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Diagnostic Differences between Obese and Non-Obese Patients Presented with Upper Gastro-Intestinal Symptoms

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Abstract:

Background: *Obesity is associated with various diseases and conditions, particularly cardiovascular diseases, type 2 diabetes mellitus, obstructive sleep apnea, etc. The correlation between upper gastro-intestinal (GI) symptoms and obesity has yet to be completely understood in the presences of many controversial study reports.*

Aim: *To find the impact of obesity on patients with upper GI manifestations through doing Esophagogastroduodenoscopy (EGD).*

Materials and Methods: *A cross sectional study done at Al-Faiha General Hospital, Basra, Iraq; from January 2013 to January 2015; targeting obese patients referred for Esophagogastroduodenoscopy (EGD) clinic complained from upper gastro-intestinal symptoms (heartburn, bloating, epigastric pain, etc.) which were not responded to treatment, had alarming feature(s) or age more than 50 years. EGD was done (by two endoscopist investigators) to the included patients looking for macroscopic abnormalities, in addition to Helicobactor Pylori (H. pylori) testing using urease test (UT).*

Result: *A total of 120 patients with upper GI symptoms were included in this study. Around 51.7% were obese and 48.3% were non-obese. No statistical significances between obesity and ethnicity or gender observed in this study (p-value > 0.05). Thirty percent presented with upper GI symptoms did not have any alarming feature(s); remaining 70% were presented with vomiting, anemia, weight loss, hematemesis and/or melena. Among obese patients, only 6.5% shown normal EGD finding versus 93.5% showed abnormal findings (p < 0.001). Hiatus hernia with esophagitis, gastritis with positive or negative H. pylori and biliary gastropathy showed a statistical difference between obese and non-obese patients with p-values = <0.001, 0.046, 0.021 and 0.002 respectively. Data was analysed using SPSS version 22.*

Conclusion: *Treating physician need to consider EGD more frequently in obese patients who present with upper GI manifestations.*

Keywords: ***Upper gastro-intestinal (GI) symptoms, Esophagogastroduodenoscopy (EGD), Obesity.***

Introduction

International data indicates that the obesity epidemic is in fact a global health problem.[1] The World Health Organization (WHO) has declared the current increase in population obesity to be an epidemic and describes obesity as one of the most blatantly visible, yet most neglected public-health problems that threaten to overwhelm both more and less developed countries.[2]

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Data on overweight and obesity in Iraq is anecdotal, scarce and not representative of the community,[3] or studying only certain variables of overweight and obesity.[4-6]

Obesity is considered a multifactorial disease, that results from a mixture of genetic predisposition, environmental influences (e.g., sedentary lifestyle), and behavioral components (e.g., food as a reward).[7] Being overweight and obese are well-known causes of morbidity and mortality.[8-11]

Obesity is primary among the medical disorders composing metabolic syndrome and is associated with many

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gastrointestinal diseases. Among the upper gastrointestinal diseases, obesity is an established risk factor for reflux esophagitis.[12] As the obese population grows, so too grows the incidence of reflux esophagitis, a condition strongly linked to obesity.[13]

Functional gastrointestinal disorders (FGIDs) such as irritable bowel syndrome (IBS) and functional dyspepsia are also extremely prevalent. Population-based data indicate that 5-10% of the US population suffers from IBS, the most common FGID.[14,17] It is possible that FGIDs and obesity have more in common than merely high population prevalence rates. Epidemiologic data indicate that obesity is associated with a wide range of chronic gastrointestinal (GI) complaints, many of which overlap with FGIDs such as IBS or dyspepsia.[18-23]

Although the Gastrointestinal (GI) tract is the dominant organ system associated with food intake, the relationship between GI symptoms and obesity has yet to be completely clarified. Previous studies described a greater prevalence of symptoms fulfilling criteria for irritable bowel syndrome

(IBS) and gastro-esophageal reflux disease (GERD) in morbidly obese patients compared to the general population.[24]

Other authors showed a positive relationship between body mass index (BMI) and frequent vomiting, upper abdominal pain, bloating, and diarrhea.[25] Fysekidis *et al*. reported a higher prevalence of functional upper and lower disorders in their obese population.[26]

This study tries to answer the question whether obesity has an impact on patients presented with upper GI manifestations through doing Esophagogastroduodenoscopy (EGD).

Materials and Methods

We conducted this study at Al-Faiha General Hospital, Basra, Iraq. It is a cross sectional study involved Patients who complained from upper gastro-intestinal symptoms such as heartburn, epigastric pain or discomfort or indigestion and referred from primary health centres to the GI outpatient clinic at Al-Faiha Hospital for either persistence of symptoms (failure of medical therapy), presence of alarming feature(s) or those patients older than 50 years of age with upper GI manifestations in the period from January 2013 till January 2015 were included in the study. The anthropometric measurements including patients' height and weight to calculate the BMI was done by one of the investigators. Other parameters which were included: patient age, gender, race, presence or absence of alarming feature(s), previous H. pylori testing or treatment and any medication(s) the patient is currently taking like proton pump inhibitors (PPI). Abdominal ultrasonography (Aloka, IPC-1230) by the same operator was performed to all patients prior to EGD to exclude other causes that might also predispose to upper GI symptoms such as hepatobiliary and pancreatic diseases. Those patients using proton pump inhibiter (PPI) were asked to stop the medication at least 4 weeks prior to EGD.

Definitions:

1. Functional gastrointestinal disorders (FGIDs):
Include a number of separate idiopathic which affect different parts of the gastro-intestinal tract characterised by chronic abdominal complaints without a structural or biochemical cause that could explain symptoms (e.g.: heartburn, bloating, indigestion, etc.).[27]

2. Obesity:
Any patient with a BMI equal or more than 30 kg/m2 was defined as obese, while those with BMI range from 18.5 to 24.9 kg/m2 were classified as non-obese according to the WHO classification of obesity.[28] Those with a BMI range from 25 and 29.9 kg/m2 (i.e. overweight) were excluded from this study.

3. Endoscopic findings:
Esophagitis: represent superficial mucosal inflammation between the gastro-esophageal junction up to 10cm proximally.[29]

Hiatus hernia: displacement of the esophagogastric junction from the diaphragmatic impression by more than 2cm caudally.[30]

Gastric and duodenal ulcer: represent a break in the lining of the mucosal integrity leading to a local defect. Gastroduodenitis: inflammation of the mucosal lining of the stomach and the duodenum without bile reflux or H. pylori infection.[31,32]

Gastritis: inflammation of mucosal lining of the stomach with or without erosions.[31,32] The gastritis sub-classified in to 2 ***Categories:*** Helicobacter pylori (H. pylori) infection associated gastritis and non- H. pylori infection associated gastritis using Biohit HealthCare H. pylori quick test for urease enzyme (UT).

Biliary gastritis: inflammation of the mucosal lining of the stomach due to bile refluxing to the stomach without H. pylori infection.[33,36]

4. Alarming features: include the following red flags:

(a) Anemia (hemoglobin less than 13.5gram/dL in male and less than 12gram/dL in female)
(b) Weight loss (a loss of equal or more than 4.5 kg of body weight over a period of 6 months)

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(c) Vomiting
(d) Melena and or hematemesis[37]

Esophagogastroduodenoscopy (EGD):

For sedation, intravenous diluted midazolam 2-5 mg was given for each patient prior to EGD. Alternatively, oral Lidocaine spray (0.1%) was used for patients who underwent EGD if sedation was contra-indicated or not preferred by the patient. Consent was obtained from all patients prior to the EGD. By using Olympus STORZ 13801 NKS gastroscope, EGD was done to all patients who were included in the study as diagnostic approach as well as for H. pylori detection using urease test (UT). A biopsy specimen was taken from gastric antrum and put in the agar for urease detection (a positive UT indicated by changes in agar colour (yellow to red), the reading of the UT was done by the two endoscopists whom also responsible for given the final EGD diagnostic report separately. Any patient with discordant diagnosis was excluded.

Other patients excluded from this study were smoker, alcoholic, BMI between 25 and 29.9kg/m^2, and those with hepatobiliary and pancreatic diseases.

Results and statistic

Data was analysed using SPSS version 22, with a P-value less than 0.05 was considered to be significant. A total of 120 patients with upper gastro-intestinal symptoms were recruited in this study. The mean age was 44.49 ±14.7 years, range from 18 to 77 years. Around 51.7% (62 patients) were obese and 48.3% (58 patients) were non-obese. The male patients represent 47.5% (57 patients) while the female represent 52.5% (63 patients) with *p-value = 0.985*, in addition to that that no statistical relation between obesity and gender was observed in this study. Overall no statistical differences between black and white patients with *p-value= 0.675*.

Also no statistical significant relation between H. pylori testing and or treating or not and obesity with *p-value = 0.982.*

Table 1: Study variables and Obese and non-obese - no. (%)

	Obese	Non-obese	Total	P-value
Gender				
Male	30 (25)	27 (22.5)	57 (47.5)	0.985
Female	32 (26.7)	31 (25.8)	63 (52.5)	
Ethnicity				
White	48 (40)	44 (36.7)	92 (76.7)	0.675
Black	14 (11.66)	14 (11.66)	28(23.3)	
H pylori				
Not tested	25 (20.83)	25 (20.83)	50 (41.7)	0.982
Tested & treated	17 (14.16)	16 (13.33)	33 (27.5)	
Tested & not treated	20 (16.7)	17 (14.1)	37 (30.8)	
Presentation				
With alarming features	44 (36.7)	40 (33.3)	84 (70)	0.815
Without alarming features	18 (15)	18 (15)	36 (30)	

In this study 30% (36 patients) with upper gastro-intestinal symptoms did not have any alarming feature(s). The remaining 70% (84 patients) were presented with vomiting, anemia, weight loss, hematemesis and/or melena. From all of the alarming features listed in the table-2, only weight loss showed a statistically significant difference (*p-value = < 0.001*) between obese and non-obese patients.

Table 2: Alarming Features in Patients with upper gastro-intestinal symptoms

	Non-obese (%)	Obese (%)	P-value
Anemia	4.2	7.5	0.285
Vomiting	13.7	16	0.612
Weight loss	7.6	0	<0.001
Melena	3.5	5.8	0.366
Hematemesis	0.8	3.4	0.18
Melena & hematemesis	3.5	4	0.739

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Table-3 showed the EGD findings for patients included in this study, where 12.5% had normal EGD. Those patients with normal EGD showed some statistical difference between obese and non-obese (normal EGD significant in non-obese group) with *p-value <0.033*. Among obese patients, only 4 patients (6.5%) shown normal EGD finding versus 58 patients (93.5%) showed abnormal findings (*p < 0.001*).

Abnormal EGD findings were hiatus hernia with or without esophagitis, gastritis with positive or negative H. pylori testing, gastric and or duodenal ulcer, gastroduodenitis and gastritis with bile reflux. Among all of these abnormal EGD findings hiatus hernia with esophagitis, gastritis with positive or negative H. pylori and gastritis due to bile reflux showed a statistical difference between obese and non-obese patients with *p-values = <0.001, 0.046, 0.021 and 0.002* respectively.

Table 3: Endoscopic Findings - n (%)

	Non-Obese	Obese	Total	P - Value
Normal	11 (9.2)	4 (3.3)	15 (12.5)	0.033
Hiatus hernia without esophagitis	4 (3.3)	5 (4.2)	9 (7.5)	0.739
Hiatus hernia with esophagitis	1 (0.83)	18 (15)	19 (15.8)	<0.001
H. pylori positive gastritis	12 (10)	4 (3.3)	16 (13.3)	0.046
H. pylori negative gastritis	10 (8.3)	2 (1.7)	12 (10)	0.021
Gastric ulcer	2 (1.66)	8 (6.66)	10 (8.3)	0.058
Duodenal ulcer	8 (6.7)	4 (3.3)	12 (10)	0.248
Gastric and duodenal ulcers	1 (0.83)	1 (0.83)	2 (1.7)	1
Gastroduodenitis	6 (5)	2 (1.7)	8 (6.7)	0.157
Gastritis with bile reflux	3 (2.5)	14 (11.7)	17 (14.2)	0.002

Discussion

We studied the EGD finding in obese and non-obese patients referred due to upper gastro-intestinal symptoms.

As a comparable to other studies like Van Oijen et al.[18] study, approximately half of the patients in this study were obese.

Literatures review showed that, among six studies, the abnormal EGD findings prior to gastric bypass surgery in obese patients ranged from 14 to 91%.[38] In compared to our study the abnormal EGD findings in obese and non-obese patients were 87.5% which was consistent with the reports in literature such as the studies by Sharaf et al. (89.7%) and Madan *et al.* (91%).[39,40]

Other EGD findings in our study (which were statically significant like hiatus hernia, esophagitis and gastritis), were comparable to many literatures.[38,41,42]

Biliary gastritis was significantly higher among obese patients in our study (*p-value < 0.002*).

Bile reflux to the stomach occur because of an incompetent pyloric sphincter, or result from disturbance of duodenal motility.[33] The presence of bile in the stomach results in disruption of the mucosal barrier.[43] In our study the endoscopist diagnosed biliary gastritis grossly through the presence of bile in the stomach without other obvious cause of gastritis other than the presence of the bile. In our study a higher percentage of the obese patients presented with upper gastro-intestinal symptoms which can only be explained by bile reflux to the stomach. A similar study done by Niemelä S *et al.,*[33] correlated the occurrence of abdominal fullness and bloating to the increase bile concentration in the stomach with *p-value < 0.05*.

The association between obesity and hiatus hernia with esophagitis was significantly high in our study (*p-value < 0.001*), such finding also observed by Locke *et al.*[44] study (*p-value < 0.05*) and El-Serag *et al.*[45] study. This suggested that obesity could be the cause of hiatus hernia and esophagitis related to gastric reflux. Although such explanation has some controversy by reviewing the literatures, as the Ayazi *st al.*[41] showed that the lower esophageal sphincter (LES) pressure in obese individual was decrease, and such finding became more prominent with increasing of the BMI. On the other hand, Herbella *et al.*[46] showed increased lower esophageal sphincter (LES) pressure in obese persons.

In our study, the percentage of EGD findings of H. pylori positive gastritis among obese patients was 3.4%, such finding was completely differed from what found by the Ozaydin N *et al.*[47] which showed a significantly higher figure (82.5 %). This can be explaining by the fact that H. pylori prevalence in obese individuals is still disputable, reports from different studies demonstrated that H. pylori positive gastritis among obese patients were ranged from 8.7 to 85.5%.[48,49] In addition to that the prevalence of H. pylori infection is variable worldwide.

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Conclusion

We conclude that obesity is an independent risk for abnormal EGD findings. Certain abnormalities are more prevalent in obese patients such as erosive esophagitis and biliary induced gastropathy. Subsequently, treating physician might consider EGD more frequently in obese patients who present with upper GI manifestations.

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