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Case Report

With Aging, Obesity, And Hypothyroidism, Can GERD Lead to A Large Hiatal Hernia?

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Abstract: Hiatal hernia (HH) is a protrusion of the upper part of the stomach that is pushed into the thorax through an opening in the diaphragm. This paper mainly discusses causes of hiatal hernia, such as obesity, aging, and hypothyroidism, in a patient of 63 years old with a past medical history of hyperlipidemia, asthma, and anemia who complains of food being stuck in her chest along with emesis of food and cough. This paper's core is analyzing the causes of hiatal hernia and precise differential diagnoses.

Keywords: Hiatal hernia; obesity; aging; etc

1. Background

Hiatal hernia (HH) is a protrusion of the upper part of the stomach that is pushed into the thorax through an opening in the diaphragm. Diaphragm is one of the central thin muscles of inspiration located below the lungs separating the abdomen from the chest. There are four types of hiatal hernias, and the most common type is the type I, known as sliding hiatal hernia. Type I is where the stomach slides into the thoracic cavity through a small opening in the diaphragm. Type II, III, and IV are all known as paraesophageal hernias. They result in hernia when a part of the stomach is pushed through the thoracic opening adjacent to the esophagus[1].

Although hiatal hernias are common and ordinarily asymptomatic, the size of the hernia could result in moderate to severe symptoms causing limitations in normal functions

of digestion. Small hernias may only have milder symptoms, such as GERD, due to the retention of acid and other contents passing through the small opening in the diaphragm, causing reflux or regurgitation. This reflux could be treated pharmacologically. However, if the hernias are large, symptoms such as dysphagia, vomiting, or discomfort/pain are usually obstructive due to compression and pressure of adjacent organs[2]. In such severe cases, large hiatal hernias need to be treated surgically to prevent further complications[3]. According to Savina et al., patients with a history of hypothyroidism (HT) may have HH and GERD as earlier signs of HT. However, the cause of HH in HT patients is not acid retention in the esophagus but rather due to motor-evacuatory disorders of the GI system[4]. Overall in adults, old age and obesity are the main risk factors resulting in asymptomatic or symptomatic hiatal hernias[5].

2. Introduction

Although a hiatal hernia involves abdominal content pushed into the thoracic cavity, knowing its orientation between the esophageal junction and diaphragm is very important to classify the type to have accurate treatment interventions. As stated above, age and obesity are the prime hiatal hernia causes. According to one study, increased body mass index was significantly associated with hiatal hernia. The probability of HH with increased BMI was ($p < 0.01$) along with esophagitis (OR 1.8; 95% CI 1.4–2.1). Therefore, excessive body weight is a significant independent risk factor that could lead to symptomatic hiatal hernia[6]. In our case, a 62 years old female patient with a history of increased body weight with a BMI <37 kg/sq meter as well as hypothyroidism suffers from symptomatic HH with common symptoms such as GERD, dysphagia, nocturnal cough, vomiting upon eating, and non-invasive erosive gastropathy due to sizeable hiatal hernia with the proximal extent of the gastric folds with 30 cm from the incisors and Hiatal narrowing of 38 cm from the incisors, which needed surgical intervention. The purpose of this case report is to illustrate the occurrence of a large hiatal hernia in an obese hypothyroid patient with GERD that was significant in size.

3. Case Details

A 63 years-old-female with a past medical history of hyperlipidemia, hypothyroidism, anemia, and asthma came to the clinic complaining for 2 years of feeling having food being stuck in her chest, emesis with food, and a cough that wakes her up at night. PPI in her case doesn't provide complete relief. She has a history of one-time hospitalization due to severe anemia and shortness of breath on exertion, activity intolerance, and weight gain. Ruled out severe sleep apnea and her previous

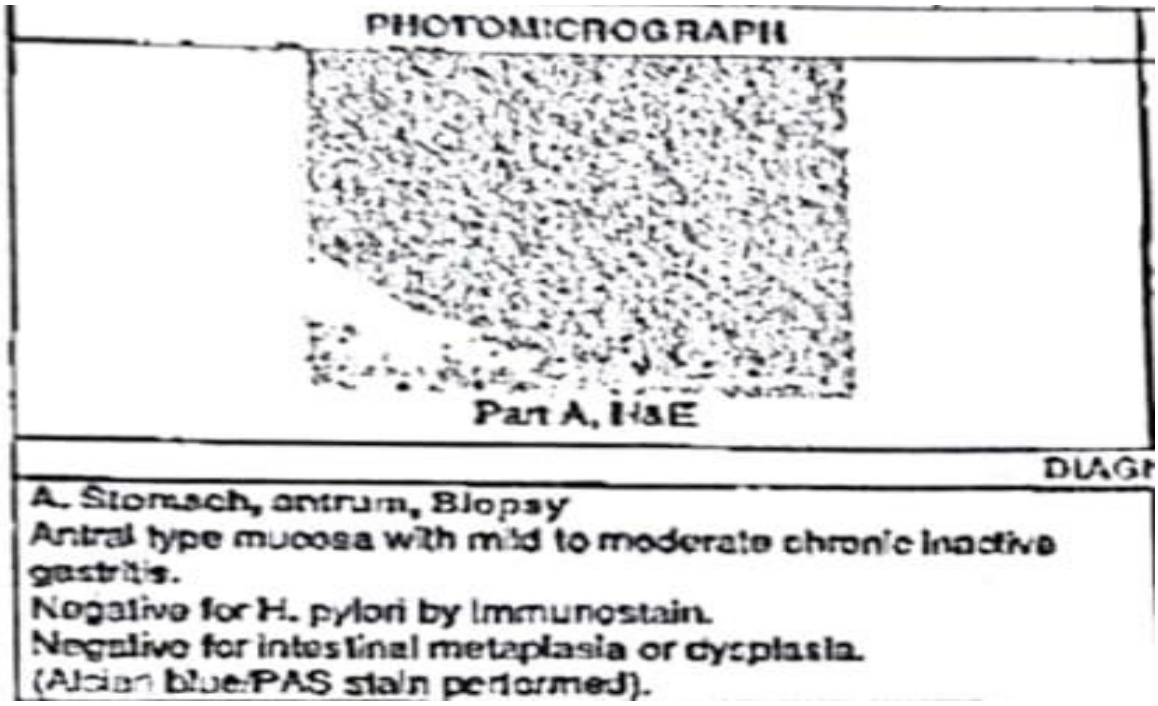
esophagogastroduodenoscopies (EGD) confirmed large hiatal hernia that is rubbing her heart.

Currently medications include vitamin D (Ergocalciferol) 1.25 mg (50,000 unit) (1 capsule orally once a week), Astelin 137 mcg/spray solution (1 puff in each nostril nasally twice a day), saline nasal spray 0.65% solution (2 sprays in each nostril as needed four times a day), fluticasone propionate 50 mcg/dose suspension (1 spray in each nostril twice a day)**,** omeprazole 40 mg capsule delayed release (1 capsule 30 minutes before morning meal once a day), levothyroxine sodium 75 mcg (1 tablet in the morning on an empty stomach orally once a day), fish oil 1000 mg (2 capsule orally twice a day), and alprazolam 2 mg (1 tablet orally every day as needed).

BMI of 37.42 indexes, weight is 98.88 kg (218 lbs) and her height is 162.56 cm (64 in). Physical examination is normal except bilateral paraspinal muscle spasms on the back. The patient looks anxious and tearful and complains of having mild depression and difficulty sleeping.

The result of pathological tests and other investigations after a careful examination indicates diagnoses of an enlarged hiatal hernia, hyperlipidemia, morbid obesity, hypothyroidism, anxiety, and mild depression.

Figure 1. Showing the biopsy of the stomach antrum along with listed results.



Esophagogastroduodenoscopy (EGD) on March 19th, 2022, revealed a large hiatal hernia with mild gastritis with negative reflux esophagitis. The proximal extent of the gastric folds (end of the tubular esophagus) was 30 cm from the incisors. The hiatal narrowing was 8 cm from the incisors. A few non-bleeding erosions were also found in the cardia.

CT scan of the chest without contrast on October 7th, 2022, shows atherosclerotic calcification of the aorta. Lower back, cardiac/mediastinum, and other vasculature show no abnormality.

The treatment plan for Hiatal hernia is Nissen fundoplication which is minimally invasive using laparoscopic and robotic techniques after the patient is medically cleared for surgery.

Nocturnal cough that wakes the patient up at night, shortness of breath on exertion, and other asthma symptoms will be controlled with medications and close monitoring. A typical mood will be achieved with psychiatry follow-up.

3.1 Actual Outcome

The patient felt happy and found it feasible. We cannot estimate the long-term complications of the surgery in this patient at this time. As per the literature, there is 89% success rate over ten years after the surgery, this surgery in this patient was found helpful, and the patient is stable[7].

3.2 Differential Diagnosis

Given the patient's main complaint of "food being stuck in her chest as well as emesis with food and a cough that wakes her up at night," one could think of several differential diagnoses, such as peptic ulcer disease, gastritis, acute coronary syndrome, and esophagitis.

Many of the listed probable diagnoses have overlapping symptoms such as heartburn, chest pain, and uneasy feeling while eating. Ulcers are characterized by burning epigastric pain. Gastric ulcer pain worsens with food intake, while duodenal ulcer pain usually gets better[8]. Because the patient does not have a recent history of traveling to a country known for H.pylori infections, the lack of change in pain, and discomfort with and without food, we were able to reject peptic ulcers as a probable cause.

The most common causes of gastritis are infections with H. Pylori and overuse of NSAIDs. The symptoms experienced with this are usually nausea, dull epigastric pain, and some emesis and bloating[9]. Though the patient had symptoms of emesis, the lack of infection or excessive use of NSAID during history taking and the lack of change in symptoms with PPI therapy helped reject gastritis as the diagnosis.

Acute Coronary Syndrome in patients presents as diffuse chest discomfort. The patients usually describe this pain as a crushing pressure and heaviness on their chest[10]. They usually state that the pain radiates to another part of their body. In addition to these crucial symptoms, they may experience nausea, vomiting, shortness of breath, confusion, and fatigue[11]. Because our patient did not have typical symptoms of crushing pressure on the chest or any pain radiating to another body location, we could reject this as a possible diagnosis.

Our final differential diagnosis was Esophagitis. Esophagitis is the inflammation of the esophageal wall that can cause chest pain, dysphagia, and odynophagia[12]. Though the patients experienced specific symptoms of Esophagitis, the EGD showed negative reflux esophagitis making it evident that the patient did not have Esophagitis.

Given these possible differential diagnoses that were disregarded, the diagnosis of a hiatal hernia was confirmed. Hiatal hernia usually presents with the classic presentation of abdominal discomfort with symptoms of gastroesophageal reflux disease (GERD)[13,14]. With heartburn, some also experience chronic cough. Though initial physical examination was not helpful, Esophagogastroduodenoscopy (EGD) revealed a large hiatal hernia with mild gastritis with negative reflux esophagitis confirming our diagnosis of Hiatal hernia.

4. Discussion

Our patient has enough risk factors for hiatal hernia, such as age, obesity, former smoking, and hypothyroidism. Adaptations with age result in kyphosis deformity of the vertebral column, which increases the residual volume and decreases the diaphragmatic muscle function, further weakening it, which may be the cumulative reason leading to a hiatal hernia[15]. A study found that the incidence of hiatal hernia in obese people with an average BMI of 43 kg/square meter was 37%, and a large hiatal hernia was 4.4%[16]. Among the risk factors mentioned, obesity in this patient might have increased the risk of hiatal hernia as obesity increases intra-abdominal pressure resulting in weak muscle tissue permitting the stomach to protrude through the diaphragm[17]. A minimal literature review says that one of the early symptoms of hypothyroidism is hiatal hernia, but clear pathogenesis relating to these two conditions is not listed. However, underactive thyroid relaxes LES causing acid reflux and partial stomach emptying due to hypothyroidism indirectly increasing acid reflux. Gastrointestinal changes due to hypothyroidism are basically due to under activity. Whether hiatal hernia causes GERD or vice versa is still questionable. As per the Cleveland clinic, even though there appears to be a link between these two, there is no connection between them as they can exist as isolated clinical conditions in so many patients[18]. Nevertheless, as

per the US digestive health, abnormal backflow of the stomach contents is caused by a hiatal hernia resulting from weakened muscle[19].

5. Conclusion

For this sizable hiatal hernia, the prevalence is 4.4% compared to small to medium-sized hiatal hernia, of 37%. Our patient's expected outcome after Nissen fundoplication surgery can be a long-term cure for persistent symptoms like having food stuck on her chest and emesis with food. As mentioned above, the etiology discussed in this paper strongly correlates with obesity, aging, and hypothyroidism as well. More studies can be done to prove strong hypothyroidism with hiatal hernia.

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References

1. Cha, R. R. Find out the differences by types of hiatal hernia!. J Neurogastroenterol Motility, 2020; 26(1): 4–5. https://doi.org/10.5056/jnm19227
2. Olarindeaa, O. T., Nandennagaria, S., Bethalab, K., Burnout and its Association with Occupational Stress among Physicians & Nurse Practitioners. NeuroQuantol, 2022; 20(11): 3752–3759.
3. Håkanson, B., Lundell, L., Rouvelas, I., *et al.* The large hiatal hernia should be acknowledged and respected. Lakartidningen, 2018; 115: E9PL. Accessed from https://pubmed.ncbi.nlm.nih.gov/30299530
4. Savina, L. V., Semenikhina, T. M., Korochanskaia, N. V., *et al*. Hiatus hernia and gastroesophageal reflux disease as a manifestation of a newly revealed hypothyroidism. Klinicheskaia Meditsina, 2006; 84(2): 71–74. https://pubmed.ncbi.nlm.nih.gov/16613012/
5. Yu, H.-X., Han, C.-S., Xue, J.-R., *et al*. Esophageal hiatal hernia: Risk, diagnosis and management. Expert Rev Gastroenterol Hepatol, 2018; 12(4): 319–329. https://doi.org/10.1080/17474124.2018.1441711
6. Wilson, L. J., Ma, W., & Hirschowitz, B. I.. Association of obesity with hiatal hernia and esophagitis. Am J Gastroenterol, 1999; 94(10): 2840–2844. https://doi.org/10.1111/j.1572-0241.1999.01426.x
7. Neuvonen, P., Iivonen, M., & Rantanen, T. Endoscopic evaluation of laparoscopic nissen fundoplication: 89 % success rate 10 years after surgery. World J Surg, 2013; 38(4): 882–889. https://doi.org/10.1007/s00268-013-2349-2
8. Malik, T. F. Peptic Ulcer Disease. StatPearls — NCBI Bookshelf. Accessed June 11, 2022 from https://www.ncbi.nlm.nih.gov/books/NBK534792/
9. Varbanova, M., Frauenschläger, K., & Malfertheiner, P. Chronic gastritis – An update. Best Pract Res Clin Gastroenterol, 2014; 28(6): 1031–1042. https://doi.org/10.1016/j.bpg.2014.10.005
10. Iqbal, M. S., Matias, W. C., Paneerselvam, G. S., *et al*. Psychometric Properties of Cohen's Perceived Stress Scale-A Study among Atrial Fibrillation Patients. J Pharm Res Int, 2021; 462–466.

11. Makki, N., Brennan, T., & Girotra, S. Acute coronary syndrome. J Intensive Care Med, 2015; 30(4): 186–200. https://doi.org/10.1177/0885066613503294

12. Biedermann, L., & Katzka, D. A. Diagnosis and treatment of eosinophilic esophagitis. Gastroenterol, 2017; 154(2): 346–359. https://doi.org/10.1053/j.gastro.2017.05.066

13. Kahrilas, P. J., Kim, H. S., & Pandolfino, J. E. Approaches to the diagnosis and grading of hiatal hernia. Best Pract Res Clin Gastroenterol, 2008; 22(4): 601–616. https://doi.org/10.1016/j.bpg.2007.12.007

14. Babu, A. K., Kumar, M. P., Krupavaram, B., *et al*. Diabetic foot ulcer, antimicrobial remedies and emerging strategies for the treatment: An overview. Int J Health Sci, 2022; (III): 2835–2850.

15. Bordoni, B., Morabito, B., & Simonelli, M. Ageing of the Diaphragm Muscle. Cureus. 2020 Accessed from https://doi.org/10.7759/cureus.6645

16. Che, F., Nguyen, B., Cohen, A., *et al*. Prevalence of hiatal hernia in the morbidly obese. Surg Obes Relat Dis, 2013; 9(6): 920–924. https://doi.org/10.1016/j.soard.2013.03.013

17. The Strong Link Between Hiatal Hernia and Obesity [Blog]. Bariatric Centers of America. Accessed August 31, 2020 from https://bcofa.com/the-link-between-a-hiatal-hernia-and-obesity/

18. Cleveland Clinic. Hiatal Hernia. Accessed from https://my.clevelandclinic.org/health/diseases/8098-hiatal-hernia

19. US Digestive Health. Hiatal Hernia. Accessed on February 17, 2023, from https://usdigestivehealth.com/your-digestive-health/conditions-and-diseases/stomach-conditions/hiatal-hernia/