

Paraesophageal Hernias: A Surgical Perspective

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Editorial

Hiatal hernias refer to the condition where intra-abdominal structures herniate into the mediastinum through the oesophageal hiatus. They occur in about 10% of the population. Hiatal hernias are classified in 4 types. Type I or sliding hernia represents 85%-90% of all hiatal hernias. It results from laxity and loss of coherence of the phreno-oesophageal membrane. The gastro-oesophageal junction (GOJ) is displaced above the diaphragm while the fundus remains below the GOJ. Hiatal hernias type II, III and IV or collectively known as paraesophageal hernias represent about 10%-15% of hiatal hernias. Type II hernia results from a localized defect in the phreno-oesophageal membrane. The gastric fundus herniates into the mediastinum, while the GOJ remains fixed to the preaortic fascia and the median arcuate ligament. Type III paraesophageal hernias have elements of both types I and II and have both the GOJ and the fundus herniating through the hiatus. Type IV hiatus hernia is associated with a large defect in the diaphragm defined by the presence of organs other than the stomach in the hernia sac commonly being the transverse colon, spleen, pancreas or small bowel.

Paraesophageal hernia is a condition mainly seen in the elderly population. In most large series, presentation with a median age of 65 to 75 years appears to be the rule [1]. Risk factors for developing hiatal hernia include age greater than 50, BMI>25 and male gender [2]. About 50% of cases are asymptomatic and the hernia is an incidental finding on imaging or endoscopy. In sliding hernias reflux symptoms such as heartburn and regurgitation are more frequent; whilst in paraesophageal hernias common symptoms include epigastric or substernal pain, postprandial fullness, dysphagia, nausea, vomiting and dyspnoea. Microcytic anaemia can be present secondary to erosions of the gastric mucosa. Acute symptoms due to gastric outlet obstruction/gastric volvulus, uncontrolled bleeding, strangulation, perforation, and respiratory compromise are indications for urgent surgery.

Hiatus hernia can be an incidental finding on a chest X-ray where the gastric bubble can be seen in the chest. On barium swallow the presence of more than 2 cm separation between the B ring (level of squamocolumnar junction) and the diaphragm suggests a sliding hiatus hernia. If a B ring is not evident on barium swallow (absent in 85% of individuals), the demonstration of at least three rugal folds traversing the diaphragm is diagnostic of a sliding hiatus hernia [3]. In paraesophageal hernias there is evidence of the fundus herniating into the mediastinum. On endoscopy a sliding hernia is defined as a greater than 2 cm distance between the squamocolumnar junction and the diaphragmatic impression on the stomach [3]. In paraesophageal hernias the hernia can be visualised on retroflexion (J manoeuvre) of

the endoscope that reveals a portion of the stomach, herniating upward through the diaphragm, adjacent to the endoscope [3]. Another indirect indicator of paraesophageal hernia that should raise suspicion is the increased difficulty or inability by the endoscopist to intubate the duodenum. This is due to the distorted anatomy and position of the pylorus just below the diaphragm. It is important that all patients undergo endoscopic evaluation of a paraesophageal hernia, for better assessment and exclusion of other esophageal or gastric pathology like gastric ulcer, erosion or ischaemia. Computed Tomography (CT) imaging provides enhanced view of the involved structures, especially in large paraesophageal hernia cases. pH and manometry studies can provide further information regarding gastro-oesophageal reflux and oesophageal dysmotility, which in turn can influence the tailoring of surgical approach and technique of fundoplication should this be advocated [4].

The majority of published studies suggest that paraesophageal hernias in low-risk surgical patients should be repaired to prevent the development of potentially life-threatening complications [5]. This has been especially encouraged with the advancement of laparoscopy and the widely available high definition systems including the new 3D optical systems that have emerged mainly during the last quinquennium. It not only provides a better view of the hiatus and the lower mediastinum with subsequent improved oesophageal mobilisation compared to traditional open surgery, but also leads to shorter recovery time due to less postoperative pain and perioperative cardiopulmonary complications, as well as lower overall mortality [6]. However, repair of all paraesophageal hernias in low-risk patients is still a matter of conflict. That became especially apparent in light of a study, which estimated that mortality rate from elective repair is in the area of 1.4% in elective surgery vs. 5.4% in the emergency setting, while the probability of developing acute symptoms requiring emergency surgery is 1.1% per year. Therefore, lifetime risk of developing acute symptoms requiring emergency surgery decreases exponentially with age above 65 years [3]. Another recent study has shown quite the opposite with more adverse prognostic factors in emergency surgery, and significantly more major complications (38% vs. 18%; $p<0.001$) and death (8% vs. 1%; $p<0.001$). After propensity weighting, median absolute percentage bias across 28 propensity score variables improved from 19% (significant imbalance) to 5.6% (well-balanced).

After adjusting propensity-weighted data for age and comorbidity score, odds of major complications were still nearly two times greater (OR 1.67, CI 1.07-2.61) and mortality nearly three times greater (OR 2.74, CI 0.93-8.1) in urgent compared to elective repair of paraesophageal hernias [7]. Currently and in contrast to what was practiced in the past most authors agree that only symptomatic paraesophageal hernias should be surgically treated [8]. As far as

asymptomatic paraesophageal hernias are concerned and although there is yet no consensus regarding the adoption of an operative approach or not, the role of prophylactic paraesophageal hernia repairs to prevent acute incarceration is limited; after careful consideration it can be mostly reserved for patients younger than 75 years of age with a good performance status [5]. In a recent Canadian study, a simulation model comparing prophylactic paraesophageal hernia repair with watchful waiting, concluded that the latter was a superior strategy in 82% of the simulations and that patients with asymptomatic paraesophageal hernias are more likely to achieve better health outcomes if they are at least initially treated by watchful waiting rather than a prophylactic hernia repair [9].

Some groups advocate that surgery is safe in elderly patients. Parker et al., in a study comparing laparoscopic repair of paraesophageal hernias in different age groups reported that mean length of hospital stay was significantly shorter in the <70 age group. Major morbidity was significantly lower in the <70 group (3.6%) when compared to Group 70-79 (17.8%; $p=0.001$). All groups demonstrated significant improvement in symptoms [10]. Another study overviews the impact of patient frailty to outcome, showing that Modified Frailty index is correlated with postoperative complications and discharge to a facility other than home after surgery [11].

Surgical practice is varied and there remains insufficient evidence regarding the optimum technique of hernia repair. Optimal repair of the paraesophageal hernia dictates that the hernia sac should be dissected and then preferably excised so as to reduce hernia and symptom recurrence [12,13].

In disagreement to American studies and practice, in Europe, the finding of "short oesophagus" is very rarely encountered. With adequate trans-abdominal mobilization of the lower-/mid-oesophagus, enough oesophageal length to obtain at least 2 cm of intra-abdominal oesophagus is achieved and thus a Collis gastroplasty is indeed rarely described in Europe [14]. In a study from Bologna, comparison of a transabdominal/trans thoracic approach (thoracoscopic Collis gastroplasty and laparoscopic 360° anti-reflux procedure) for the treatment of short oesophagus, with the standard laparoscopic 360° anti-reflux procedure (Nissen fundoplication), revealed equally satisfactory results with both approaches, but higher complication rate in the Collis-Nissen group, thus making the use of the latter an "unnecessary" step of the procedure [15]. A trans-abdominal laparoscopic approach is nowadays considered the gold standard repair of paraesophageal hernia and the use of a trans-thoracic approach like the Belsey Mark IV, mainly promoted by thoracic surgeons in the past, has dramatically decreased worldwide [16].

Use of mesh (synthetic or biological) for reinforcement of large hiatal hernia defects remains controversial. Some studies seem to encourage mesh placement mainly due to decreased short-term recurrence rates compared to suture hiatal repair [17-19]. Others suggest that primary crural repair with or without mesh reinforcement, does not alter the recurrence rate and the five-year recurrence-free probability is similar in both groups [20]. The limited available information does not allow us to make conclusions about the long-term efficacy of mesh in this setting. Quality of evidence supporting routine use of mesh cruroplasty is low. Until further studies evaluating symptomatic outcomes, quality of life, and long-term recurrence are available, mesh should be used at surgeon discretion [21]. Similar to hernias at other sites, the use of mesh, likely is another adjunct step that may improve short-term outcomes in paraesophageal hernia repair. However, when utilized, biological mesh should be preferred

over synthetic one, so as to avoid complications like mesh erosion [14]. Recently, together with the laparoscopic approach for large paraesophageal hernias, surgeons have embraced the use of pledgets (mainly PTFE) for crural reinforcement, with excellent long-term results. In an American study, patient satisfaction with the pledgeted hiatoplasty was above 80%, with a recurrence rate of 6.7% [22].

Addition of fundoplication is described as a step of the repair in most studies [14]. This is thought to aid in prevention of postoperative gastroesophageal reflux and prevent hernia recurrence by creating a sub-diaphragmatic bulk. There is however no high-level evidence to support this practice of routine fundoplication. Anterior gastropexy (with or without lateral diaphragmatic relaxing incisions) has been suggested by some, mainly in the United States, as a routine step of the procedure. That is in addition to hiatal repair and in order to reduce tension across the hiatus and thus early recurrence [14]. This practice has not been widely accepted and is hence not commonly performed.

Another matter of discussion amongst surgeons is the rate of recurrence post paraesophageal hernia repair. A meta-analysis from Ireland showed that recurrence rate was independent of the learning curve and estimated the overall recurrence rate to be in the area of 10.2%. However, in over 950 patients studied, when objective evidence with Barium swallow performed at a minimum of 6 months post-repair was used, the "true" recurrence rate was 25.5%. The same UK study concluded that the rate of recurrence was significantly lower when oesophageal lengthening by means of Collis gastroplasty was performed [23]. Another recent study on Type III paraesophageal hernias from the Netherlands, where laparoscopic closure of the hiatus was always combined with an anti-reflux procedure, showed a very low of less than 5% symptomatic recurrence rate, after about 3 years median follow up [24].

Routine postoperative contrast studies are not necessary in asymptomatic patients. Even though routine follow-ups uncover a greater incidence of recurrence, these are mostly small and asymptomatic with no intervention needed. In case of post-operative symptoms such as dysphagia, or suspicion of other complications, contrast studies can be undertaken and revisional surgery can safely be undertaken laparoscopically. Primary as well as revisional surgery of hiatal hernias by experienced surgeons in high volume centers, has shown a small but significant inverse relationship between the hospitals' case volume and mortality [25].

Conflicts of interest

The authors declare that they have no conflicts of interest.

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