011) all subjects with endoscopically suspected BE should be confirmed by histological diagnosis to avoid overestimation of the prevalence of BE in Asia [21].

Limitations

- The sample size was small and study period was short due to COVID-19 pandemic situation.
- Inadequate biopsies (Four quadrant biopsies, one from each quadrant) instead of eight biopsies, two from each quadrant as the standard protocol.
- It was single center base study, so, the observation of this study may not be the reflection of the whole country.

Conclusion

From this study we can conclude that Barrett's esophagus is not uncommon in our country. This study showed that most of the patients had short segment Barrett's esophagus with no significant association with socio-demographic characteristics. Barrett's esophagus has significant relation with BMI.

Funding

No funding sources.

Conflict of Interest

None declared.

Ethical Approval

The study was approved by the Institutional Ethics Committee of Bangabandhu Sheikh Mujib Medical University.

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