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HIATAL HERNIA: AN INDEPTH NARRATIVE REVIEW

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ABSTRACT The esophagogastric junction (EGJ) is a pivotal anatomical and functional region connecting the esophagus to the stomach, characterized by dynamic changes during swallowing. Peristalsis-driven sequential contractions of esophageal muscles propel food through this region, while the phrenoesophageal membrane anchors it to the diaphragm. This complex structure also serves as an anti-reflux barrier, involving the lower esophageal sphincter (LES), gastric sling fibers, and the crural diaphragm. Hiatus hernias, primarily Type I (sliding), are common in this region, causing the EGJ to move above the diaphragm. Type II, III, and IV (paraesophageal) hernias are less frequent, resulting from various factors, including anatomical changes and surgical procedures. Type I hernias often lead to gastroesophageal reflux disease (GERD) symptoms, whereas Type II, III, and IV hernias may manifest as intermittent discomfort. Diagnosis typically occurs incidentally during imaging or endoscopy. Surgical management depends on the hernia type, with Type I hernias primarily addressing GERD symptoms. Type II, III, and IV hernias require surgery for symptomatic or complicated cases. Understanding the EGJ's intricate anatomy and pathophysiology is crucial for effective diagnosis and management of hiatus hernias.

KEYWORDS : Hiatal Hernia, Gastroesophageal reflux, Herniorrhaphy, Laparoscopy.

INTRODUCTION

Hiatus hernia is a frequent concern encountered by both radiologists and gastroenterologists. However, accurately estimating the prevalence of hiatus hernia remains challenging due to inconsistencies in identifying small sliding hiatal hernias. Furthermore, there exists a certain level of ambiguity regarding the normal functioning of the gastroesophageal junction and the clinical implications of a hiatus hernia (1,2).

METHODS

In our narrative review of hiatal hernia, we conducted a systematic search across PubMed, Scopus, and Google Scholar, utilizing MeSH and DeCS terms associated with hiatal hernia. Our inclusion criteria encompassed peer-reviewed articles from the past decade, focusing on research articles, systematic reviews, and meta-analyses while excluding case reports and conference abstracts. Two independent reviewers performed title and abstract screening, followed by full-text assessment, with quality evaluation conducted using appropriate guidelines. Data extraction, thematic synthesis, and final article selection yielded 15 relevant articles, forming the foundation for our comprehensive narrative exploration of hiatal hernia's pathophysiology, classification, clinical manifestations, diagnosis, and management.

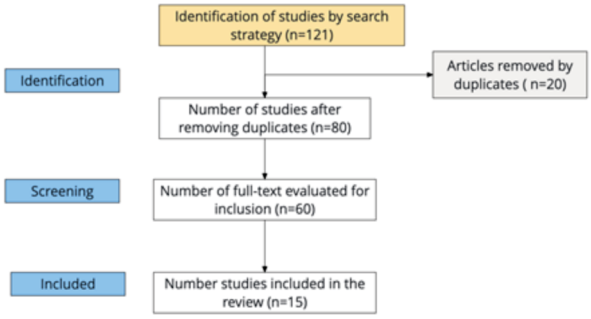

Figure 1. PRISMA

Anatomy and physiology of the esophagogastric junction

The esophagogastric junction (EGJ) is a complex anatomical and functional region crucial for digestive processes. Anchored to the diaphragm by the phrenoesophageal membrane, it undergoes dynamic changes during swallowing. During swallow-initiated peristalsis, the longitudinal and circular muscles of the esophagus contract sequentially to propel food. As the longitudinal muscle contracts, the phrenoesophageal membrane stretches, allowing the squamocolumnar junction to move through the diaphragmatic hiatus, a phenomenon referred to as "physiologic herniation." (3,4)

Radiographically, the phrenic ampulla forms above the diaphragm during peristalsis, acting as the relaxed lower esophageal sphincter (LES). This ampulla empties between breaths as the LES contracts and the esophagus re-lengthens. Repeated stress from swallowing, abdominal straining, and acid reflux can lead to wear and tear on the phrenoesophageal membrane, potentially contributing to age-related degeneration. The EGJ also serves as an anti-reflux barrier, involving the LES, the angle of His created by gastric sling fibers, and the crural diaphragm. Diaphragmatic contraction augments EGJ pressure, acting as an external sphincter, while approximately 2 cm of the tubular esophagus normally resides within the abdomen. Understanding this intricate anatomy and physiology is vital for managing disorders of the EGJ (5,6).

Classification and Epidemiology

Over 95% of hiatus hernias are Type I (sliding), while approximately 5% are Type II, III, or IV (paraesophageal). Among paraesophageal hernias, Type III is the most common, and Type II is the least prevalent. The prevalence of Type I hiatus hernias in North America varies widely (10-80%) due to difficulties in distinguishing small sliding hernias from "generous" phrenic ampullas. Hiatus hernia is characterized by the herniation of abdominal cavity elements through the diaphragmatic esophageal hiatus (7). While the exact causes of most hiatal hernias are speculative, trauma, congenital factors, and iatrogenic complications have been implicated in some Type I hiatus hernias. Types II, III, and IV hernias are known complications of surgical procedures involving the hiatus, such as antireflux operations, esophagomyotomy, or partial gastrectomy. Hiatus hernias are broadly categorized into two main types: sliding and paraesophageal hernias (8). A comprehensive classification system identifies four types:

Type I: Sliding Hernia: This type involves the displacement of the esophagogastric junction (EGJ) above the diaphragm, while the stomach remains in its typical alignment.

Type II: Paraesophageal Hernia (Localized): It results from a focal defect in the phrenoesophageal membrane, with the gastric fundus leading the herniation, while the EGJ remains fixed.

Type III: Paraesophageal Hernia (Mixed): Combining features of both Types I and II, Type III hernias feature both the EGJ and the fundus herniating through the hiatus, with the fundus positioned above the EGJ.

Type IV: Paraesophageal Hernia (Large Defect): This type is characterized by a substantial defect in the phrenoesophageal membrane, allowing organs other than the stomach to enter the hernia sac, such as the colon, spleen, pancreas, or small intestine.

Pathophysiology of Hiatus Hernia Types

Type I Sliding Hernia: Type I hiatus hernia stems from the progressive deterioration of the esophagogastric junction (EGJ). Initially, it involves the loss of intra-abdominal esophageal length, followed by a widening of the hiatus and herniation of the gastric cardia. This occurs due to the relaxation of the phrenoesophageal membrane and the resultant upward displacement of a portion of the gastric cardia. Unlike other hernia types, Type I doesn't have a hernia sac and slides into the chest since the EGJ isn't fixed within the abdomen. It's confined within the posterior mediastinum (9).

Gastroesophageal Reflux Mechanism in Type I Hiatus Hernia: Patients with Type I hernias often experience gastroesophageal reflux disease (GERD). The likelihood of GERD increases with EGJ anatomical compromise and hernia size, impacting reflux by undermining EGJ competence in preventing reflux and compromising esophageal acid clearance during reflux episodes (10).

Esophageal Emptying Compromise: In Type I hernias, acid clearance, especially when recumbent, is prolonged. Hiatus hernias impair fluid emptying from the distal esophagus by causing "re-reflux" during swallowing, mainly during inspiration. This is due to the loss of the crural diaphragm's normal one-way valve function (11).

Paraesophageal Hernias (Types II, III, and IV): Abnormal laxity of the gastrosplenic and gastrocolic ligaments is associated with paraesophageal hernias, allowing stomach displacement. As these hernias enlarge, the greater curvature of the stomach rolls up into the thorax, potentially causing organoaxial or mesenteroaxial volvulus. Over time, the entire stomach can herniate, leading to an intrathoracic stomach (11).

Understanding the pathophysiological mechanisms underlying each hernia type is essential for effective diagnosis and management.

Clinical Features and Diagnosis of Hiatus Hernia

Type I (sliding) hiatal hernias are often asymptomatic or associated with gastroesophageal reflux disease (GERD) symptoms, such as heartburn, regurgitation, and dysphagia. However, large Type I hernias can lead to Cameron lesions, presenting as linear erosions near the hiatus and causing iron deficiency anemia (12).

Patients with Type II, III, and IV (paraesophageal) hernias may be asymptomatic or exhibit vague, intermittent symptoms like epigastric or substernal pain, postprandial fullness, nausea, and retching. GERD symptoms are less common in paraesophageal hernias (12). Complications in paraesophageal hernias often result from mechanical issues due to the hernia, including:

Gastric Volvulus: Large paraesophageal hernias can lead to dysphagia, postprandial pain, ischemia, and, rarely, strangulation due to gastric volvulus.

Bleeding: Infrequently, bleeding occurs from gastric ulceration, gastritis, or erosions within the incarcerated hernia pouch.

Dyspnea: Limited lung expansion caused by herniation of stomach or other organs through the hiatus can lead to dyspnea.

Diagnosing a Type I hiatus hernia is suspected in patients with GERD symptoms. Type II, III, and IV hernias are suspected in patients with a history of surgical hiatus dissection and symptoms like epigastric or substernal pain, fullness, nausea, or vomiting. Typically, hiatus hernia is diagnosed incidentally during upper endoscopy, manometry, or imaging studies conducted for other reasons. Barium swallow is sensitive for diagnosing paraesophageal hernias, while upper endoscopy and high-resolution manometry help evaluate sliding hernias. In patients with paraesophageal hernias, an upright radiograph, CT scan, or MRI of the chest may reveal a retrocardiac air-fluid level within a paraesophageal hernia or intrathoracic stomach. Type IV paraesophageal hernias may show other organs within the hernia sac on imaging (13).

Understanding the clinical presentation and diagnostic methods is crucial for proper management and treatment of hiatus hernias.

Surgical Management

Sliding Hiatal Hernia: Surgical intervention for asymptomatic type I hiatal hernias is generally not recommended. The primary focus for patients with symptomatic sliding hiatal hernias involves addressing gastroesophageal reflux disease (GERD). The management of GERD, both medically and surgically, will be discussed independently (14).

Paraesophageal Hernia: The optimal approach to asymptomatic patients with paraesophageal hernias remains a topic of debate. While a minority of experts advocate for prophylactic surgical intervention even in the absence of symptoms, most experts discourage this approach. This is primarily due to the relatively low annual risk of developing acute symptoms necessitating emergency surgery, which is less than 2 percent. Elective repair of a paraesophageal hernia carries an approximate 1.4 percent mortality rate (14,15).

Surgical repair is warranted in cases of symptomatic paraesophageal hernias. Urgent surgical intervention becomes imperative when patients present with complications such as gastric volvulus, uncontrollable bleeding, obstruction, strangulation, perforation, or respiratory distress resulting from the hernia. Comprehensive details regarding the criteria for surgical repair, preoperative assessment, and the technical aspects of surgical intervention for paraesophageal hernias are extensively discussed in dedicated medical literature (15).

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