Paraoesophageal hernia: an overview

Paraoesophageal hernias are a rare but clinically important type of hiatus hernia. Gastric volvulus and perforation may ensue. Investigation and management is determined by patient presentation. This review summarizes current research regarding paraoesophageal hernias.

Hiatus hernia is defined as a protrusion of the abdominal contents, usually the stomach, into the thorax through the oesophageal hiatus. Hiatal hernias are classified according to the gastro-oesophageal position in relation to the diaphragm and there are four variants. Type I hernias (sliding hernias) are the most common and will not be discussed further here. In type II (rolling hernias) the gastro-oesophageal junction is anchored in the normal sub-diaphragmatic position with herniation of part or all of the gastric fundus through a defect in the phrenico-oesophageal membrane to lie alongside the oesophagus in the thorax (Morris and Wood, 2001; Williams et al, 2008). These are much rarer with an incidence of 0.2% (Scheidler et al, 2002). Type III hernias are a mix of type I and type II hernias whereby the gastro-oesophageal junction migrates through the hiatus with an additional paraoesophageal component. Finally, type IV hernias involve other abdominal viscera in addition to the stomach. The gastro-oesophageal junction may or may not migrate into the thorax in this sub-type of hernia. Type II–IV hernias are collectively paraoesophageal hernias.

This review discusses the typical presentation, the appropriate diagnostic investigations and evolving techniques for managing paraoesophageal hernias.

Presentation

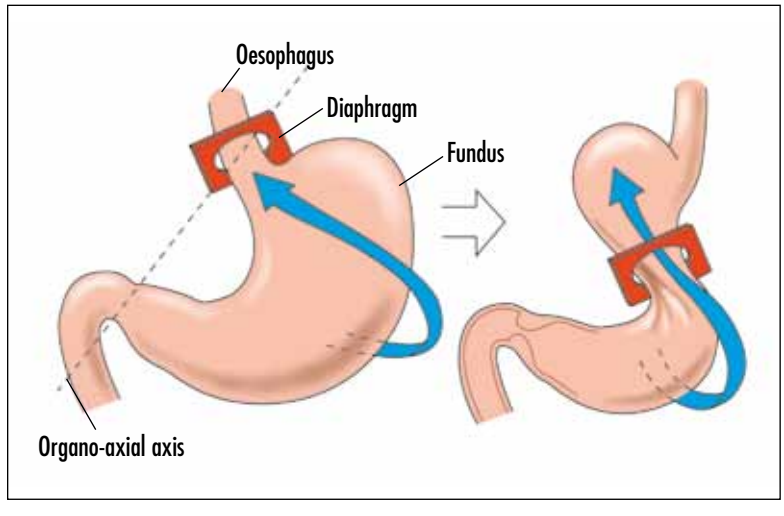
Elderly female patients are most commonly affected with an average age of 64 years and the male to female ratio is 1:1.8. Indeed, many patients tend to have multiple comorbidities with up to 86% of patients who undergo repair of paraesophageal hernia having an American Society of Anesthesiologists score of greater than or equal to 2 (Mattar et al, 2002). The majority of hernias are asymptomatic. However, they may present with epigastric pain, vomiting, dysphagia, odynophagia, hiccoughing, chest pain, palpitations or dyspnoea (Maziak et al, 1998; Mattar et al, 2002; Pierre et al, 2002; Patel et al, 2004; Menon and Trudgill, 2011). These symptoms are usually exacerbated by eating and somewhat relieved by eating smaller portions, and by sitting upright while eating and for a period of time afterwards. Rolling hiatus hernia may also contribute to chronic anaemia as a result of gastro-oesophageal erosions and ulceration. In some circumstances, acute upper gastrointestinal haemorrhage may occur, with resulting haematemesis and malaena. Paraoesophageal hiatus hernias have the potential to become incarcerated and may cause gastric volvulus.

Gastric volvulus is the malrotation of the stomach greater than 180°. Organo-axial is the subtype most commonly associated with paraoesophageal hernias (*Figure 1*). As the stomach herniates into the chest, it also rotates. The more mobile greater curvature moves anteriorly and cephalad. This causes foregut obstruction, usually at the level of the diaphragmatic hiatus, and may lead to gastric ischaemia, necrosis and perforation (Krahenbuhl et al, 1998).

Investigations

Blood investigations may reveal deranged electrolyte balance in those patients with protracted vomiting with evidence of dehydration, hypochloraemia and alkalosis. This should be corrected with adequate electrolyte replacement with intravenous saline. There may

Figure 1. The stomach rotates around an axis which runs from the pylorus to the gastro-oesophageal junction thereby causing a closed loop foregut obstruction. Occlusion of the gastric vessels leads to ischaemia, necrosis and perforation.



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be evidence of iron deficiency anaemia on the full blood picture. Plain chest radiograph may exhibit a retro-cardiac air fluid level but cannot reliably differentiate between varieties of hernia. Barium contrast studies can demonstrate the position of the gastro-oesophageal junction, oesophageal shortening and can demonstrate oesophageal dysmotility (Wasselle and Norman, 1993).

Computed tomography scan with intravenous and, when possible, oral contrast can accurately demonstrate paraoesophageal hernia. This is an important investigation in patients where acute gastric volvulus or paraoesophageal hernia are suspected (*Figure 2*).

Upper gastrointestinal endoscopy can accurately diagnose and classify hiatal hernia and may allow assessment of organo-axial rotation in gastric volvulus. This must be performed to exclude other causes of upper gastrointestinal symptoms including malignancy (Kahrilas et al, 2008; Karmali et al, 2008).

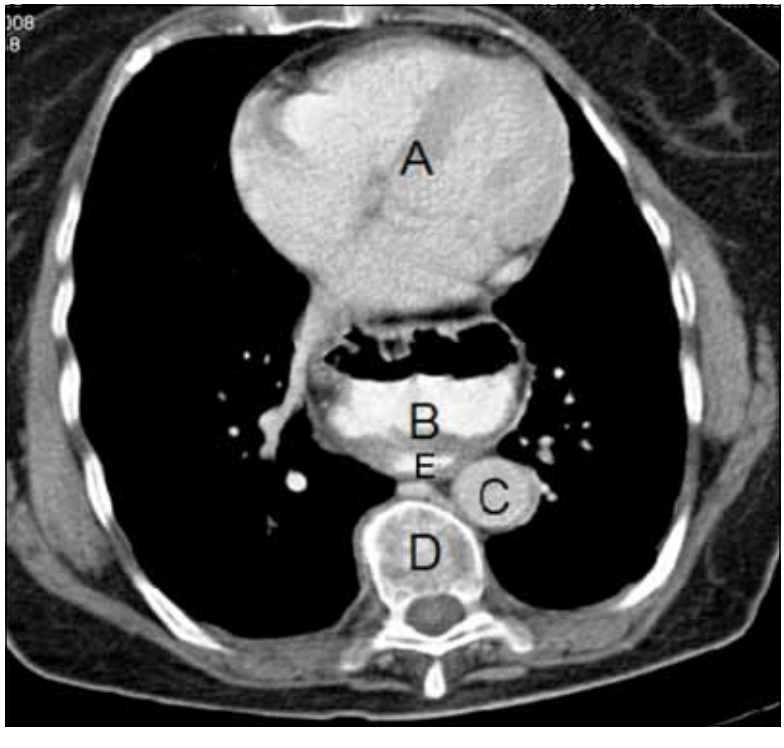
Emergency management

Gastric volvulus presents with a triad of epigastric and chest pain, retching without vomiting and an inability to pass a nasogastric tube, as described by Borchardt (1904). Acute gastric volvulus is often diagnosed late, because of the wide range of differential diagnoses. Volvulus is usually first recognized following computed tomography or upper gastrointestinal endoscopy. However, plain abdominal film may show a massively distended stomach in the left upper quadrant and possibly extending into the chest. Endoscopic reduction has been described for acute gastric volvulus in patients who are not fit for anaesthetic (Lowenthal et al, 1985; Kodali and Maas, 1995; Wolfgang and Lee, 2001; Kulkarni and Nagler, 2007). However, surgical management remains the mainstay of management for acute gastric volvulus. This involves emergency laparotomy with reduction of the hernia followed by repair of any diaphragmatic defect. Partial gastrectomy will be necessary if volvulus has resulted in infarction of the stomach.

Perforation should be treated with emergency surgery including an attempt to decompress the stomach with concomitant resuscitation.

Consideration should be given to improving nutritional status in patients in whom there is evidence of malnutrition and where surgical intervention can wait (Khanna and Finch, 2011). This includes assessment with a verified nutritional screening tool (e.g. Malnutrition Universal Screening Tool), dietician assessment and either enteral or parenteral nutrition if indicated.

Figure 2. Axial computed tomography scan of the thorax with oral contrast demonstrating herniation of the stomach into mediastinum. A = heart; B = paraoesophageal hernia with an air–fluid level; C = descending aorta; D = thoracic vertebrae; E = oesophagus.



Elective management

In asymptomatic patients found to have a rolling hernia, a watchful waiting strategy can be used (Landrenau et al, 2005). This avoids the considerable morbidity associated with hernia repair especially since many patients tend to have multiple comorbidities and a relatively poor performance status.

Surgical intervention aims to reduce symptoms of dysphagia, reflux, epigastric and chest pain and also improves cardiovascular function. In the past, large transthoracic and abdominal wounds were created to perform open reduction of the hernia (Khanna and Finch, 2011). This was associated with significant morbidity and mortality in an elderly and infirm patient population (Mattar et al, 2002).

No randomized controlled trials or prospective studies have examined whether or not laparoscopic repair of paraoesophageal hernia confirms a benefit over open repair. A review of eight retrospective reviews found that, although laparoscopic surgery for paraoesophageal hernias had longer operating times, it resulted in lower blood loss, shorter hospital stay, fewer intraoperative complications and a reduction in overall morbidity compared to patients who had an open procedure (Khanna and Finch, 2011) (*Table 1*). In addition, laparoscopic surgery resulted in comparable symptomatic improvement when compared to the open cohort. However, the end points in these studies are heterogeneous making comparison difficult. Both open and laparoscopic surgery result in significant, but similar rates of mortality and morbidity. Morbidity rates range between 12% and 60% and mortality rates between 0.5% and 20%. Schauer et al (1998) reported

Table 1. Open *vs* laparoscopic paraoesophageal hernia repair – a summary of eight retrospective case series

Reference	Patients (*n*)	Follow up	Main outcomes
Hashemi et al (2000)	41 (20 open, 21 laparoscopic)	24 months	Recurrence laparoscopic 42%, open 15%*
Schauer et al (1998)	95 (25 open, 70 laparoscopic)	None stated	Average hospital stay laparoscopic 4.9 days, open 10.3 days*, major complication laparoscopic 10.5%, open 48%*
Ferri et al (2005)	60 (25 open, 35 laparoscopic)	None stated	Recurrence laparoscopic 23%, open 44%, no difference in disease-related quality of life
Karmali et al (2008)	93 (46 laparoscopic, 47 open)	16 months for laparoscopic, 18 months for open	Average hospital stay laparoscopic 5 days, open 10 days*, postoperative complications laparoscopic 22%, open 53%*, recurrence rate equal
Mattar et al (2002)	136 (all laparoscopic, three converted to open)	40 months	2.2% symptomatic recurrence requiring reoperation
Andujar et al (2004)	166 (all laparoscopic)	15 months	Laparoscopic repair improves symptoms, 18% hiatal hernia recurrence
Pierre et al (2002)	203 (all laparoscopic, three converted to open)	18 months	Patient questionnaire of surgery outcome: 84% excellent outcome, 8% good, 5% fair and 3% poor
Boushey et al (2008)	58 (all laparoscopic, one converted to open)	None stated	Average hospital stay 3.8 days, 83% marked symptom improvement, 17.2% recurrence of hiatus hernia

*Indicates a significant difference

major complications in 10.5% of their laparoscopic group compared to 48% in the open cohort. However, there were four instances of oesophageal perforation in the laparoscopic group compared to none in the open group. Other major complications included myocardial infarction, cardiac arrhythmia, congestive heart failure and pneumonia. Rates of recurrence of paraoesophageal hernia for both open and laparoscopic repair vary between studies but are high in several series.

The frequent forces exerted through the hiatus as a result of breathing, coughing and the valsalva manoeuvre put stress through the hernia repair, and mean recurrence of symptoms in primary repair is high. In addition, large diaphragmatic defects generally mean primary repair is either under tension or impossible. This necessitates the use of mesh to augment the repair. Three prospective randomized trials investigated the use of mesh in laparoscopic hiatal hernia repair (Frantizides et al, 1999, 2002; Oelschlager et al, 2006) and their findings are summarized in *Table 2*. Mesh repair results in decreased recurrence rates when compared to primary closure and is not associated with a significant increase in complications, morbidity or mortality.

The use of oesophageal manometry and 24-hour pH monitoring preoperatively, to assess the degree of reflux and the competence of the lower oesophageal sphincter, is of uncertain value; these investigations can be difficult and unreliable on account of the difficulty in passing probes through an anatomically distorted lower oesophageal sphincter (Linke et al, 2008). No prospective randomized trials to date have addressed the value of routinely adding an anti-reflux procedure during repair of paraoesophageal hernias. A review of the literature suggests that, in the urgent setting, an anti-reflux procedure should be routinely included; where the repair is elective, manometry and pH monitoring should be used to tailor the surgical approach. There is no evidence to suggest that adding an anti-reflux procedure has any impact on recurrence of the hernia itself, but has a positive impact on symptom control in individuals with an incompetent lower oesophageal sphincter.

Evolving endoscopic treatments for the treatment of paraoesophageal hernia have been described. However, at present, these have not been fully validated and are not recommended as routine practice (Xenos, 2000; Frantzides et al, 2002; Tabo et al, 2003; Cadiere et al, 2009).

Table 2. Primary paraoesophageal repair *vs* mesh repair – a summary of three randomized control trials

			Recurrence rate		
Reference	Primary repair group (*n*)	Mesh repair group (*n*)	Primary repair	Mesh repair	*P* value
Oelschlager et al (2006)	57	51	24%	9%	0.04
Frantzides et al (1999)	18	17	17%	0%	0.08
Frantzides et al (2002)	36	36	22%	0%	0.006

Conclusions

Rolling hiatus hernias are a rarer, but potentially fatal, subtype of hiatus hernia and may lead to significant morbidity and mortality. Barium contrast studies, endoscopy and computed tomography scan are the mainstay of investigation. Watchful waiting can be used for asymptomatic cases while surgical repair is the treatment of choice when patients are adversely affected. There is a lack of good quality prospective research investigating the advantages of laparoscopic surgery over the open approach and the addition of anti-reflux procedures in routine practice. In the future, endoluminal procedures may replace surgical procedures if shown to be as safe and effective. **BJHM**

Conflict of interest: none.

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KEY POINTS

- Rolling hiatus hernias are a rarer type of hiatus hernia (0.2% incidence).
- They affect an elderly and infirm population.
- The majority are asymptomatic.
- Gastric volvulus with subsequent perforation is the most serious consequence.
- In the emergency setting management requires urgent resuscitation, imaging and transfer to theatre.
- There is no good quality research to fully endorse laparoscopic over open repair.
- Endoscopic therapy may play a role in the management of paraoesophageal hernias in the future.