Large Paraesophageal Hiatus Hernia: Is Surgery Mandatory?

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Rezumat

Herniile paraesofagiene voluminoase: este tratamentul chirurgical obligatoriu?

Introducere: Deși herniile hiatale paraesofagiene sunt relativ rar întâlnite, incidența lor se înscrie pe o traiectorie ascendentă, în momentul de față ele reprezentând c. 5-10% din numărul total de hernii hiatale. Scopul acestui review al literaturii este de a prezenta controversele legate de tabloul clinic și de investigațiile esențiale preoperatorii, cât și de a reliefa opțiunile chirurgicale sau non-chirurgicale de tratament.

Material și Metodă: Toate articolele conținând cuvintele cheie ‘hernie paraesofagiană voluminoasă sau gigantă’, ‘hernie hiatală/de hiatus’, ‘chirurgie laparoscopică’, ‘chirurgie antireflux’, ‘plasă’, ‘volvulus gastric’ și ‘hernie diafragmatică’ publicate între 1998 și 2017 în platforma PubMed au fost luate în considerare pentru a fi incluse în studiu.

Rezultate: Simptomatologia acestei afecțiuni este nespecifică și poate fi atribuită în mod eronat unui număr semnificativ de alte patologii. În cursul evoluției pot surveni complicații semnificative, cum ar fi volvulusul gastric și necroza gastrică, care, în contextul prezentării nespecifice, pot crea un tablou clinic confuz. Opțiunile terapeutice în context electiv sunt controversate, tratamentul chirurgical fiind dificil de justificat în ceea ce privește o prezentare cu simptomatologie minimă, în special la pacienți vârstnici și cu eventuale multiple comorbidități. Cu toate acestea, în era chirurgiei laparoscopice perihiaiale, reducerea stresului operator conferă abordării chirurgicale un avantaj semnificativ în contextul operațiilor electiv. În ceea ce privește aspectele de tehnică

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chirurgicale (adaugarea unei proceduri antireflux sau nu, oportunitatea gastropexiei, utilizarea unei plase protetice pentru ranforsarea hiatusului esofagian) cât și relevanța clinică a recurenței documentate endoscopic sau radiologic, nu există în prezent un consens, aceste probleme aflându-se încă în dezbateri.

Concluzii: Tratamentul laparoscopic al herniilor hiatale paraesofagiene este eficient, și este asociat cu o rată de morbiditate scăzută în cazul în care este oferit fie pacienților simptomatici, fie celor asimptomatici dar cu un risc perioperator satisfăcător. Sunt necesare studii suplimentare pentru a evalua diferitele inovații legate de tehnica operatorie (ex. utilizarea plasei protetice sau gastropexia), cât și pentru a îmbunătăți înțelegerea complicațiilor postoperatorii și a riscului de recurență postoperatorie.

Cuvinte cheie: hernie hiatală paraesofagiană, cura laparoscopică a herniei hiatale, volvulus gastric, stomac intratoracic

Abstract

Purpose/Aim: Paraesophageal hiatus hernias are seldom found, however the incidence is increasing accounting for 5-10% of all hiatal hernias. The aim of this review is to emphasize controversies in clinical presentation, essential workup investigations and highlight non-surgical and surgical management options.

Materials and Methods: A PubMed literature search using the keywords 'large or giant paraesophageal hernia', 'hiatus or hiatal hernia', 'laparoscopic surgery', 'antireflux surgery', 'mesh', 'gastric volvulus' and 'diaphragmatic hernia' published between 1998 until 2017 was conducted.

Results: Presenting symptoms are non-specific and can be erroneously attributed to various more common medical conditions. Significant complications as gastric volvulus and stomach necrosis, may occur and the obscured clinical presentation can be confusing for the clinician. Management options in the elective setting are controversial, and surgical repair cannot be easily justified for a minimally symptomatic condition, especially in an elderly and perhaps frail patient. However, in the era of laparoscopic surgery around the hiatus, reduced operative stress makes surgical repair appealing in the elective setting. Surgical matters as the adjunct of an antireflux procedure or not, the use of prosthetic mesh to reinforce the hiatus, gastropexy and the clinical importance of radiological or endoscopic recurrence are still under debate.

Conclusions: The laparoscopic treatment of paraesophageal hiatus hernias is effective with low morbidity rates, offered in symptomatic patients and good operative risk asymptomatic individuals. More studies are needed to assess improvement suggestions, as the use of prosthetic mesh or gastropexy, regarding complications and recurrence risks.

Key words: paraesophageal, hiatus hernia, laparoscopic hiatus hernia repair, gastric volvulus, intrathoracic stomach

Introduction

Large paraesophageal hiatus hernias (HH) occur mostly in the elderly, after the age of 70 (1). Its incidence is about 5-10% of all HHs, however it is increasing in observational studies, due to the ageing population. Minor

problems, as anemia, up to life-threatening complications, as gastric volvulus and necrosis of the stomach, may potentially arise in these patients and management can be troublesome (2). Clinical management controversies arise when these large HHs are incidentally found ranging from watchful waiting to a number of

surgical procedures (3). Since the introduction of laparoscopic surgery perioperative complications and hospital stay reduced dramatically (4). On the other hand the magnitude of these operations, the high recurrence rates and the debate among experts for the addition of anti-reflux procedures or the use of prosthetic material, keeps management of large paraesophageal hernias as a matter of skepticism (5).

The aim of this study is to highlight the usual presentation of patients with large paraesophageal HHs in everyday clinical practice, the essential baseline workup and investigations needed to assess the HH and finally, discuss modern, elective and emergent management options.

Materials and Methods

Hiatus Hernia Classification and Pathophysiology

The main types of HH are four, according to the anatomic position of the gastroesophageal junction (GEJ)/gastric cardia (6): a. type I, which is called sliding HH and is the most common, in which the GEJ/gastric cardia is 'sliding' above the esophageal hiatus orifice and into the chest, b. type II, or true paraesophageal HH, where the gastric fundus is rolling into the mediastinum/chest cavity, while the GEJ/gastric cardia remains normally positioned, c. type III, or mixed type, which combines types I and II, and both the GEJ/gastric cardia and fundus roll into the chest, and finally d. type IV, where another abdominal organ as the transverse colon is also drawn upward, along the stomach.

Practically, accurate preoperative distinction between these types of HH is difficult and it is more than often set at surgical exploration. Most authors suggest that large paraesophageal HH are defined as all HH including more than a third of the stomach into the chest, regardless of the GEJ/gastric cardia anatomic position (3). The latter includes types II, III and IV of HHs in a single category that needs similar work-up and management (*Fig. 1*).

A combination of factors related with

advanced age is mostly theorized as the underlying mechanism that led to the development of these large HHs (7).

Obesity and increased intra-abdominal pressure works similarly to the development of abdominal wall hernias. Age related weakness of the phrenoesophageal membrane, as imbalance of Type 1 and Type 2 collagen, or chronic collagen disorders predispose to HHs. Long-standing gastroesophageal reflux disease (GERD) and the resulting shortened esophagus is another potential co-factor. Also, patients with kyphoscoliosis have increased incidence of large paraesophageal HHs (8).

This review is based on a PubMed literature search using the keywords 'large or giant paraesophageal hernia', 'hiatus or hiatal hernia', 'laparoscopic surgery', 'antireflux surgery', 'mesh', 'gastric volvulus' and 'diaphragmatic hernia' published between 1998 until 2017.

Results

Clinical Presentation

Patients with large paraesophageal HHs can be diagnosed incidentally during endoscopic or imaging investigations for unrelated reasons (9).

Despite the above, after careful history taking, most of these patients have been experiencing symptoms even for years, attributing these to other conditions as gastritis, gallstone disease or anxiety and stress. Upper abdominal and chest

Figure 1. Laparoscopic intraoperative view of the mediastinum /diaphragmatic crus post paraesophageal hiatus hernia reduction

discomfort as well as heartburn and regurgitation are mostly reported in the presence of these HHs. Folding of the stomach into the hernia sac can apply pressure on the esophagus and cause dysphagia, while patients sometimes have already modified their diet to soft food. The same mechanism and anatomic distortion can cause delayed emptying of the stomach and early satiety, or aggravating reflux like symptoms. Chest pain varies between 9-59% in relevant studies, and microcytic anemia is also reported in 17-47% of cases (10). The latter is thought to be caused by 'Cameron's ulcers', which are gastric mucosal erosions from crural pressure applied at the neck of the HH (11). Of course, all other common causes of microcytic anemia should be excluded with upper and lower gastrointestinal endoscopy before attributing anemia to the large paraesophageal HH. Moreover, decreased pulmonary reserve and shortness of breath is a major reason that patients with large HHs are commonly referred for surgical repair; however only a minor, about 10%, improvement in pulmonary function tests is reported post-operatively (12).

Preoperative symptoms should be thoroughly documented in cases that operative repair is planned, and realistic goals should be set from the surgical intervention.

Acute severe complications are generally rare and include gastric outlet obstruction and strangulation of the stomach, mostly named as 'gastric volvulus'. Ischemic strangulated stomach can lead to perforation and leakage of gastric contents into the mediastinum, which is the main cause of mortality from the presence of large paraesophageal HHs. The clinical presentation of these patients is described with Borchardt's triad: severe epigastric pain, retching with inability to vomit, and failure to place a nasogastric tube, but occurs in 70% of cases (13). Severe pain of the left upper abdominal quadrant radiating to the left shoulder, may be caused from internal bleeding irritating the diaphragm.

It is very difficult to establish the actual risk of developing the above life-threatening complications, and offer surgery in mostly elderly patients, who have more than often

multiple comorbidities. In an interesting study from Stylopoulos et al, a Markov model is used to define the need for elective versus urgent operation when and if needed (14). The outcome of this landmark study was that watchful waiting is the preferred approach for the asymptomatic patients, and elective surgery should be offered to symptomatic patient complaining of gastric outlet obstruction or GERD symptoms.

Work up

When a large paraesophageal HH is considered in the differential diagnosis a barium swallow test and contrast upper gastrointestinal series can provide the correct diagnosis. Computed tomography (CT) of the chest and upper abdomen is reasonable to be performed to exclude pulmonary disease and define the anatomy of the HH in more detail. Upper gastrointestinal endoscopy is recommended, but usually this is a lengthy procedure which needs good sedation for the patient and often fails to visualize the distorted anatomically stomach. The endoscope can be coiled into the upside-down stomach and the pylorus or duodenum is sometimes impossible to be assessed. In case of anemia, however, esophago-gastroduodenoscopy should be definitely attempted, along with colonoscopy. Capsule enteroscopy is also suggested in the literature to exclude small bowel lesions (15). Routine esophageal physiology tests are not indicated as GERD and increased esophageal intraluminal pressures are demonstrated anyway (16), due to the anatomic distortion and without any underlying functional disorder, thus not adding to the clinician's 'decision making' process.

Management

The optimal management of large paraesophageal HHs is still a matter of debate and should be individualized. Gastroenterologists and surgeons are asked to distinguish between asymptomatic and symptomatic patients, since the presence of symptoms is used as the

principal indication for surgery. It has to be noted though that the vast majority of these patients are in their 70s or 80s, with high prevalence of comorbidities and pose increased operative risk. On the other hand, large HH repair led to significant quality of life improvement on symptomatic patients regardless of age in previously published studies (17). The surgical approach of choice is laparoscopic surgery, with all the benefits of minimally invasive surgery, and thus an enhanced recovery postoperative course. Sometimes, primary physicians do not refer their elderly patients for surgery due to their poor overall health, but a formal anesthetic risk assessment would be more sensible, before refusing operative repair for symptomatic individuals.

Skepticism exists among clinicians and current literature is of little value towards the optimal management of asymptomatic or minimally symptomatic patients. Estimating the risk of developing the above mentioned severe complications from a large paraesophageal HH is almost impossible. Even if the number of patients who need emergent operative repair, or acute hospitalization for these conditions can be documented in a retrospectively designed study, the actual denominator of the study sample cannot be calculated. Stylopoulos et al, including five studies results, reported an incidence of acute complications as 0.7 to 7% per patient per year (14). Mortality rates of acute complications, as gastric volvulus, is reported as high as 16% (18), so elective surgery is advocated even for minimally symptomatic patients in large population studies (19).

Mortality rates for large paraesophageal HH repair are very low, less than 1%, in the

elective setting (20, 21) (*Table 1*). These rates and significant postoperative morbidity were higher in the open surgery era, however nowadays, laparoscopic approach is the norm even for emergency surgical repair (22). A recent review on the subject, concludes that elective surgery should be offered in all symptomatic patients unless they have very high anaesthetic risk regardless of their age, and to all asymptomatic or minimally symptomatic patients up to the age of 75 (1). The latter is justified from the mortality rate that emergent repair poses. Another very interesting study, claimed that 'non-elective repair was independently associated with 1.7 times increased odds of major adverse events and trended toward an increase of 2.7 times for odds of mortality compared to elective repair, after accounting for age and comorbid index score (23). Emergency repair of a large paraesophageal HH is associated with increased morbidity in comparison with elective surgery, in a study of the American College of Surgeons National Surgical Quality Improvement Program, including 383 patients (16% versus 1.6%) (22).

Acute presentation with incarcerated stomach into the chest, due to gastric volvulus, should be managed with resuscitation of the patient and an initial effort to decompress the stomach (24). A gentle nasogastric tube placement or even urgent upper gastrointestinal endoscopy and aspiration can be very helpful, and if successful it gives the patient enough time to be transferred to the appropriate surgical unit for a semi-urgent operation under improved conditions. If the above maneuvers fail, then emergency surgical decompression, and repair of the large paraesophageal HH is indicated.

Table 1. Postoperative complications of laparoscopic large paraesophageal hiatus hernia repair in the elective versus emergent setting

Authors	Year	Number of pts Elective/Emergent	Morbidity Elective/Emergent	Mortality Elective/Emergent
Tam et al (23)	2016	753/171	18%/38%	1%/8%
Kaplan et al (22)	2015	10273/383	5.2%/21%	0.65%/5.5%
Jassim et al (19)	2014	30958/10765	16.5%/33.4%	0.37%/3.2%
Polomsky et al (37)	2010	104/23	3%/30%	1%/22%

Discussion

Large paraesophageal HHs are increasingly found in an ageing population, who undergoes more and more tomographic imaging studies for unrelated reasons. Primary physicians and eventually gastroenterologists and surgeons are confronted with the optimal management queries on the matter. Controversies exist in every aspect, starting from the troublesome definition of the condition, the actual symptoms, the optimal diagnostic work-up, management options and finally surgical techniques and long-term outcomes.

In regards with the optimal surgical approach, laparoscopic surgery is the mainstay of treatment approaches, benefiting patients from reduced postoperative pain, shorter hospital stay, less surgical trauma complications. Early reports of increased recurrence rates of laparoscopic repair in comparison to the open approach, attributed to less adhesions intraabdominally after laparoscopy, are counterfeited as laparoscopic repair is standardized (25). Laparoscopy is the preferred route in both elective and emergency repair, with a higher though risk of conversion to open in the latter setting (26, 27).

In terms of surgical considerations and controversies, it is widely accepted that the hernia sac should be 'non-aggressively' resected, to avoid excessive bleeding or truncal vagus nerve injuries (28). The hiatal defect should be closed and the use of prosthetic mesh is a matter of debate among upper gastrointestinal surgeons. A meta-analysis (29) and a recent review (30) have discordant results and in practice the use of prosthetic material around the esophagus varies according to the individual surgeon's preferences. Characteristically in a study from the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), 23% of surgeons never used a mesh on principle around the gastroesophageal junction and 25% almost always use prosthetic material to reinforce the hiatus (6). The actual material used is also important, as non-absorbable polypropylene mesh can erode the esophagus even many years later, which

can have devastating consequences (31). On the other hand, if absorbable polytetrafluoroethylene (PTFE) type of mesh is used, then recurrence rates are higher (32). Lengthening of the esophagus with a 'Collis gastroplasty' is rarely if ever needed since laparoscopic mobilization of the esophagus is very effective, reaching high into the mediastinum, achieving almost always a good intraabdominal esophageal length. Nevertheless, quality of life is very good in the rare event of such a procedure needed intraoperatively (33). A partial or even full 360° fundoplication is an essential part of the operation reducing the recurrence rates and treating the underlying GERD which practically co-exist in most patients, without significant postoperative dysphagia and bloating (27).

Another issue that a clinician may come across is the recurrent hiatus hernia after initial surgical repair. The rates reported after laparoscopic or open large paraesophageal HH repair are very high, up to 60% (34), if strict radiological and anatomical criteria are used. In reality though, clinically most of the patients having anatomical recurrence of a HH remain asymptomatic with good quality of life, which has definitely improved after surgery (35). In the light of the above, follow up upper gastrointestinal series or CT scans suggesting recurrent HHs should be interpreted carefully taking into account the patient's complains and symptoms. Reoperations have a high morbidity rate and should be performed after excessive preoperative investigations in high volume centers, and after having frank consultation with the patient regarding potential complications and suboptimal long-term results (36).

Conclusion

In conclusion, more studies are needed to address the unanswered questions regarding the optimal management of large paraesophageal HHs. Elective surgery should be offered to all symptomatic patients and to asymptomatic individuals of low operative risk. Meticulous preoperative evaluation of the operative risks and a pragmatic discussion

with the patient and his family for the potential risks and benefits are of paramount importance. The laparoscopic approach is established and the use of prosthetic mesh is still under debate. Recurrence rates are high, however symptomatic recurrence is rare.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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