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Original Research Article

Incidence of Hiatal Hernia in Patients with Gastroesophageal Reflux Disease (GERD)

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Abstract:

Introduction: Gastroesophageal reflux disease (GERD) arises from contact of the esophageal epithelium with acidic gastric contents that significantly affects the patient's quality of life. Hiatal hernia is one of the factors causing reflux. Hiatus hernia refers to condition in which elements of the abdominal cavity, most commonly the stomach, herniate through the oesophageal hiatus into the mediastinum. Hiatal hernia is a frequent finding during upper gastrointestinal endoscopy. Type I hiatal hernia is the sliding hiatal hernia, which accounts for more than 95% of all hiatal hernias and remaining 5% is paraesophageal hiatal hernias.

Aim and Objectives: The aim of the study was to detect the frequency of hiatal hernia (HH), in patients with Gastroesophageal reflux disease (GERD), to compare the acid reflux pattern in patients with and without HH, and to search the relationship between the erosive gastroesophageal reflux (GER) and HH.

Materials and Methods: A total of 64 patients (30 Male, 34 Female) with GERD were examined. The patients who presented with complaints of upper gastrointestinal symptoms and underwent upper gastrointestinal endoscopy in Hind Institute of Medical Sciences, Mau Ataria, Sitapur, UP. During the period of April 2022 to July 2023. The frequency of hiatal hernia (HH), in patients with GERD, the acid reflux pattern, the relation of body mass index and erosive esophagitis with HH were studied.

Results: Out of 64 patients, 30 males (46.875%) and 34 females (53.125%) were part of the study, who presented with upper GI symptoms, 11 (17.19%) patients were diagnosed with hiatus hernia. Out of these 11 cases, 9 patients (81.81%) were found to be having sliding type of hiatus hernia and 2 patients (18.18%) having rolling type. The mean age of the patients was 44.0 6 ±9.6 years. Hernia was small in 6 (54.54%) cases, medium in 3 (27.27%), and large in 2 (18.18%). There was no significant difference in body mass indices between patients with HH and GERD. HH was found to be significantly correlated with GERD ($P \leq 0.05$).

Conclusion: Hiatal hernia is very closely associated with GERD by 17.19% incidences. Early diagnosis and timely management or surgical intervention reduces morbidity associated with hiatus hernia and acid reflux. Hence, all patients presenting with persistent upper gastrointestinal symptoms should undergo upper GI endoscopy managed accordingly.

Keywords: Hiatal hernia (HH), Gastroesophageal reflux disease (GERD), Upper gastrointestinal endoscopy.

Introduction

A hiatal hernia is a condition in which the upper part of the stomach or other internal organ bulges through the hiatus of the diaphragm. When there is laxity in this hiatus, gastric content can back up into the esophagus and is the leading cause of gastroesophageal reflux disease (GERD) [1]. Hiatal hernia (HH) represents a relatively frequent condition in the general population. Hiatal hernias may be congenital or acquired. There is an increased prevalence in older people. It is believed that muscle

weakness with loss of flexibility and elasticity with age predisposes to the development of a hiatal hernia. This may cause the upper part of the stomach to not return to its natural position below the diaphragm during swallowing. Other predisposing factors have been identified, such as elevated intraabdominal pressure. This typically is a result of obesity, pregnancy, chronic constipation, and chronic obstructive pulmonary disease (COPD). Trauma, age, previous surgeries, and genetics can also play a role in the development of a hiatal hernia.[2]

The incidence of hiatal hernias increases with age. Approximately 55%-60% of individuals over the age of 50 have a hiatal hernia. However, only about 9% have symptoms, and it depends on the type and competency of the lower esophageal sphincter. The vast majority of these hernias are type I sliding hiatal hernias. Type II, paraesophageal hernias, only make up about 5% of hiatal hernias where the LES remains stationary, but the stomach protrudes above the diaphragm. There is also an increased prevalence in women, which could be attributed to increased intraabdominal pressure during pregnancy. Hiatal hernias are most common in Western Europe and North America and are rare in rural Africa, South Asia [3].

Over the past few decades, our understanding on the relationship between hiatal hernia and gastroesophageal reflux disease (GERD) has evolved, shifting from one extreme to the other. Initially it was considered that the presence of hiatal hernia, an anatomical abnormality, was a sine qua non in the pathogenesis of GERD ever since its association was first emphasized by Allison in 1951[1,4].

The incidence of symptomatic cases of hiatal hernia appears to be linked to the diagnosis of gastroesophageal reflux disease (GERD), the 2 conditions being closely associated.

The most characteristic manifestation one will find in hiatal hernia is gastroesophageal reflux, manifested through regurgitation and heartburn, while less common symptoms include dysphagia, epigastric or chest pain and even chronic iron deficiency anemia [5]. Large hernias can present with dysphagia, early satiety or regurgitation [6]. Conventionally, hiatal hernia used to be classified as either sliding or paraesophageal. The current anatomic classification of hiatal hernias consists of four types.

• Type I or sliding hernias - associated with symmetrical ascent of the stomach through the diaphragmatic crus. Type I hernias represent more than 90% of cases of hiatal hernia and are known for their frequent association with GERD [7]. They are also associated with more severe degrees of esophagitis and Barrett's esophagus [8].

• Type II hernias or pure paraesophageal hernias (PEH) – a portion of the gastric fundus herniate through the diaphragmatic hiatus adjacent to the esophagus, while the gastroesophageal junction remains in its normal anatomic position.

• Type III hernias are a combination of types I and II, where both the fundus and the gastroesophageal junction herniate through the hiatus. The fundus is above the gastroesophageal junction.

• Type IV hernias consist of a structure other than the stomach herniating through the thoracic cavity (small bowel, colon, omentum, peritoneum or spleen)[9].

Types II-IV is referred to as paraesophageal hernias (PEH); their main clinical importance is due to their potential for ischemia, obstruction or volvulus [10]. The anatomic classification of hiatal hernia is necessary especially regarding the treatment approach, as indications for the surgical method are quite different between sliding and paraesophageal hernias [11].

Symptoms of hiatal hernia: Many people never have symptoms of hiatal hernias. But among those who do, the most common symptoms are related to chronic acid reflux (gastroesophageal reflux disease, or GERD). These include [12]:

1. Heartburn. A burning sensation in your chest, especially after eating.
2. Noncardiac chest pain. Recurring chest pain that feels like angina but is n't.
3. Indigestion. Feeling full soon after eating, with a burning type of abdominal pain.
4. Burping and regurgitation. Food, gas and acid rising back into your throat.
5. Difficulty swallowing or a lump in your throat when you swallow.
6. Sore throat and hoarseness when you speak, due to irritation from the acid.

Other possible warning signs of a hiatal hernia might include:

1. Nausea, due to compression of your stomach or acid overflow, or both.
2. Shortness of breath, if your hernia is compressing your lungs.
3. Pressure or pain in your upper abdomen or your lower chest.

Diagnosis of esophageal hiatal hernia:

According to the Society of American Gastrointestinal and Endoscopic Surgeons, only investigations that will have an impact on the clinical management of the patient should be performed [2]. The diagnosis of hiatal hernia can be rather challenging at times due to the shift in the anatomy of the esophagogastric junction during deglutition, respiration and movement.

A complete history and physical examination are mandatory, as they may reveal symptoms that were not previously apparent.

Diagnosis: The diagnosis of hiatal hernia can be made through radiographic, endoscopic, and manometric assessment. Whereas large hiatal hernias can be detected and diagnosed without difficulty using either of these methods, diagnosing small hiatal hernias (<2 cm) can be challenging with each modality having its limitation (table-1 and Fig-1 & 2).

Table 1: Current diagnostic methods for hiatal hernia [13]

Diagnostic technique	Evaluation	Warnings
Barium swallow X-ray	size, location of hernia, motility dysfunction, stenosis, stricture related to GERD, short esophagus diagnosis	contraindicated in pregnancy, barium or iodine hypersensitivity, exposure to radiation
Endoscopy	analysis of esophageal mucosa, erosive esophagitis, Barrett's esophagus, malignancy, Cameron's ulcers, swallowing difficulty	air insufflation of the stomach may exaggerate hernia size, difficulty to assess massive hernias accurately
Manometry	integrity of esophageal peristaltis, motility disorders, achalasia	difficulty in placing Manometry catheter
pH testing	quantitative analysis of reflux episodes	-
CT	gastric volvulus, perforation, pneumoperitoneum, pneumomediastinum	unable to exactly define the configuration of the hernia, exposure to radiation

It was reported that, for a preoperative evaluation of a patient, barium swallow X-ray, upper endoscopy and Manometry are essential [1,13,14]. Moreover, others considered that, in order to have a reliable exclusion of hiatal hernia prior to treatment, all three investigations must be performed [15,16].

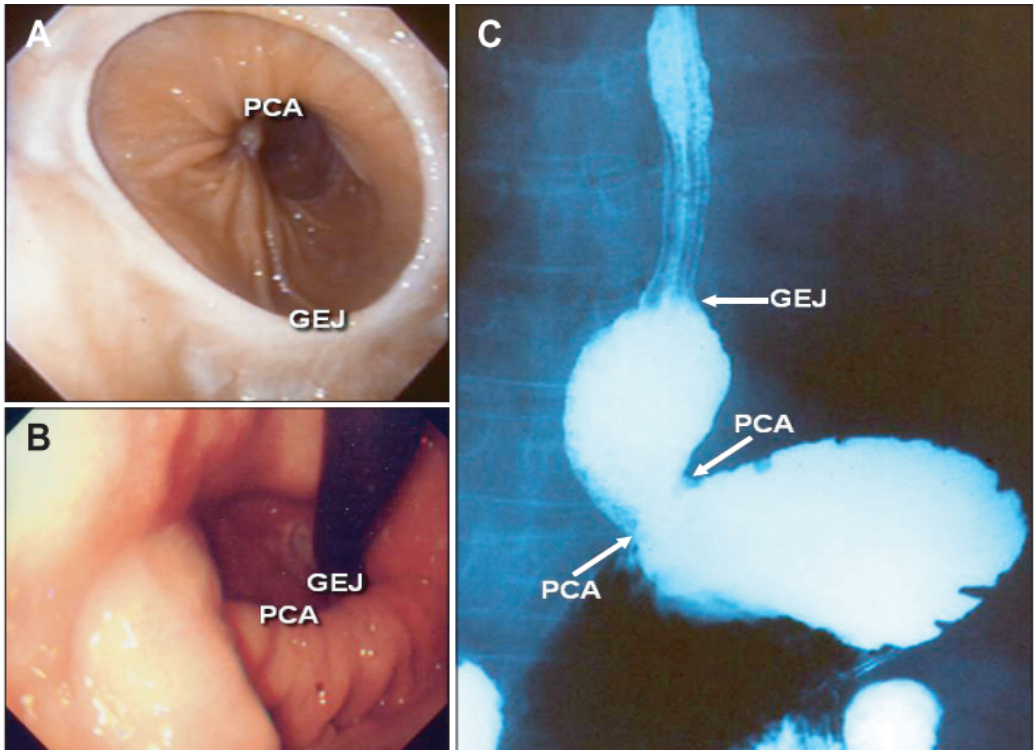

Figure-1: Endoscopic and radiologic findings of a sliding type hiatal hernia:[15]

{Endoscopic and radiologic findings of a sliding type hiatal hernia. A hiatal hernia is a portion of proximal stomach between the gastroesophageal junction (B ring; GEJ) and the diaphragmatic indentation (pinchcock action, PCA). If it is large, a hiatal hernia can be easily observed with a forward or retroflexed view during an upper gastrointestinal endoscopy (A, B) or with barium swallows (C)}. The hiatal hernia itself can play a role in the development of both acid reflux and a chronic form of acid reflux called gastroesophageal reflux disease (GERD). Endoscopic and radiographic studies suggest that 10%–70% of patients with reflux disease have a hiatal hernia, whereas the prevalence

of hiatus hernia in control subjects was significantly lower within each study. Despite this association, the role of hiatal hernia in the pathogenesis of symptomatic reflux is incompletely defined [15]. Recent investigations suggest that hiatal hernia may lead to increased esophageal acid exposure both by increasing the susceptibility to reflux and by prolonging the process of acid clearance. An increased number of reflux events may occur because of an increased susceptibility to strain-induced reflux and because of the associated diminished esophagogastric junction (EGJ) pressure [16].

Hiatal hernia also increases esophageal acid exposure by prolonging the process of esophageal acid clearance, especially while subjects are in a recumbent posture [9]. Missing from the above account of the role of hiatus hernia in the pathogenesis of gastroesophageal reflux disease (GERD) is the relationship between hiatal hernia and transient lower esophageal sphincter relaxation (tLESR). Numerous manometric studies provide compelling evidence that tLESR is often the dominant mechanism of reflux [10].

The anatomy and physiology of the GEJ, as it relates to the development and progression of GERD, has been the primary focus of much research beginning in the 1950s.

Concept of the two-sphincter hypothesis:

The "Two-Sphincter Hypothesis" is a concept that incorporates both the anatomy and the physiology of the GEJ to form the reflux barrier. The reflux barrier has four components—the lower esophageal sphincter (LES), the crural diaphragm, the angle of His, and phrenoesophageal membrane (Figure 1)—all of which must function together to establish a barrier against reflux. The components fall broadly into two categories: intrinsic sphincter which includes the LES and the angle of His and extrinsic sphincter which includes the crural diaphragm and phrenoesophageal ligament.

Functionally, the intrinsic sphincter components contribute to the reflux barrier at rest; whereas, the extrinsic components actively contribute barrier function during respiration and changes in position and intra-abdominal pressure [17].

The aim of this study was to determine if and how hiatal hernia influences the vulnerability to gastroesophageal reflux in patients with GERD, ii) to detect the frequency of hiatal hernia (HH), in patients with Gastroesophageal reflux disease (GERD),iii) to compare the acid reflux pattern in patients with and without HH, iv) and to search the relationship between the erosive gastroesophageal reflux (GER) and HH.

Materials and Methods:

Study Site: Hind Institute of Medical Science, Mau Ataria, Sitapur

Study Design: Analytical study

Study Period: 18 months after obtaining HIMS IHEC`S Approval.

Sample size: 64, Male-30 and Female-34.

Materials:

Table 2: The GERD questionnaire respondents enter the frequency scores after reflecting on their symptoms over the previous week/daily.

Question	Frequency score (points) for symptom			
	Absent	>2/ Week	≤2/ Week	Daily
1. How often did you have a burning feeling behind your breastbone (heartburn)?	0	1	2	3
2. How often did you have stomach contents (liquid or food) moving upwards to your throat or mouth (re-gurgitation)?	0	1	2	3
3. How often did you have a pain in the centre of the upper stomach?	3	2	1	0
4. How often did you have nausea?	3	2	1	0
5. How often did you have difficulty getting a good night's sleep because of your heartburn and⁄or regur-gitation?	0	1	2	3

6.How often did you take additional medication for your heartburn and⁄or regurgitation, other than what the physician told you to take? (such as Tums, Ro-laids, Maalox?)	0	1	2	3
Dysphagia	0	1	2	3
Hoarseness	3	2	1	0
Sore throat	0	1	2	3
Bloating	0	1	2	3
Belching	0	1	2	3
Vomiting	3	2	1	0
Heartburn	0	1	2	3
Regurgitation	0	1	2	3
Epigastric pain	0	1	2	3
Sedentary lifestyle	N0	yes	-	-
Insomnia	No	yes	-	-
Alcohol	0	1	2	3
Smoking	0	1	2	3
Tobacco	0	1	2	3
Co Morbidity				
Type2 Diabetes	No=0	Yes=1	-	-
Cardiovascular Diseases	No=0	Yes=1	-	-

The data which form the basis for the GerdQ were collected in a large international study (DIAMOND, study code D9914C00002)[2].

Methods:

The Present study comprised of 64 patients (30 Male, and 34 female) who presented with complaints of upper gastrointestinal symptoms and underwent upper gastrointestinal endoscopy in HIMS hospital, Sitapur during the period of April 2022 to July 2023. Informed consent was taken for both the procedure as well as for research purpose. After obtaining adequate history (GERDQ- Table-2) and general examination, patients were taken up for fibre optic upper GI endoscopy and results were analysed and tabulated using Microsoft excel.

Patients were kept nil per oral for 6 hours or fasting over-night. Patients were made to lie down in the left lateral position, and pharyngeal spray comprising of 10% xylocaine was sprayed topically into the oral cavity and the pharynx, and asked to retain the same for 10-15 minutes before swallowing it, to act as local anaesthesia. Endoscopy was carried out using fibre optic flexible esophagogastroduodenoscopy (olympus). Mouth guard was placed, and the lubricated scope was passed over the dorsum of the tongue and under direct vision into the oesophagus. Subsequently the endoscope was advanced with clear view of the lumen.

During the whole procedure, examination of oesophagus, stomach up to second part of duodenum was done to look for any abnormal findings such as herniating contents, laxity of oesophageal hiatus, thinning out of membranes, gastroesophageal reflux or ulcers.

Once again visualised while withdrawing the endoscope, and also care taken to suction out any air or gastric contents. Entire procedure was recorded by photography and videography for purpose of documentation and further follows up (Figure-2).

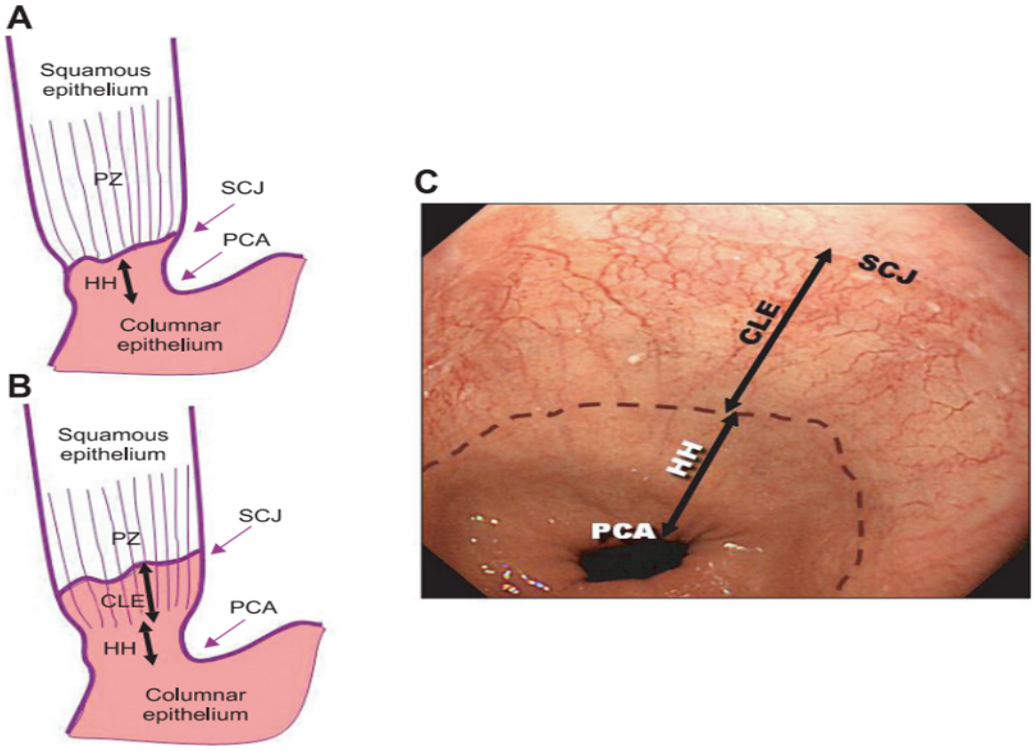

Figure 2: Endoscopic assessment of Haital Hernia. [15]

{Endoscopic diagnosis of short segment hiatal hernias using lower esophageal capillary patterns as guides. Endoscopic identification of the gastroesophageal junction is occasionally difficult, especially in patients with short segment hiatal hernias (HHs). Using the distal margin of longitudinally arrayed subepithelial capillaries (palisade zone, PZ) as a landmark for the gastroesophageal junction, patterns can be classified according to the relationships between the distal end of the PZ with the squamocolumnar junction (SCJ) and the diaphragmatic indentation (pinchcock action, PCA). (A) The PCA is distal to the other two markers that are at the same level. (B) The SCJ is proximal to the distal end of the PZ, which is proximal to the PCA. The HH is the area between the distal margin of the PZ and the PCA, and the columnar-lined esophagus (CLE) is in the area between the SCJ and the distal margin of the PZ}.

Inclusion criteria: Patients at the age of 18 years and above, stable general condition presenting with dyspepsia, dysphagia, chest burn, nausea, vomiting, acid regurgitation, excessive belching, bloating sensation, epigastric pain, and hematemesis (both outpatients, inpatients and patients referred from other hospitals) were included in this study.

Exclusion criteria: Exclusion criteria for current study were; paediatric

patients <18 years of age, patients presenting with massive upper GI bleed, corrosive poisoning, unconscious, unstable patients, patients previously detected with upper GI cancer, anaemia due to chronic disease, and patients with intentional weight loss.

Body mass index: Body Mass Index (BMI) was assessed, defined as donor weight (in kilograms) divided by height (in square meters), for the relation of BMI with GERD and HH.

Statistical Analysis:

Statistical Analysis: All the data was processed by using SPSS v26.0 (SPSS Inc., Chicago, IL, USA). Frequency and percentages were given for age groups, gender, biochemical parameters and type of operation. Chi square was used to determine the association of postoperative development of incisional hernia with sutures among two groups. Independent sample t test was used to compare the mean age and hospital stay between both groups. A p value ≤ 0.05 was considered significant.

Results

Out of 64 Patients, 30 males (46.875%) and 34 females (53.125%) were part of the study, who presented with GERD. After adequate history, clinical examination and upper GI endoscopy, the results were found to be as follows;

Amongst the 64 patients, 11 patients (17. 19%) were diagnosed with hiatus hernia and the mean age group of all the patients who underwent upper GI endoscopy was 44.0 6 ±9.6, and those who were diagnosed with hiatus hernia was 57 years (Mean). Amongst those diagnosed with hiatus hernia (11Pts), 7 patients (63.63%) were females and 4 patients (36.36%) were males. Out of these 11 cases, 9

patients (81.81%) were found to be having sliding type of hiatus hernia and 2 patients (18.18%) having rolling type. Moreover, it was found that, the Hernia was small in 6 (54.54%) cases, medium in 3 (27.27%), and large in 2 (18.18%) with 100% reflux. HH was found to be significantly correlated with GERD (P≤ 0.05). Moreover,

The larger the hernia, the higher the incidence of GERD (P≤0.05). Furthermore, the significance of the correlation between HHs and post-OAGB GERD increased with the hernia size. There was no significant difference in body mass indices between patients with HH and GERD.

In this study, amongst the 11 patients with hiatus hernia, the most common upper gastrointestinal symptom complained by the patient was dyspepsia or Upper abdominal pain, which was reported by 81-90% of the patients.

Apart from these, other symptoms that were found in patients with hiatus hernia were excessive belching (63-67%), vomiting (35-42%) and decrease in appetite (23-28%).

Table 2: Demographic and anthropometric characteristics of patients with HH and GERD

Variables	GERD		Haital Hernia (HH)	
	Male	Female	male	female
Age (y)				
18-30	2	4	0	1
30-50	10	10	1	2
50-70	14	16	2	4
70-100	4	4	1	0
BMI (Kg/m^2)				
18 -24.9	5	3	0	1
25-29.9	8	6	1	1
30-34.9	14	16	2	4
≥35	10	9	1	1
Symptoms				
dyspepsia	80%	78%	82%	81%
Upper abdominal pain	72%	73%	89%	90%
belching,	65%	62%	67%	63%
vomiting	45%	40%	35%	42%
Decreased appetite	25%	21%	23%	28%
Types of Haital Hernia				
Sliding	-	-	3	6
Rolling/para-esophageal	-	-	1	1

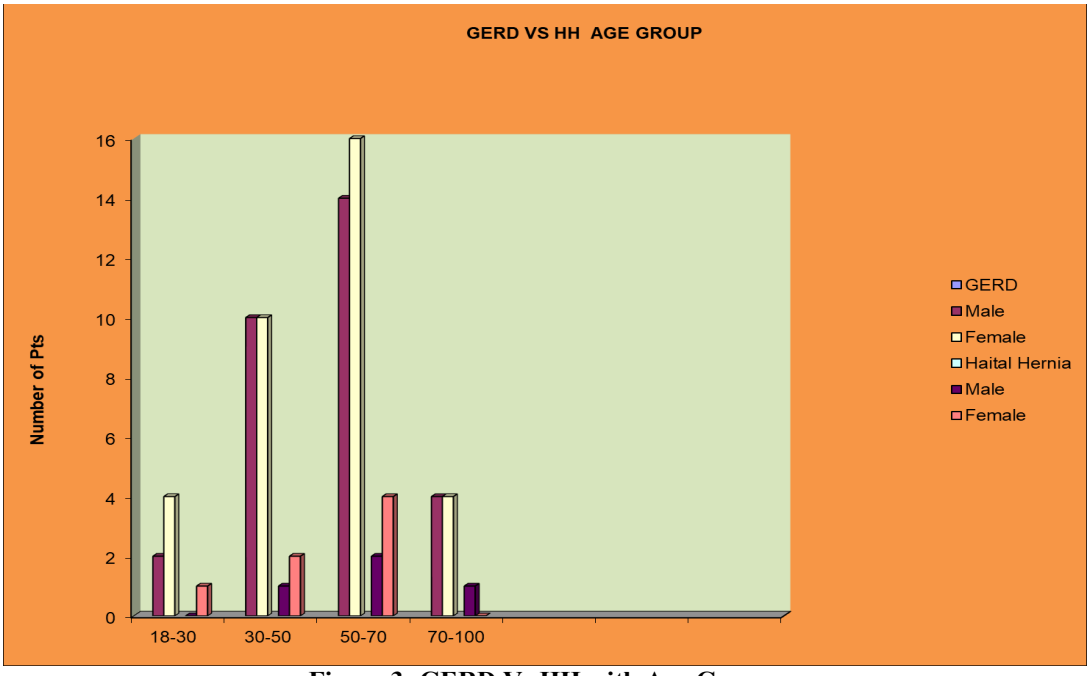

Figure 3: GERD Vs HH with Age Groups

50-70 years age groups were more susceptible against GERD and HH; females were more prone in both (P≤0.05).

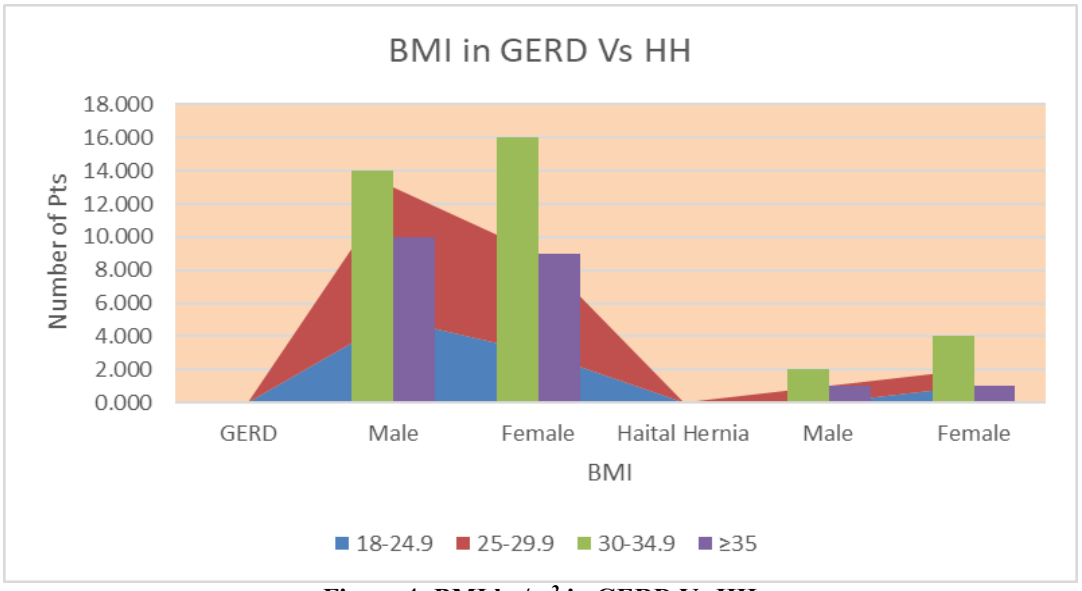

Figure 4: BMI kg/m^2 in GERD Vs HH

BMI -30-34.9 kg/m^2 group was more susceptible against GERD and HH; females were more prone in both (P≤0.05).

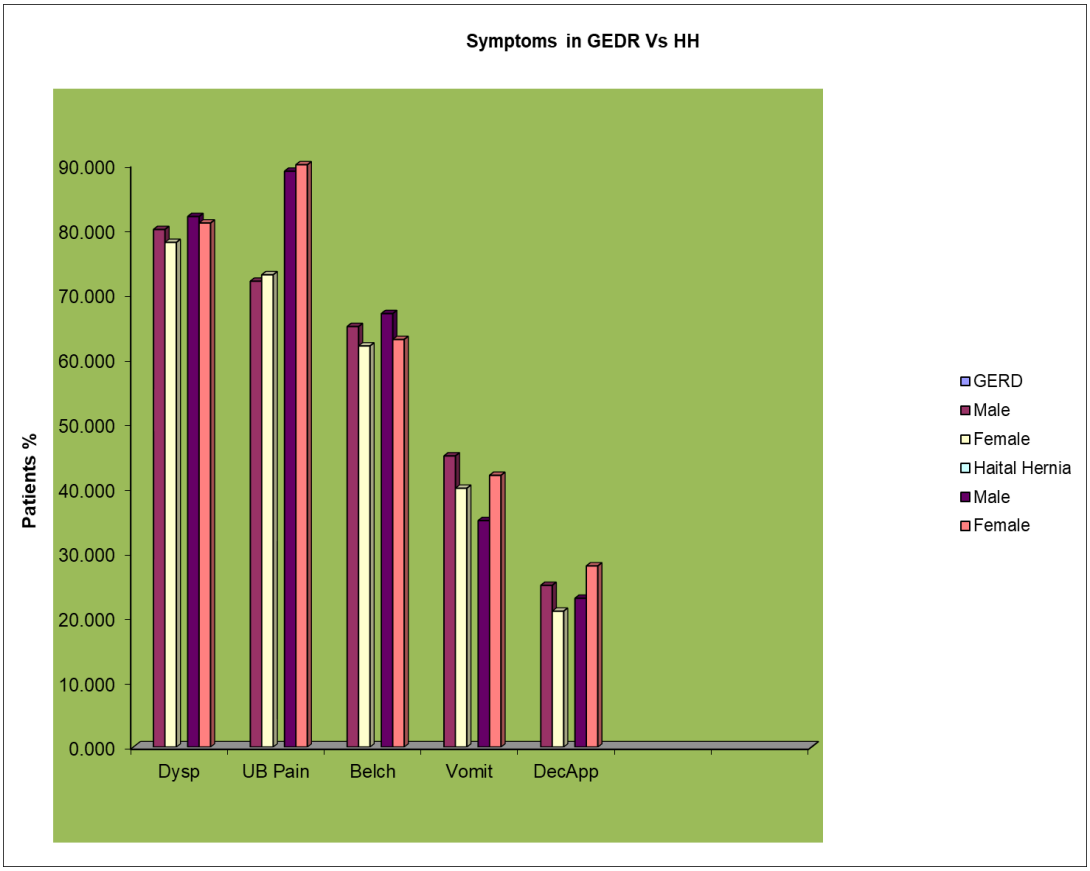

Figure 5: Symptoms in GERD and HH patients

Dyspepsia & upper Abdominal Pain were more in HH as Compared to GEDR (P≤0.05).

Table 3: Reflux Characteristics in GERD Patients With and Without a Hiatus Hernia

Variables	GERD patients with hiatus hernia	ERD patients without hiatus hernia	P Value
Time with esophageal pH ≤ 4 (%)	8.3 (6.7–12.3)	4.1 (3.5–6.8)	0.01
Reflux episodes (n/h)	3.8 (3.1–5.2)	2.1 (1.8–2.4)	0.001
Mean duration reflux episode (s)	81.5 (54.0–108.9	96.8 (70.7–96.0)	ns

Table 4: Association between the hiatal hernia size and reflux Hiatal hernia

Variables	Hital Hernia		P value
Size		Acid Reflux %	
Small	6 (54.54%)	66.66%	0.042/0.013
Medium	3 (27.27%)	66.66%	0.023/0.012
Large	2 (18.18%)	100%	0.041/0.05

Out of 64 GERD patients, Twenty (31.25%) participants consumed alcohol, 33 (51.56%) had type 2 diabetes, and 28 (43.75.2%) were smokers or ex-smokers before the surgery. Smoking and alcohol consumption before OAGB as well as type 2 diabetes and BMI before and after the surgery were not related to GERD.

Discussion

The Role of Hiatal Hernia in the Pathogenesis of GERD: The development of a hiatal hernia can lead to GERD by several mechanisms. Much attention has been paid to the esophagogastric high-pressure zone (HPZ) in the prevention of reflux from the high-pressure environment of the stomach to the lower pressure environment of the esophagus. The HPZ consists of both physiologic (lower esophageal sphincter [LES]) and anatomic (crural diaphragm [CD] and flap valve) components. The main determinants of competency of the HPZ include not only the intrinsic tone and contractility of the LES, but also the presence or absence of a hiatal hernia, which alters the juxtaposition of the LES to the CD and affects the geometry of the gastroesophageal flap valve created by the angle of His. A HPZ can be identified at the EGJ during manometric assessment. The HPZ has no anatomic landmarks, but typically consists of both an intrinsic tone from LES smooth muscle Fibers as well as a phasic extrinsic component from skeletal muscle contributions of the CD. The presence of a hiatal hernia alters the anatomic relationship between the CD and the LES, negatively impacting the physiology of the reflux barrier. Three components of the LES have been shown to contribute to its efficacy at preventing reflux: pressure (best measured at end-expiration), overall length, and the length exposed to the positive pressure environment of the abdomen[18, 19].

The intra-abdominal sphincter length aids in the prevention of reflux during periods of increased abdominal pressure. If pressure applied externally to the stomach is not countered with an equal pressure applied to the LES, reflux of gastric contents may result. A hiatal hernia contributes to the loss of intra-abdominal sphincter length. By utilizing HRM, assessed the impact of the CD on the HPZ[11]. In normal individuals, pressures from the CD during inspiration are directly superimposed on the LES leading to significant respiratory augmentation. In patients with a slight degree of cephalad displacement of the EGJ, quantifiable separation of the CD from the LES is appreciable, though the degree is insufficient to constitute a sliding hiatal hernia. Further axial displacement of the EGJ leads to an overt hiatal hernia. This same group used a combined barostat and manometric catheter to measure cross-sectional area (CSA) and distensibility of the EGJ in normal subjects, patients with GERD, and those with GERD and a hiatal hernia [20].

Baseline mean LES pressure was significantly lower in patients with a hiatal hernia compared to others. When pressure was applied with a barostat, patients with a hiatal hernia demonstrated a significantly greater increase in CSA compared to normal and to patients with GERD and no hiatal hernia. In a study it has been emphasized, the importance of the physiologic flap valve created by the angle of His as a barrier against gastroesophageal reflux [21]. Esophageal acid exposure has been correlated to the endoscopic appearance of the flap valve, highlighting the importance of geometry at the EGJ in the prevention of GERD [22].

A hiatal hernia alters the anatomic angles between the esophagus and gastric fundus in this region, rendering the flap valve less competent. In addition, gastric distention affects the flap valve by shortening the LES and lessening the acuity of the angle of His, also leading to sphincter incompetence. Thus, the loss of intra-abdominal LES length, the diminution of the crural contribution to the HPZ, and the loss of the flap valve are all proposed mechanisms by which a hiatal hernia contributes to GERD [23].

Hiatal hernia, defined as the cephalad migration of the stomach through the esophageal hiatus into the mediastinum, is a common affliction linked to the pathogenesis of gastroesophageal reflux disease (GERD), the most prevalent foregut disorder in the Western hemisphere. Epidemiologic studies have

shown that approximately 7% of adults in the United States suffer from daily heartburn, nearly 20% have weekly symptoms, and up to a third experience at least 1 episode per month [1,2]. The findings of the present study were also agreed with the above-mentioned observation. The development of a hiatal hernia is problematic not only due to the symptoms and complications that can arise from the hernia itself, but also due to those that result from GERD. It has been reported that 19% to 70% of patients with GERD symptoms had a hiatal hernia, as compared to 13% to 59% of control subjects. In addition, 50% of patients with a hiatal hernia had esophagitis, while the vast majority (84%) of patients with esophagitis had a concomitant hiatal hernia [20]. In the present study 17.19% patients were found HH in GERD and it was almost agreed with the above study.

Type I hiatal hernias and their association with GERD was vary enormously, the reported prevalence, with estimates ranging from as low as 10% to as high as 80% of the adult population in North America [9]. In our study, out of these 11 cases, 9 patients (81.81%) were found to be having sliding type of hiatus hernia and 2 patients (18.18%) having rolling type. The findings of the present study were also agreed with the above-mentioned observation.

The presence and size of hiatal hernia was a significant risk factor for the presence and severity of endoscopic lesions in the patients with GERD. In our study it was found that, the Hernia was small in 6 (54.54%) cases, medium in 3 (27.27%), and large in 2 (18.18%) and subsequently 100% reflux was found in large size HH. An investigation has also been suggested that hiatal hernia may lead to increased esophageal acid exposure both by increasing the susceptibility to reflux and by prolonging the process of acid clearance. The presence and severity of endosco- pic lesions of GERD are positively correlated with total esophageal acid exposure [21]. Our results presented evidence favouring an even closer association between hiatal hernia and GERD and supports the clinical significance of an endoscopically detected hiatal hernia. Endoscopic and radiographic studies have found that the prevalence of hiatus hernia is 60-90% of all patients with reflux disease, whereas hiatus hernia was reported far less frequently (13-40%) in control subjects without reflux disease (22,23). Our study results were also similar to above. The etiology of erosive reflux esophagitis were studied and clarified by using a case- control design to study potential risk factors in a large group of patients. Their results clearly demonstrated that the presence of hiatus hernia increased the risk of all grades of esophagitis. Hiatal hernia was associated with a 5-fold increased risk of esophageal erosions. Furthermore, the authors referred that by endoscopic, radio- graphic and manometric studies. Hiatus hernia in 50-94% of all patients with reflux disease was found (24-26). In our study, 66.66-100% reflux was found in HH patients.

Conclusion:

Hiatal hernia was very closely associated with GERD by 17.19% incidences in our study. Early diagnosis and timely management or surgical intervention reduces morbidity associated with hiatus hernia and acid reflux. Hence, all patients presenting with persistent upper gastrointestinal symptoms should undergo upper GI endoscopy and managed accordingly. Further studies are also recommended that be conducted using larger samples to differentiate between new cases of GERD and Hiatal Hernia. The GERD questionnaire is also recommended that be administered in all patients with or without symptoms after surgery.

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