



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.2545825>Available online at: <http://www.iajps.com>

Research Article

ESOPHAGEAL HERNIA- TYPES AND MANAGEMENT

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Abstract:

Introduction: The incidence of Esophageal adenocarcinoma has been rapidly elevating around the world, specifically in America and Europe. Now, the US stated that there are up to 17,000 patients who die every year because of esophageal cancer. This malignant disease involves gastroesophageal reflux, causing abnormal growth within the inner mucosal lining with a rapid development of malignant cells. One of the most important predisposing factors for developing esophageal cancer is considered to be hiatal hernia, which is known as dilatation of the hiatus of the esophagus, associated with debilitated muscles of the diaphragm, elevated intraabdominal pressure, along with other features that will be discussing through this review. Until the 70s, it was thought that having hiatal hernia was the only predisposing factor for developing gastroesophageal reflux. However, the presence of abnormalities in the pressure of the lower esophageal sphincter emerged later to be the most important feature predisposing for GERD. **Aim of work:** In this review, we will discuss Esophageal hernia- types and management. **ethodology:** We did a systematic search for Esophageal hernia- types and management using PubMed search engine (<http://www.ncbi.nlm.nih.gov/>) and Google Scholar search engine (<https://scholar.google.com>). All relevant studies were retrieved and discussed. We only included full articles. **Conclusions:** Surgical operation modalities are likely to be to be the only definitive treatment for any underlying esophageal hiatal hernia in all age groups. A post-operative positioning of herniated organs will also decrease the physiological abnormalities associated with clinical manifestations of the hiatal hernia. The best surgical procedure is considered to be laparoscopic Nissen fundoplication. Interestingly, recent reports have been suggesting that surgical operations can be done in patients who have severe GERD, correlated with their hiatal hernia, especially in cases with expulsions of the esophagus or the pharynx. Higher BMI and/or age have been found to significantly increase the risk of developing a hiatal hernia, with some reports of redo surgeries and fundoplication. however, laparoscopic interventions can also trigger the formation of gas along with developing difficulties in swallowing, which might also cause mortality in about five percent of the operated population.

Key words: Esophageal hernia, presentation, types, management.

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Please cite this article in press Alaa Ahmed Mohamed Elmorsy et al., *Esophageal Hernia- Types And Management.*, Indo Am. J. P. Sci, 2019; 06(01).

INTRODUCTION:

The incidence of Esophageal adenocarcinoma has been rapidly elevating around the world, specifically in America and Europe [1]. Now, the US stated that there are up to 17,000 patients who die every year because of esophageal cancer. This malignant disease involves gastroesophageal reflux, causing abnormal growth within the inner mucosal lining with a rapid development of malignant cells. One of the most important predisposing factors for developing esophageal cancer is considered to be hiatal hernia, which is known as dilatation of the hiatus of the esophagus, associated with debilitated muscles of the diaphragm, elevated intraabdominal pressure, along with other features that will be discussing through this review.

Until the 70s, it was thought that having hiatal hernia was the only predisposing factor for developing gastroesophageal reflux. However, the presence of abnormalities in the pressure of the lower esophageal sphincter emerged later to be the most important feature predisposing for GERD.

In this review, we will discuss the most recent evidence regarding Esophageal hernia- types and management

METHODOLOGY:

We did a systematic search for **Esophageal hernia- types and management** using PubMed search engine (<http://www.ncbi.nlm.nih.gov/>) and Google Scholar search engine (<https://scholar.google.com>). All relevant studies were retrieved and discussed. We only included full articles.

The terms used in the search were: Esophageal hernia, presentation, types, management.

Types of hiatal hernia

Thorough investigation of etiologies of esophageal hiatal hernia showed the sliding of the gastro-esophageal junction along hiatus of the esophagus to be present above the diaphragm [2]. Hiatal hernias can generally be categorized as Type I, Type II, Type III, and Type IV based on the extent and spread of the hernia itself.

Type I of hiatal hernia is considered to be the most common subtype of the disease, being responsible of up to 95% of hiatal hernia cases. It is usually called 'sliding hiatal hernia' because in this type, the gastroesophageal junction moves above the diaphragm in a sliding manner. Type I hiatal hernia cases usually show protrusion of the stomach and

distal esophagus to the thoracic cavity making the size of the hernia vary. The stomach keeps the alignment longitudinally, whereas the fundus moves below the GE junction.

Type II hiatal hernia (also known as Paraesophageal hiatal hernia) is, on the other hand, the least common subtype of the disease but is also the most complicated and complex subtype. This type is marked by the presence of stomach permeation into the thoracic cavity. Type II hiatal hernia has also been called 'rolling hernia' because it can involve stomach movement towards the distal esophagus at the posterior of the thoracic cavity in a rolling manner. The GE junction maintains its original anatomic structure, and the fundus of the stomach enters the diaphragmatic hiatus near the esophagus. Despite being rare, a huge para-esophageal hernia can arise when penetration from the abdomen through the thorax is more than thirty percent.

Type III of hiatal hernia does not in fact affect the positioning and alignment of the gastro-esophageal junction along the pre-aortic fascia and median arcuate ligament lying under the diaphragm [3]. This type actually stretches to the right chest cavity with an 180° angle of alignment to the esophagus. Type III has overlapping features of both Type I and type II hiatal hernias, as both the GE junction and fundus of the stomach herniate in the hiatus, and the fundus of the stomach is repositioned through the GE junction. therefore, Type III has also been called the 'mixed' hiatal hernia subtype, as it has characteristics of both rolling hiatal hernias and sliding hiatal hernias.

Type IV of hiatal hernias does not seem to restrict only the stomach, but also it can show herniation of the colon, omentum, peritoneum, small intestine, and spleen into the chest cavity [4].

Pathophysiology implicated in hiatal hernia

Most patients with hiatal hernia are actually asymptomatic and the disease is most likely accidentally discovered. In some patients, the presence of a hiatal hernia might lead to the developing of reflux or might even worsen an already present reflux. The pathophysiology of the condition includes the development of frequent minor bleedings due to the presence of some associated ulcers along with esophagitis. This can lead to the later development of anemia. Another complication that is rarely seen in some patients with hiatal hernia is the development of incarceration of the hernia. As we stated above, type I is the most prevalent type of hiatal hernias. The pathophysiological manifestations

of this subtype of hiatal hernias include the loss hemoglobin, reflux of acid, development of regurgitation, development of dysphagia, having chest pain and having chronic cough [5]. These manifestations usually develop following the herniation of the GE junction into the thoracic cavity.

Type II hiatal hernia, on the other hand, is not as prevalent as type I hiatal hernia but can be associated with many complications. Some of the general pathophysiological features of this subtype include anemia, which results from ulcer-like growth along the lining of the stomach, and postprandial reflux of acid and developing chest pain. This condition does also involve the presence of a delay in the swallowing, owing to slow digestion and resulting in emptying of the stomach and esophagus. Both Type II hiatal hernias and Type III hiatal hernias have been found to be associated with an impediment at the ending of the esophagus, which results in causing regurgitation of some amounts of undigested food and blood from time to time. This can also cause the development of substernal thoracic pain, mimicking a cardiac-originating pain. As a characteristic of hiatal hernias of the esophagus, entry of some food particles (especially small particles) and acid reflux into the lung's or the respiratory system may cause the development of chronic cough associated with a feeling of discomfort in the throat and the thorax.

Finally, Type IV hiatal hernia is frequently associated with the presence of acidity and the development of peptic ulcers, and para-esophageal hiatal hernia does involve stomach penetration. During acute cases, serious life-threatening manifestations like esophageal puncture, severe gastro-esophageal hemorrhage, obstruction of the bowels and entanglement of the intestines can also be seen. Previous studies of emergency operation-associated mortalities in patients with hiatal hernia have also been published [6].

CAUSES AND SYMPTOMS OF HIATAL HERNIA:

The term 'hiatal hernia' was initially introduced in the year 1951 by the physician 'Allison', who was the first to show that there is an association that exists between esophageal hernias and the later development of esophagitis [7]. A significant overlapping of many features and clinical symptoms and signs of esophageal hiatal hernia had been previously seen in patients who had GERD and had been both managed in similar ways until van Herwaarden identified in the year 2000 a unique

variation between the two conditions [8]. In contrast to GERD, esophageal hiatal hernia showed bouts of gastric reflux due to the shrinkage of the crural part of the diaphragm and following molecular changes in the diaphragmatic muscular cells that led to significant reductions in the lower esophageal sphincter pressure. This caused the development of an imbalance status within the lower sphincter pressure causing flanking of the esophageal tube and abdomen [9]. Finally, elevated pressure in the stomach causes dislodging of the GE junction to the thorax.

Type I (which is also known as sliding hernia) usually involves the cardia of the stomach; a shift from sagittal to circular hiatal aperture Closely linked to GERD. Type II (which is also known as Rolling Hernia) usually Involves the fundus of the stomach; with the presence of abnormalities in the phreno-esophageal ligament. Clinical symptoms include GERD and are usually associated with the presence of shrinkage of the chest cavity. Type III (which is also known as true para-esophageal Mixed hiatal hernia) can cause entry of the esophagus with to the cardia of the stomach and fundus of the stomach moving into the thoracic cavity. Patients can suffer from dyspnea and pain that is spasmodic in nature; leading to misinterpretation as angina pectoris or another cardiac cause. Type IV can cause an upside-down stomach herniation of the whole stomach body, without the duodenal junction, the gall bladder, and the lower sphincter of the esophagus. The presence of a state of hyperpnea has been found to increase rates of recurrence of the hernia

Many researchers in this field have described the condition of esophageal hiatal hernia as a condition that evolved from the extracellular matrix, with the hypothesis that abnormal metabolism of collagen is an essential factor for the development of hiatal hernias. The condition (with all it subtypes) has been found to be associated with the presence of collagen-related diseases like Ehler-Danlos syndrome and Marfan's syndrome, which result from collagen formation abnormalities [13]. Being overweight has also been reported to have a significant correlation with GERD and hiatal hernias, as the elevated pressure in the abdomen along with the presence of mechanical deformity of the GE junction can both increases the process. In addition, esophagitis, known by the presence of inflammatory cells and esophageal irritation due to abnormal emptying of the esophagus, helps in the development of a retention of the acidic pH and decreased clearance of acid out of the esophagus [10]. An enclosed sac of acid in the hiatus seems to be one an essential cause of the

development of acid reflux. The hiatal hernia itself plays a crucial role in the supra-diaphragmatic and infra-diaphragmatic positioning of this acid sac, where the later contributes to only 10% of the problem, and the former in fact causes the rest 90% of observed clinical manifestations.

The classical clinical manifestations of hiatal hernia usually include obstacles at pylorus of the stomach, strangulation of the hernia, detention and ulceration that causes restriction of the blood flow to the bowels. Some secondary characteristics of the esophageal hiatal hernia include the development of lung-related conditions like asthma which results from the presence of abdominal spasms or thoracic dislocation. However, a significant difference can exist between cases of sliding hernias and case of para-esophageal hernia, where the first one usually attacks lower sphincter of the esophagus, while the second one does not affect the functionality of the lower sphincter of the esophagus. The presence of a state of hemoglobin deficiency and anemia, due to peptic ulcer and severe intestinal hemorrhage, are crucial characteristics of esophageal hiatal hernia. Although relatively less common when compared to adults, GERD can also be common prevalent among children and the younger populations. In population-based studies, it has been found that up to seven percent of children have GERD, and the presence of erosive esophagitis was found to be common among children aged between ten and twelve years. clinical manifestations of strictures, ulcers and nodules of the esophagus were also present among patients with GERD [11].

RISK FACTORS OF HIATUS HERNIA:

Obesity and older age are considered to be the most important predisposing factors for the development of a hiatal hernia. An increased loosening of the esophageal ligament and the diaphragmatic ligament among older individuals contributes significantly to the development of proximal and distal esophageal acidity [12]. Moreover, being overweight causes undesired abdominal and intestinal hiatus hernia. It has been found that a basic metabolic index that is more than 25 was associated with a higher chance of having abnormal esophageal acidity. In fact, there are statements that show a four- to five-fold elevation in the risk of developing hiatal hernia among patients who have basic metabolic index higher than thirty. Individuals who have a history of any surgery in the esophagus, especially Heller's myotomy, endoscopic antireflux process and partial sleeve or full gastrectomy also have significantly higher risk of

developing esophageal hernia. The presence of a thoracoabdominal aortic aneurysm, as a result of accidents or sudden falls, can also play a causative role in developing hiatal hernia. Abnormalities of the musculo-skeletal system, resulting from bone degeneration and decalcification, and in-born difficulties are also associated with the development of esophageal hiatal hernias. Moreover, the presence of abnormal spinal curvatures, hunchbacks and/or anomalous midgut movement increase the rates of formation of esophageal hiatal hernias, especially among patients who have vulnerability against gastric reflux [24]. Innate gastric and skeletal abnormalities might also lead to the development of pediatric para-esophageal hiatal hernias. The classic predisposing factors for the development of pediatric esophagitis include esophageal atresia with distal tracheoesophageal fistula, chronic pulmonary distress, cerebral spasticity, and regurgitation or heartburn. In addition, the presence of GERD in young children for long durations was found to be an essential cause for the development of severe erosive esophagitis.

Diagnosis of esophageal hiatal hernia

hiatal hernia is usually diagnosed using three different techniques: endoscopy barium swallow radiography, and/or manometry [13]. Regarding barium swallow modality, the GE junction and the hiatus of the diaphragm usually have a clear visibility. Radiologists can identify the presence of hiatal hernia that can range from mild non-malignant cases to serious fatal conditions which can be acquired or congenital. Generally, radiographical imaging play a significant role for imaging the diaphragm, as it distinguishes the lung from the surrounding intestinal fat. Radiographical imaging can also reveal the presence of bowel air within the right hemithorax [14].

CT imaging modalities can also help for developing an idea regarding the direction, the contents and the dimensions of a herniated mass that is found entering the chest alongside the esophagus. CT imaging can also aid in the identification of ischemic punctures that could be caused post-operatively, making it necessary to do an immediate surgical operation. CT imaging following surgical operations is usually considered to be the best imaging modality as it has been found to detect the presence of aspiration, lung thrombi, pneumonia, pulmonary infections, accumulation of any fluids in the lung or cavities, etc. CT-guided removing of the esophageal growth are also used usually, especially when patients do not tolerate other surgical interventions. Catheters can be

placed also at the site of the hernia using guidance of CT to remove secondary spontaneous pneumothoraces. Many suggest that it is important to obtain a confirmatory magnetic resonance imaging in patients who have an asymptomatic omental hiatal hernia [15].

Endoscopic intervention in cases of sliding hiatal hernia can get slightly inconsistent results, and in many cases, endoscopy was not able to identify the actual length of the gap that is separating the squamo-columnar connection and the esophago-gastric connection. On the other hand, an study on endoscopy use found that age, gender, ethnicity, BMI, drinking habits and smoking status are all crucial predisposing factors for the development of esophageal gastric disorders and esophageal hiatal hernias. Despite the fact that endoscopy can have similar constraints when compared to barium swallow, however, retroflexed view through endoscopy is currently suggested to provide improved visualization when compared to standard barium swallow radiography. Tracings with manometric catheters can also be used to assess the pressure of stomach, the pressure of the esophagus, the relaxation of the esophageal sphincter and the motility of both the pharynx and esophagus. High-resolution manometry does account for pressure alterations [16]. In addition, live pressure recording over the GE junction could be done also using manometry with high-resolution that allows for a distinct association between adjoining pressure sensors near the esophagus.

Situations demanding surgical intervention in hiatal hernia

It is claimed that gastric hernias that do not show reflux of acid might not need surgical operations. Small esophageal hiatal hernias are usually managed pharmacologically with intestinal PPIs or H2 blockers. Surgical operations are usually needed in cases where the condition does not improve even following sufficient treatment with sufficient period for drugs to work, especially in cases of big hernias and in the presence of reflux-induced bleeding and/or thinning of the GE lining. Failure of performing a nasogastric intubation during a gastric volvulus seems to be a main reason for the initiation of antireflux surgery, even in cases without clear sliding hiatal hernia. These factors have all been greatly described in the Borchardt's Triad of gastric volvulus. At first, surgical intervention was proven to be the most practical option for the treatment of esophageal hiatal hernias. However, these guidelines were changed, to involve non-surgical modalities,

specifically for Type III hiatal hernias that revealed a post-operative recovery of serious conditions in patients who had a small esophagus, leading to the development of iatrogenic adverse events [17].

Age is usually considered to be a crucial reason to avoid performing surgical repair; however, conditions that involve serious expulsion of the pharynx, injuries of the gastric mucosal, ulceration or bleeding of the gastric mucosa, pulmonary aspiration and cough, hemoglobin insufficiency and difficulties in swallowing associated with the motility of the stomach towards the chest required surgical operations. On the other hand, recent reviews showed that the presence of an asymptomatic esophageal hiatal hernia is a relatively rare phenomenon, and careful consideration regarding gastric problems and eating style has been ignored, specifically among older patients. Besides problems related to the stomach itself, pulmonary traits were also detected through chest radiographs which led to the formation of a main reason to perform surgery with labored breathing correlated with gastric influx and postprandial thoracic fullness in para-esophageal hernias. Dyspnea was more prevalent among older patients, while other issues related to the stomach were mainly detected among younger individuals.

Sometimes, the presence of a minimal esophageal hiatal hernia can lead to the development of a large hernia that is adjacent to the esophagus, the later could grow from kyphotic cervical curvatures, or the thoracic and sacral regions curvatures. obstructions of the stomach can also become the main factor for the development of a hiatal hernia, that will later need a surgical operation. Hiatal hernias that affect the motility of the gastric upper portion can present with severe gastric obstructions, necessitating a shift from the management of a minimally symptomatic condition to the management of a symptomatic para-esophageal hernia. sometimes, the presence of dilation in the stomach, necrotic/inflammatory tissue and/or focal full-thickness of the anterior wall of the intestine can also result in increasing the risk of developing complications and will need suitable surgical repair strategies [18].

CONCLUSIONS:

Surgical operation modalities are likely to be to be the only definitive treatment for any underlying esophageal hiatal hernia in all age groups. A post-operative positioning of herniated organs will also decrease the physiological abnormalities associated with clinical manifestations of the hiatal hernia. The

best surgical procedure is considered to be laparoscopic Nissen fundoplication. Interestingly, recent reports have been suggesting that surgical operations can be done in patients who have severe GERD, correlated with their hiatal hernia, especially in cases with expulsions of the esophagus or the pharynx. Higher BMI and/or age have been found to significantly increase the risk of developing a hiatal hernia, with some reports of redo surgeries and fundoplication. However, laparoscopic interventions can also trigger the formation of gas along with developing difficulties in swallowing, which might also cause mortality in about five percent of the operated population.

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