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CASE REPORT

Parahiatal Hernia: An Elusive Diaphragmatic Defect Revealed Intraoperatively

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ABSTRACT

Background: Parahiatal hernia (PHH) is an exceptionally rare diaphragmatic defect located adjacent to the normal esophageal hiatus. Its clinical presentation often mimics that of paraesophageal hernia, making preoperative diagnosis challenging. **Case Presentation:** We report the case of a 69-year-old man with a one-year history of postprandial epigastric pain. Imaging studies suggested a mixed hiatal hernia with complete intrathoracic migration of the stomach. Laparoscopic exploration revealed a 4-cm left paraesophageal defect consistent with parahiatal hernia. The herniated stomach was reduced, and the defect was closed in a tension-free manner using interrupted sutures. Given the presence of gastroesophageal reflux and to minimize tension following left crus dissection, a Nissen-Rossetti fundoplication was performed. The postoperative course was uneventful, and the patient remained asymptomatic at the one-month follow-up. **Discussion**: PHH represents less than 0.2% of hiatal hernia repairs and is typically located lateral to the left phrenic pillar. Diagnosis is rarely established preoperatively due to its anatomical proximity to the esophageal hiatus and nonspecific symptoms. Optimal management involves minimally invasive reduction and primary closure of the defect. For large or tension repairs, mesh reinforcement—particularly with synthetic nonresorbable materials—reduces recurrence without increasing morbidity. Muscle-flap repair may serve as an alternative in selected cases. The decision to perform fundoplication should be individualized based on reflux symptoms and the stability of the hiatal complex. **Conclusion**: Awareness of PHH and its distinguishing radiologic and intraoperative features is crucial for accurate diagnosis and tailored surgical repair, minimizing recurrence and improving outcomes.

Keywords: parahiatal hernia, diaphragmatic hernia, hiatal hernia.

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1. INTRODUCTION

Esophagus hiatus surgery is occupying an increasing place in the surgical schedule despite its rarity. The Herniamed registry recorded 13,859 operations for hiatal hernia in a 9-year study period. (1). There are four types of hiatal hernia (2). Surgical treatment is mandatory in paraesophageal hernias (3). However, a similar type can be confused with hiatal hernia, which has a different treatment: parahiatal hernia (PHH). This is a rare form of non-hiatal diaphragmatic hernia (4). Palanivelu et al. reported only eight cases of PHH between 1999 and 2007 (5). This condition can manifest itself suddenly by the occurrence of a gastric volvulus, requiring urgent surgery (6). Their preoperative diagnosis is almost impossible due to the lack of knowledge of the medical setting and the proximity of the diaphragmatic defect to the hiatal hiatus. A review of the literature published in 2020 highlighted that, among the 27 cases collected, none of them were correctly diagnosed preoperatively (7). We report a case of intraoperatively discovered PHH. This case provides an opportunity to highlight the diagnostic challenges associated with PHH and to discuss the optimal surgical management strategies based on the most recent evidence in the literature.

2. OBSERVATION

A 69-year-old man with a medical history of hypertension and atrial fibrillation was referred to our department for dull epigastric abdominal pain evolving over the past year, typically triggered by food intake. The pain was non-radiating and not associated with fever or jaundice. The patient denied any history of drug use, alcohol consumption, or smoking.

Abdominal examination was unremarkable. Upper gastrointestinal endoscopy revealed congestive gastropathy. An abdominal CT scan demonstrated a mixed hiatal hernia containing the entire stomach. A barium meal confirmed the presence of a massive gastroesophageal reflux and a mixed hiatal hernia with complete gastric herniation (figure 1). No manometry or pH metry was ordered when considering these features.

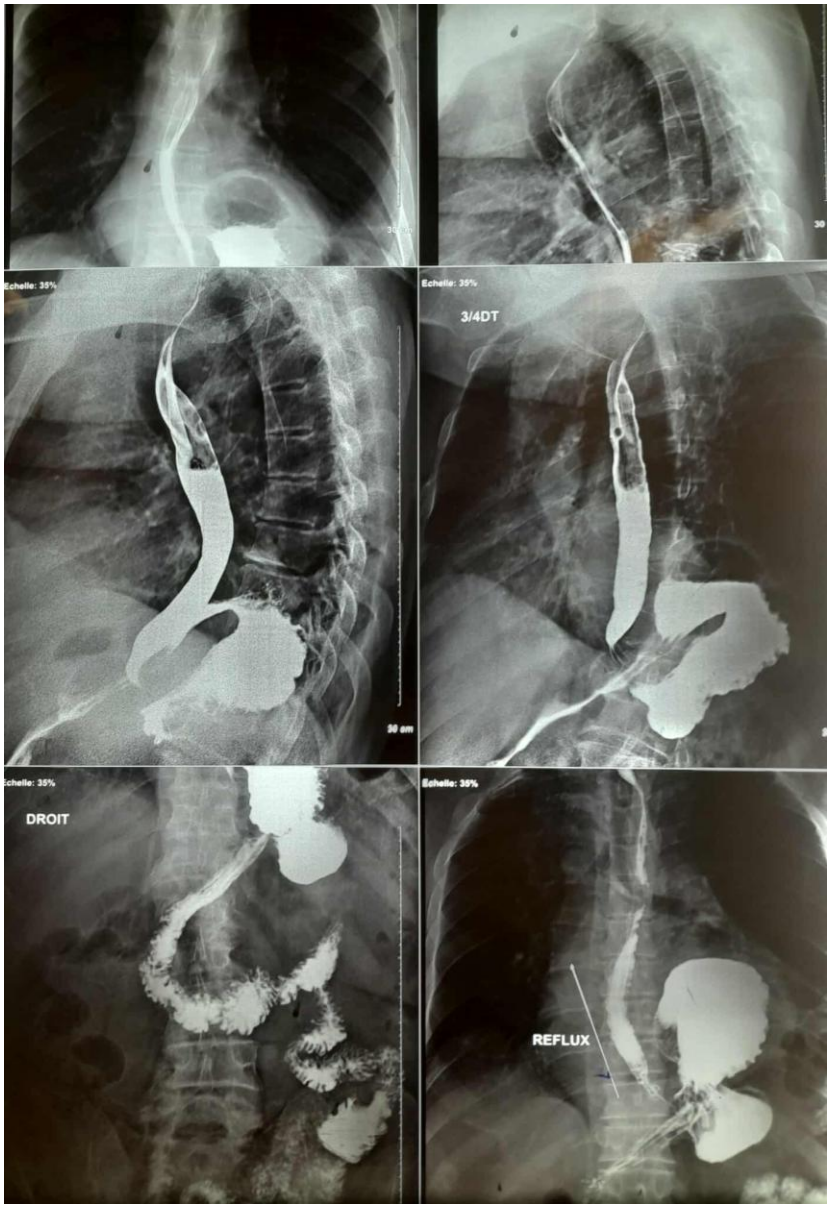

Figure 1. Barium meal demonstrating the presence of gastroesophageal reflux and a mixed hiatal hernia with complete gastric herniation.

The patient was scheduled for laparoscopic surgery. Intraoperative exploration revealed a 4 cm left paraesophageal diaphragmatic defect (figure 2) through which the entire stomach had herniated, without evidence of strangulation. We proceeded with reduction of the herniated contents and resection of the hernia sac, taking care to avoid pleural injury. The diaphragmatic defect was closed tension-

free using four simple interrupted sutures with Polaster 2-0 (figure 3). Given the presence of gastroesophageal reflux and to relieve tension on the suture line following dissection of the left diaphragmatic crus, we decided to perform a complete Nissen-Rossetti fundoplication (figure 4). The procedure was completed by placing a subhepatic Redon drain.

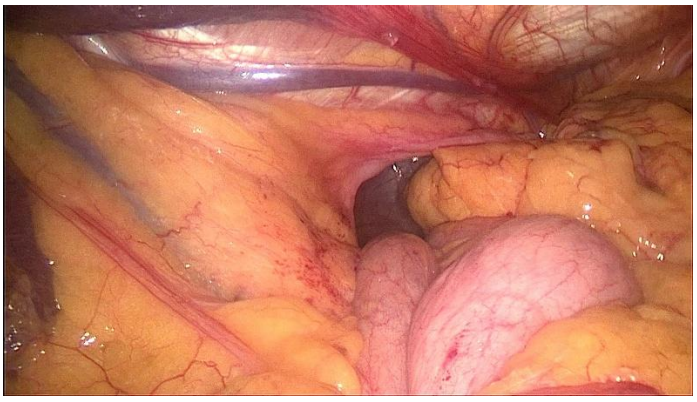

Figure 2. Intraoperative view of a parahiatal hernia measuring 4 cm in defect.

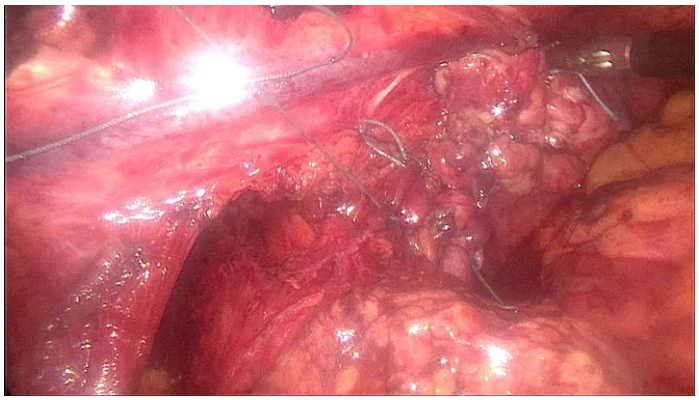

Figure 3. Intraoperative view of closing the diaphragmatic defect with interrupted sutures.

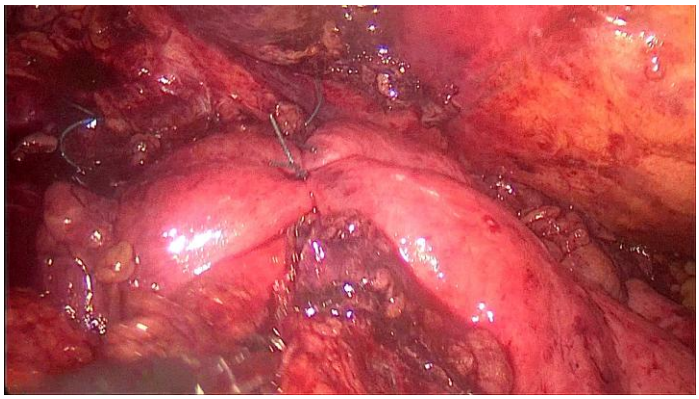

Figure 4. Intraoperative view of a Nissen fundoplication.

Postoperative recovery was uneventful. A liquid diet was initiated on postoperative day 1 and was well tolerated. Bowel function resumed on postoperative day 2. The patient was discharged on postoperative day 3. At one-month follow-up, he remained asymptomatic, with no abdominal discomfort or dysphagia.

3. DISCUSSION

PHH is extremely rare, representing 0.2% of the entire laparoscopic antireflux surgical experience of Scheidler et al. and 1.6% (2 of 127) of our patients with a presumptive clinical diagnosis of paraesophageal hernia (8). The PHH is almost always lateral to the left phrenic pillar (9), because the contralateral side is protected by the liver. They can be primary or secondary. Junsheng et al. reported the predominance of the primary character in their review of the literature (7). It affects both sexes without discrimination (10). Due to a blunt and non-specific symptomology, the rate of hernia complications is high (43%) (10).

Its diagnosis is often overlapped with hiatal hernia, as in our case, because radiologists are unfamiliar with this condition and the proximity of the PHH defect to the phrenic hiatus. It is distinguished from hiatal hernias by a normally opening esophageal hiatus. In addition, in PHH, the intrathoracic herniated abdominal viscus is noticeably displaced to the left of the midline, in contrast to paraesophageal hernias, where the posterior mediastinal air–fluid levels representing the herniated viscus are typically midline or right-sided (8). Another distinguishing radiographic feature of parahiatal hernias is the presence of a well-defined tissue band that separates the contrast-filled distal esophagus from the contrast within the herniated viscus (8).

Given the rarity of PHH, management strategies are not well established. There are currently no established guidelines for the management of parahiatal hernias due to their exceptional rarity and low incidence. However, the therapeutic strategy can be reasonably extrapolated from the principles and outcomes reported in the surgical repair of hiatal and other diaphragmatic hernias.

When considering surgical approaches, the thoracic or abdominal approaches are equivalent if carried out by a minimally invasive route. The multicenter study collected 14,910 patients with diaphragmatic hernias and operated between 2010 and 2015 (11) demonstrated that open abdominal and thoracic approaches were associated with a higher incidence of postoperative complications (including sepsis, pneumonia, surgical site infection, prolonged postoperative ileus, and acute myocardial infarction), longer hospitalization, increased overall hospital costs, and a significantly elevated risk of mortality (OR = 2.62; 95% CI 1.59–4.30 and OR = 4.60; 95% CI 2.37–8.91, respectively) compared with laparoscopic abdominal repair. In contrast, patients who underwent thoracoscopic repair had a mortality risk comparable to those treated laparoscopically via the abdominal route (OR = 0.87; 95% CI 0.11–6.43).

The role of reinforcement mesh remains debated, especially for large defects**.** This material reduces suture tension. (12). Achieving a tension-free repair is critical, especially in large defects, since it is well established that excessive tension on the repair increases the risk of recurrence and complications such as chest wall deformities (13). In 2021, Tam V et al. (14) conducted a systematic review and meta-analysis comparing suture-only versus mesh-reinforced cruroplasty in the laparoscopic repair of large hiatal hernias and included 13 studies involving 1,194 patients. The authors analyzed the rates of hernia recurrence, reoperation, and complications, using a random-effects model to account for heterogeneity between studies. The results showed that prosthetic repair was associated with a significantly lower recurrence rate (13% vs. 24% for suture-only; OR = 0.51, 95% CI 0.30–0.87; p = 0.014), with no significant difference in reoperations (OR = 0.42, 95% CI 0.13–1.37; p = 0.149). However, in long-term follow-up, the prosthetic group showed superiority. In a retrospective study, the authors analyzed data from 503 patients operated between 2012 and 2024 by robotic repair of a hiatal or paraesophageal hernia, comparing “suture only” cruroplasty with the same repair reinforced by a biosynthetic prosthesis (15). They evaluated, in the short term (3 months to 1 year) and long term (≥ 1 year), anatomical recurrence (confirmed by imaging or endoscopy) as well as symptomatic recurrence. Of the 308 patients who received a mesh and the 195 treated with suture alone, both groups showed comparable symptomatic improvement after the intervention. In the short term, the anatomical recurrence rates were 11.8% with prosthesis and 15.6% without (p = 0.609), respectively; in the long term, they were 24.7% versus 44.9% (p = 0.015). Regarding symptomatic recurrence, the long-term rates were 17.2% in the prosthesis group versus 42.2% in the suture group (p = 0.003). Particularly for medium to large hernias, prosthesis reinforcement resulted in a relative reduction of approximately 50% in anatomical recurrences and 59.2% in symptomatic recurrences at one year or more of follow-up.

The literature shows substantial variability in the types of prosthetic materials used for diaphragmatic hernia repair, with at least 19 distinct patch types reported (16). Synthetic nonresorbable meshes consistently demonstrate the lowest recurrence rates, particularly Goretex®-based materials. Techniques using sutures or glue are preferable for prosthesis fixation due to the proximity of the pericardium, making tackers unsuitable (10). Conversely, hemoplasty remains a safe alternative since it avoids the risk of mediastinal or transesophageal migration (17).

Alternative techniques to reduce suture tension include muscle flap opposition. In a retrospective review of patients operated on for congenital diaphragmatic hernia between 2005 and 2016, excluding cases of simple or minimally invasive suture (18). They classified patients treated with synthetic prosthesis (GORE-TEX®, DUALMESH®) or muscle flap (transversus abdominis muscle alone or combined with internal oblique), and compared reherniation rates and time to recurrence. Of 131 long-term survivors (median follow-up 5 years), overall recurrence was 8.8% in the patch group and 3.5% in the flap group (p = 0.295). Time to recurrence did not differ significantly (median 5.5 months for patch vs. 57 months for flap, p = 0.272).

Economical hiatus dissection is recommended to release tension around the hiatal orifice or to widen it if phrenoraphy is causing tension. (10). However, a focused dissection should be limited to the left crus, while the right crus should remain untouched, as unnecessary dissection could compromise an otherwise intact and normal hiatus (19).

The decision to perform fundoplication should be individualized (20), considering factors such as the patient's symptoms, the presence of gastroesophageal reflux disease, the surgeon's experience, and whether the hiatus was destabilized during repair surgery.

The present study is limited by the short postoperative follow-up of one month. This duration is insufficient to evaluate the long-term effectiveness and durability of the surgical intervention. Longer follow-up is required to confirm the stability of the outcomes.

4. CONCLUSION

In conclusion, PHH is an extremely rare condition that is often misdiagnosed as a hiatal hernia due to its subtle and atypical radiologic features. It typically occurs lateral to the left phrenic pillar, may be primary or secondary, and carries a high risk of complications because of its nonspecific presentation. Recognizing its distinctive anatomical and imaging characteristics is essential for accurate diagnosis. Management should follow the principles of diaphragmatic and hiatal hernia repair, with careful dissection and consideration of mesh reinforcement to minimize recurrence and improve outcomes.

Ethical considerations: Patient consent was obtained and all identifying information has been removed to ensure full respect of patient anonymity.

Competing interests: The authors declare that they have no competing interest.

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