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Hiatus hernia and erosive oesophagitis at endoscopy in Nigerian patients

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Abstract

Hiatus hernia is an extramural factor in the integrity of the lower oesophageal sphincter (LOS) complex. An incompetence of this complex is the crux in pathogenesis of gastroesophageal reflux disease. This paper aims to study hiatus hernia and its association with erosive oesophagitis in Nigerian patients. It is a cross-sectional and retrospective study of patients undergoing upper gastrointestinal (GI) endoscopy with diagnosis of hiatus hernia made at a referral endoscopy facility located in Port Harcourt metropolis, Niger delta region of Nigeria, from February 2014 to September 2019. The variables collated included demographics, presence/severity of hiatus hernia, and oesophagitis. Statistical analysis was performed using SPSS version 21. A total of 442 upper GI endoscopies were performed with 89 patients included in the study. The age range of study patients was from 11 years to 88 years; mean age of 50.4 ± 18.5 years. Of these, 49 (55.1%) were females and 40 (44.9%) males. Erosive oesophagitis was seen in 19 (21.3%) cases. The age of patients in study population was statistically significant for the size of hernia (p value = 0.027). Two (0.5%) cases of short segment Barret's oesophagus with low grade dysplasia were recorded and no paraoesophageal hernia seen. Erosive oesophagitis and increasing size of hiatus hernia are common with aging. Barret's oesophagus and paraoesophageal hernia are rare.

Keywords: Hiatus hernia; Erosive oesophagitis; Endoscopy

1. Introduction

The earliest report from world literature on hiatus hernia (HH) was published in mid-nineteenth century and diagnosis by x-ray was made years later [1]. Clinical estimations report that approximately 50-60% of patients over the age of 50 years suffer from hiatus hernia [2]. However, hiatus hernia is reported as a rarity in Africans [3]. In Nigeria, an earlier prevalence report of 0.39% for hiatus hernia was made using barium meal [4]. More recently, endoscopy-based studies on prevalence of hiatus hernia from symptomatic patients report 3.3% to 28.0% however marred by uniformity in method of diagnosis [5, 6]. Hiatus hernia is closely related to reflux disease. Gastro-oesophageal reflux disease (GORD) is a condition which develops when the reflux of stomach contents causes troubling symptoms and/or complications [7]. The prevalence of GORD ranges from 2.5% to 7.8% in East Asia, 8.8% to 25.9% in Europe, 8.7% to 33.1% in the Middle East, 11.6% in Australia, 23.0% in South America and 18.1% to 27.8% in North America [8].

Hiatus hernia may be congenital or acquired; the acquired variety being either traumatic or non-traumatic in origin. Acquired non-traumatic hernias are typically classified into four subtypes: sliding - type I (90-95%) and paraoesophageal -type II. The mixed type with coexisting features of sliding and paraoesophageal hernia observed as type III and type IV as hiatal hernia associated with short esophagus [9]. Hiatus hernia reduces lower oesophageal sphincter length and pressure while impairing the augmenting effects of the diaphragmatic crus. Also, it is associated with decrease in oesophageal peristalsis, an increase in cross-sectional area of the gastroesophageal junction (GOJ), and

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acts as a reservoir allowing reflux from the hernia sac into the oesophagus during swallowing [10]. The presence of a hiatus hernia may be asymptomatic or associated with symptoms of gastro-oesophageal reflux, increased prevalence and severity of reflux oesophagitis, as well as Barrett's oesophagus and oesophageal adenocarcinoma [11]. GORD is broadly divided into two groups based on endoscopy findings: no mucosal damage (non-erosive reflux disease, NERD); and having esophageal mucosal damage (erosive esophagitis and Barrett's esophagus).

Radiologically, diagnosis of small hiatal hernia less than 2 cm in size is very difficult by barium contrast examination [12]. High resolution esophageal manometry (HRM) is a diagnostic tool for hiatal hernia with a 92% sensitivity and 95% specificity [13]. Also, 24-hr oesophageal pH monitoring can quantitatively assess oesophageal acid exposure [14]. These investigative modalities are however not readily available in some developing countries like Nigeria. Endoscopy is the standard method for diagnosis and treatment of disorders of the upper gastrointestinal tract [15]. In addition to a diagnosis of hiatus hernia, an evaluation of esophagitis and esophageal dysplasia is possible with added options of treating complications. Endoscopically, a hiatus hernia is diagnosed as a proximal migration of the separation line (z-line) between oesophageal mucosa and the gastric mucosa for more than 2cm above the diaphragmatic hiatus impression [16]. Also, the retroflexed endoscope in the stomach near the cardia with adequate insufflation can demonstrate a hiatus hernia. There are various endoscopic classifications for assessing the severity of reflux erosive oesophagitis with the Los Angeles classification being most popular [17].

This study aims to study hiatus hernia and its association with erosive oesophagitis from Nigerian patients undergoing upper gastrointestinal endoscopy.

2. Patients and method

2.1. Study design and setting

This was a cross sectional observational retrospective study conducted in a referral endoscopy facility in Port Harcourt metropolis of Rivers State, South-south Nigeria. Port Harcourt is the fifth largest city in Nigeria, located in the Niger delta region. According to World Population Review, Port Harcourt has an estimated population of 3, 020, 232 [World Population Review portal, <https://worldpopulationreview.com/world-cities/port-harcourt-population/>, Last accessed on 25/03/2020]. The period of study was from February 2014 to September 2019. Data was extracted from the records of patients after ethical approval was obtained. The inclusion criteria for the study was all consecutive patients undergoing endoscopy for upper gastrointestinal symptoms that an endoscopic diagnosis of hiatus hernia was made with or without evidence of reflux oesophagitis. The exclusion criteria were distal oesophagitis from corrosive ingestion, oesophageal instrumentation, oesophageal trauma and histologic diagnosis of eosinophilic oesophagitis or specific non-reflux causes of oesophagitis in the distal oesophagus. Also, excluded were patients with a history of gastric surgery. The variables extracted were demographics, primary indication symptom, endoscopic finding of hiatus hernia and/or oesophagitis and histologic findings. The recorded videos of procedures were retrieved from the Centre's video library and reviewed for grade of reflux oesophagitis if not specified in record.

2.2. Endoscopy equipment

The endoscopy equipment used was Karl Storz (Germany) video processor, 100W Xenon lamp, HD monitor and forward viewing video gastroscopes- 13801 and 13821 PKS.

2.3. Endoscopy procedure

A systematic examination was made with the patient in left-lateral position. The sedation/ analgesia protocol involved intravenous diazepam (5-10mg) and pharyngeal local anaesthesia using 10% xylocaine spray. Hiatus hernia was diagnosed by 2 methods. A proximal migration of the z-line more than 2cm above the diaphragm was first noted. There was a further assessment on retroflexion of the endoscope in the stomach with the endoscope pulled up to a few centimetres of the diaphragmatic hiatus following air insufflation. The size of the defect around the endoscope was estimated using the size of endoscope (9.7mm) as a guide. A defect that was twice the size of the endoscope caliber or less was graded as small (< 2cm). Beyond this, was graded as large. All cases were performed, and videos reviewed where necessary by one of the authors (ERO) hence reducing inter-observer variability. Erosive oesophagitis was graded using the Los Angeles classification [17]. Grade A is one (or more) mucosal break(s) (\leq 5mm) not extending between the tops of two mucosal folds. Grade B is like A with the difference of size of mucosal break being $>$ 5mm. Grade C is one or more mucosal break(s) and continuous between the tops of two or more mucosal folds but involving $<$ 75% of the circumference. Grade D is one (or more) mucosal break(s) which involve \geq 75% of the oesophageal circumference.

2.4. Statistical analysis

The analysis of data was performed using IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY, USA. The results were summarized as numbers, mean + standard deviation and percentages as appropriate. Categorical variables were compared using Pearson’s Chi-square. A p value < 0.05 was considered statistically significant. The continuous variables were compared with the independent t test. A p value < 0.05 was considered statistically significant.

3. Results

A total of 464 cases of upper gastrointestinal endoscopies were performed during the study period. Eighty-nine consecutive cases were diagnosed with hiatus hernia (20.1%) and were all included in the study. The age range of study patients was from 11 years to 88 years (mean age of 50.4±18.5 years). There were 49(55.1%) females and 40(44.9%) males. The age and sex distribution are as shown in Figure 1. A peak in age-adjusted prevalence was recorded in the fourth decade of life 21 (23.6%) with a second peak recorded in the sixth decade 16(18.0%)-Figure 2.

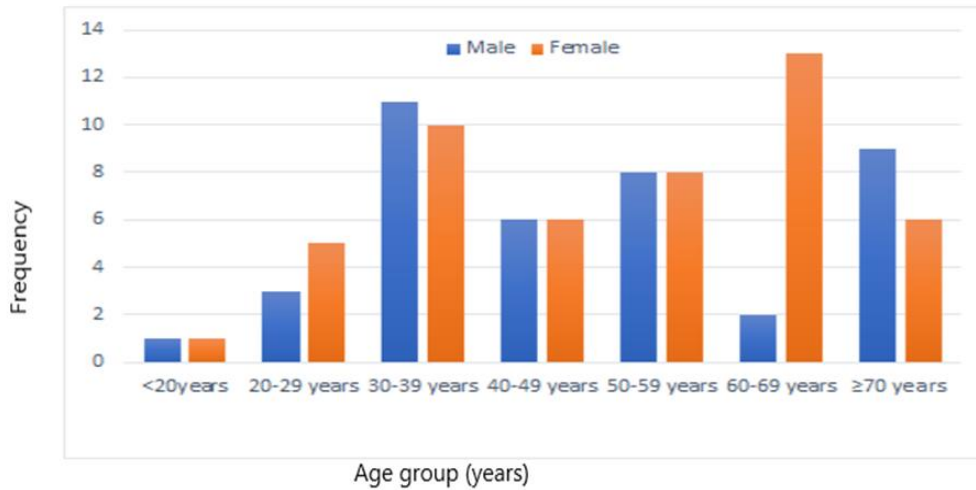


Figure 1 Demographics of hiatus hernia cases

Type I hiatus hernia was recorded in all 89 patients. The hernia defect size was < 2cm (small) in the majority of cases- 77(86.5%). A defect size of > 2cm (large) was observed in 12 (13.5%) cases.

Age was statistically a significant factor in hernia size -Table 1. There was no statistical difference in sex distribution (p 0.316).

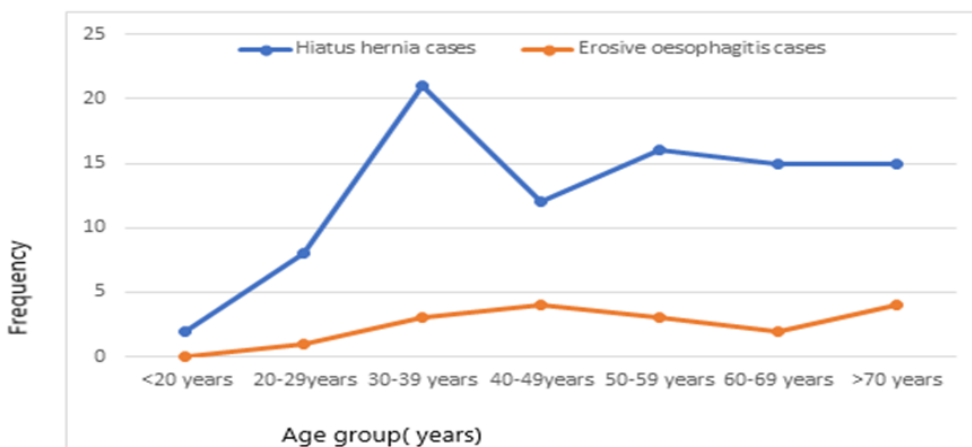


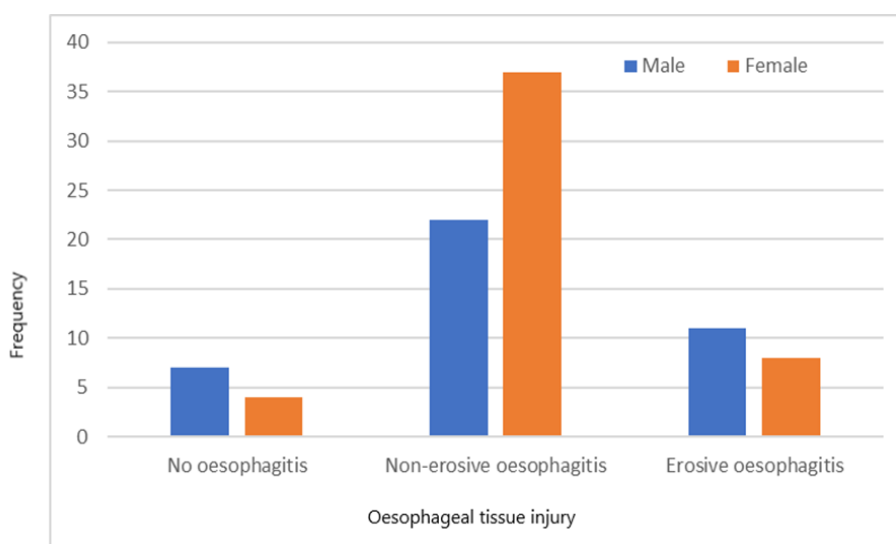
Figure 2 Age distribution of hiatus hernia and erosive oesophagitis cases

Table 1 Relationship of age to hiatus hernia

Variables	Small hiatus hernia	Large hiatus hernia	P value
Mean Age	50.3 ± 17.6	51.0 ± 24.7	0.027

Erosive oesophagitis was seen in 19(21.3%) cases but mild features of erythema without mucosal breach observed in 59(66.3%) cases. No evidence of oesophagitis was seen in 11(12.4%) cases-Figure 3. Los Angeles classification grade A reflux oesophagitis was the most frequently recorded- 8 cases-Table 2. A higher grade of reflux oesophagitis (grade B) was recorded in the 2 sole cases of large hernia with reflux oesophagitis. Of the 4 cases of grade D reflux oesophagitis there were 2 histologically diagnosed cases of short segment Barret's oesophagus which were less than 3cm long with low grade dysplasia. A case of Cameron lesion was recorded.

Helicobacter pylori was histologically confirmed in 16(18.0%) cases.

**Figure 3** Oesophageal tissue injury and sex distribution in study patients**Table 2** Grading of reflux oesophagitis cases

Grade of Reflux (n=19)	Frequency	Percentage
Grade A	8	42.1
Grade B	4	21.1
Grade C	3	15.7
Grade D	4	21.1
Total	19	100

4. Discussion

The crural diaphragm contributes to the anti-reflux barrier through a pinchcock effect on the distal oesophagus preventing reflux of gastric acid. A hiatus hernia impairs LOS competence, reduces LOS pressure and length and alters the opening characteristics of the GOJ, resulting in delayed oesophageal acid clearance and increased oesophageal acid exposure [18]. In this study an estimated hiatus hernia prevalence of 20.1% was recorded. In a similar endoscopy-based study from South-west Nigeria a prevalence of 28% was reported.[5] This is however unlike report of 3.3% prevalence rate from North-central Nigeria.[6] This disparity is very likely due to difference in the method of diagnosis of hiatus hernia. Hiatus hernia was seen with a bimodal peak in the fourth and sixth decades of life. Traditionally HH is more frequent with age; however, this age distribution may be attributable to the age pattern of GORD in study population.

There was no statistically proven predilection of hiatus hernia for a sex despite the marginally higher female sex of study patients. Reports of hiatus hernia from some studies in Western countries with high prevalence of GORD similarly report no sex predilection for HH [19, 20].

The functional integrity of gastroesophageal junction complex is a valvular mechanism with both intrinsic and extrinsic components. The extrinsic components comprise: the compression by the crural diaphragm; intra-abdominal location of the lower oesophageal sphincter (LOS); integrity of the phrenoesophageal ligament; and maintenance of an acute angle of entry of the esophagus into the stomach (angle of His) [21, 22, 23]. The lower oesophageal sphincter is a functional barrier with no anatomical landmarks. The intrinsic muscles of the distal oesophagus and the proximal stomach, with the sling fibres of the cardia, form the intrinsic part of the LOS [18]. The LOS is approximately 4 cm long, 2 cm of which lies intra-abdominally with a pressure of approximately 20mmHg in adults [24]. The dominant mechanism of gastroesophageal reflux may vary as a function of disease severity with transient LES relaxation predominating with mild disease and mechanisms associated with a hiatus hernia and or weak sphincter dominating with more severe disease [25].

A prevalence rate of 3.8% for erosive esophagitis was recorded. This rate is close to the lower range of reports from Asia [26, 27]. The low rate in Asia is speculated to be related to a high prevalence of *Helicobacter pylori* with atrophic gastritis and reduced acid production. As in the Far East, the prevalence of *H. pylori* infection is reported to be high in sub-Saharan Africa however with a low prevalence of reflux disease and PUD. However, a previous study on dyspeptic patients conducted by one of the authors in this metropolitan population recorded a prevalence rate 38.5% for *helicobacter pylori* and 6.7% for atrophic gastritis [28]. This was speculated to be due to common practice of eradication therapy for dyspeptic symptoms prescribed by managing physician before referral for gastroscopy. Race and dietary factors may have contributory role in the low prevalence of erosive oesophagitis. The few cases of large hernia seen were uniformly associated with higher grade of reflux disease. The presence and size of a hiatal hernia are associated with a more incompetent LOS, defective peristalsis, more severe mucosal damage, and increased acid exposure [29]. A slight predominance in male sex was recorded for erosive oesophagitis. This is like reports of age and male sex being associated with a higher incidence of esophagitis in Asian populations. [30, 31].

Anti-reflux surgery is indicated in patients affected by severe GORD who are (i) not compliant with long-term medical therapy, (ii) who require high doses of drugs and (iii) who wish to avoid lifetime medical treatment and (iv) symptomatic with a large hiatal hernia [32]. None of the patients had a symptomatic large hiatus hernia mandating a firm recommendation of surgery from the endoscopist. The patients diagnosed with hiatus hernia and reflux disease were referred to the managing physician after endoscopy for medical treatment to include lifestyle modifications, proton pump inhibitor, prokinetics and anti-reflux agents. Though there are minimally invasive anti-reflux interventions including transoral incisionless fundoplication (TIF) using EsophyX device, Stretta procedure, Medigus ultra surgical endostapler and Plexiglas Linx™ reflux management system [33, 34]. These services were not available in the low resource setting of the study. Surveillance was recommended for the 2 cases of Barrett's oesophagus with low grade dysplasia.

The limitations to this study include the sample size and its symptomatic study population. A large population-based study will reveal a more accurate prevalence rate for hiatus hernia especially as not all hiatus hernia cases are symptomatic. Also, not all erosive reflux oesophagitis cases are associated with a hiatus hernia. There was a non-inclusion of known risk factors of reflux disease beside hiatus hernia like body mass index. Also, a history of acid suppressants especially proton pump inhibitors, commonly prescribed by referring physicians for dyspepsia before upper gastrointestinal endoscopy, was not included. This is important since presence or absence of endoscopic oesophagitis at a given time is dependent to some extent on whether the patient is taking these medications.

5. Conclusion

Age is directly related to increase in hiatus hernia size with no significant sex predisposition in this subset of African population. Barrett's oesophagus and paraoesophageal hernia are rare.

Compliance with ethical standards

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Disclosure of conflict of interest

Drs Emeka Ray-Offor and Bode Falase have no conflicts of interest to declare.

Statement of ethical approval

Ethical approval was obtained for this study.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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