

## CASE PRESENTATION

# Laparoscopic management of the rare concomitant paraoesophageal hiatal and Morgagni hernias: a case report and literature review

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### ABSTRACT

Combined diaphragmatic hernias, comprising paraoesophageal hernia and Morgagni's hernia, represent a rare surgical pathology with an incidence not exceeding 1% of all diaphragmatic hernias. This combination is interesting and requires a specific surgical approach. In the presentation we are presenting a case of a 56-year-old female patient who was presented with nonspecific cardiorespiratory and gastrointestinal symptoms and was diagnosed with combined diaphragmatic hernias; Morgagni and paraoesophageal hiatal hernia, with clear description to the surgical procedure. the patient experienced an uncomplicated postoperative recovery and was discharged on day 5, with no early recurrence or reflux on contrast study.

In addition, we conducted a comprehensive literature review about such rare combination. A systematic search of literature published over the last 20 years was conducted in PubMed, Scopus, Web of Science, eLibrary.ru, and the Cochrane Library using key terms: "combined diaphragmatic hernias," "Morgagni hernia," "paraoesophageal hiatal hernia," and "surgical treatment." The primary focus was the analysis of diagnostic algorithms and surgical methods for combined hernias. We found a fewer than 10 cases and their Laparoscopic correction was found to be safe and effective treatment method. The application of minimally invasive technologies enables optimal outcomes in rare and complex forms of diaphragmatic pathology.

**Key words:**Diaphragmatic hernia, hiatal hernia (HH), Gastroesophageal Reflux Disease (GERD), ischemic heart disease (IHD), Computed Tomography (CT), Ultrasonography (US).

### INTRODUCTION

Large hiatal hernias and Morgagni hernias, as types of diaphragmatic hernias, exhibit significant differences in anatomical location, clinical manifestations, diagnostic challenges, and therapeutic strategies.<sup>[1,2]</sup> These conditions represent complex pathological entities often requiring surgical intervention to correct anatomical defects and prevent life-threatening complications.<sup>[2,3]</sup> While hiatal hernias are relatively common in the adult population, Morgagni hernias are rare congenital anomalies (defects of the Larrey-Morgagni

triangle) that are often diagnosed incidentally in adults. The combination of these two distinct pathologies—a parasternal Morgagni hernia and a paraoesophageal hiatal hernia—is an exceedingly rare clinical scenario, with only isolated cases reported in the world literature.<sup>[2,4]</sup> Despite insufficient epidemiological data on this combined pathology, existing clinical observations confirm its exceptional rarity, characterised by a complex clinical course that necessitates a comprehensive diagnostic algorithm and an individualised surgical strategy.<sup>[2,5]</sup> To date, a review of the English-language literature indicates that fewer than



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10 cases of this synchronous combination have been documented.

The clinical presentation of this combined pathology is polymorphic and nonspecific. Symptoms can arise from either a hernia or a combination of both. This includes signs of gastrointestinal dysfunction (Dysphagia, postprandial pain, vague abdominal discomfort, and risk of strangulation); respiratory impairment (dyspnea, lung compression); as well as cardiovascular disorders (arrhythmias, and syncope), which complicate timely diagnosis.<sup>[2,4,6]</sup> For instance, dyspnea may result from mechanical compression of the lungs by the herniated contents of a large hiatal hernia or from the space-occupying effect of a Morgagni hernia. Similarly, postprandial chest pain could be due to gastric volvulus in a paraoesophageal hernia or compression of mediastinal structures. This symptomatic overlap necessitates a high index of suspicion and comprehensive imaging. The synchronous combination of these hernias is associated with a risk of life-threatening complications, including intestinal obstruction, strangulation, acute respiratory failure, and even cardiac tamponade due to compression of mediastinal structures. These conditions require prompt surgical intervention due to the risk of rapid progression of multi-organ dysfunction.<sup>[2,7]</sup>

### Risk Factors

The pathogenesis of these hernias involves different mechanisms. For hiatal hernias, key risk factors include advanced age, obesity, and conditions that chronically increase intra-abdominal pressure, such as chronic obstructive pulmonary disease (COPD) or chronic constipation.<sup>[8,9]</sup> Patients with a high body mass index (BMI  $\geq 30$  kg/m<sup>2</sup>) are at an increased risk.<sup>[3]</sup> Morgagni hernias, caused by a congenital defect in the parasternal zone (Morgagni's triangle), may remain latent for decades. Their clinical manifestation in adults is often triggered by the same precipitating factors that increase intra-abdominal pressure, such as obesity, trauma, or chronic cough.<sup>[10]</sup> These hernias are characterised by a predominant right-sided location (80–90% of cases) and typically contain omentum or

transverse colon, requiring differentiation from mediastinal tumours.<sup>[11]</sup>

### Clinical Picture and Diagnosis

The simultaneous presence of a large hiatal hernia and a Morgagni hernia present unique clinical challenges due to their rarity and potential for complications.<sup>[11,12]</sup> As noted, symptoms are often nonspecific. Gastrointestinal manifestations are most common and arise from mechanical compression of herniated organs. Nausea, vomiting, and postprandial abdominal distension may be exacerbated by mechanical obstruction.<sup>[2,11,13,14]</sup> Dysphagia is common in large hiatal hernias due to oesophageal compression or distortion.<sup>[3,15]</sup> In severe cases, complete or intermittent intestinal obstruction can occur, presenting as an acute surgical abdomen.<sup>[13,16]</sup> While GERD is a common manifestation of sliding hiatal hernias, in large, fixed paraoesophageal hernias, mechanical symptoms such as Dysphagia and vomiting often predominate over heartburn.<sup>[3,15]</sup>

Respiratory symptoms, primarily dyspnea, are common due to compression of the lungs and diaphragm.<sup>[15,17–20]</sup> Chest pain, often postprandial, can be mistaken for cardiac angina, complicating diagnosis.<sup>[20–22]</sup> Pulmonary aspiration is a serious risk, particularly with large hiatal hernias, potentially leading to aspiration pneumonia.<sup>[15,19]</sup> Atelectasis can result from lung compression, further exacerbating respiratory symptoms.<sup>[15,23]</sup>

Cardiovascular symptoms, though less common, can be life-threatening,<sup>[24]</sup> arising from compression of the heart and major vessels.<sup>[25]</sup> Documented complications include paroxysmal atrial fibrillation triggered by compression of the left atrium,<sup>[23,26,27]</sup> postprandial syncope,<sup>[22,23]</sup> and electrocardiographic changes mimicking acute coronary syndrome.<sup>[21,27–29]</sup> In rare instances, cardiac compression can lead to cardiac arrest.<sup>[23,25]</sup>

### Diagnosis

Diagnosing these hernias requires a comprehensive application of instrumental methods.<sup>[3]</sup> Computed tomography (CT) with contrast plays a key role, providing detailed

## SYSTEMATIC REVIEW:

**Objectives:** This review was conducted to evaluate the effectiveness of the laparoscopic approach for the surgical correction of a rare combined diaphragmatic hernia by presenting a detailed clinical case and reviewing the relevant literature.

**Methodology:** Given the extreme rarity of the condition, a formal systematic review of randomised controlled trials was not feasible. Instead, this article presents a detailed clinical case and a comprehensive narrative review of the literature. A literature search was conducted in PubMed, Scopus, Web of Science, eLibrary.ru, and the Cochrane Library for articles published in the last 20 years using the key terms: “combined diaphragmatic hernias,” “Morgagni hernia,” “paraoesophageal hiatal hernia,” and “surgical treatment.” The primary focus was to identify and analyse previously reported cases, diagnostic algorithms, and surgical methods for combined hernias.

**Results:** The literature review confirmed the extreme rarity of combined paraoesophageal and Morgagni hernias, with fewer than 10 documented cases identified in the international literature over the past 20 years. Analysis of these reported cases, alongside our own, reveals that the clinical presentation is highly variable and nonspecific, often comprising a mix of gastrointestinal, respiratory, or cardiovascular symptoms. Despite this variability, a common finding across all reviewed cases was the feasibility of a single-stage surgical correction. Specifically, the reviewed cases consistently demonstrate that a laparoscopic approach for the simultaneous repair of both hernia types is technically achievable and is associated with favourable short-term outcomes, including the absence of major intraoperative complications and rapid postoperative recovery, when performed by experienced surgeons.

**Conclusion:** Laparoscopic correction of combined diaphragmatic hernias represents a safe and effective treatment method. The application of minimally invasive technologies enables optimal outcomes in rare and complex forms of diaphragmatic pathology.

visualisation of the stomach's position, the contents of the hernial sac (omentum, colon), the degree of mediastinal displacement, and any signs of ischemia or perforation.<sup>[2,3,8,30,31]</sup> For the combined pathology suspected in our case, CT was essential in confirming the presence of both defects. Upper gastrointestinal endoscopy is crucial for detecting erosions, strictures, or signs of ischemia within the herniated stomach and for ruling out other oesophageal pathology.<sup>[2,8,16]</sup> Chest radiography has limited sensitivity (60–70%) and often shows only nonspecific findings, such as a retrocardiac air-fluid level or mediastinal opacification.<sup>[32,33]</sup> If synchronous hernias are suspected, a multimodal approach (CT and endoscopy) is recommended to minimise diagnostic errors and allow for timely planning of surgical correction.<sup>[8,24,34,35]</sup>

### Treatment Strategy

The surgical strategy for this rare

combination requires a multimodal approach based on anatomical features and the risk of complications.<sup>[3,18,20]</sup> The current gold standard is a single-stage minimally invasive correction of both defects. The priority is simultaneous laparoscopic correction, including reduction of displaced organs, repair of the diaphragmatic defects, and an anti-reflux procedure.<sup>[19,20,36]</sup> For the hiatal hernia, the steps include complete sac excision, closure of the oesophageal hiatus (crurorrhaphy) with nonabsorbable suture material (with or without mesh reinforcement), and fundoplication (Nissen or Toupet) to prevent postoperative GERD.<sup>[10,21]</sup> The parasternal Morgagni defect is typically closed primarily or with mesh. Robotic surgery may be employed for giant hernias or complex anatomy, providing enhanced precision.<sup>[14,37,38]</sup> Postoperative management includes early mobilisation and a stepwise diet.<sup>[10,11,39]</sup> This algorithm, based on limited clinical data, highlights the need for



**Figure 2 (A, B, C) |** Native CT images of the chest in axial, sagittal, and coronal planes demonstrate a large diaphragmatic hernia with protrusion of abdominal cavity contents into the thoracic cavity.

further reports to optimise protocols.

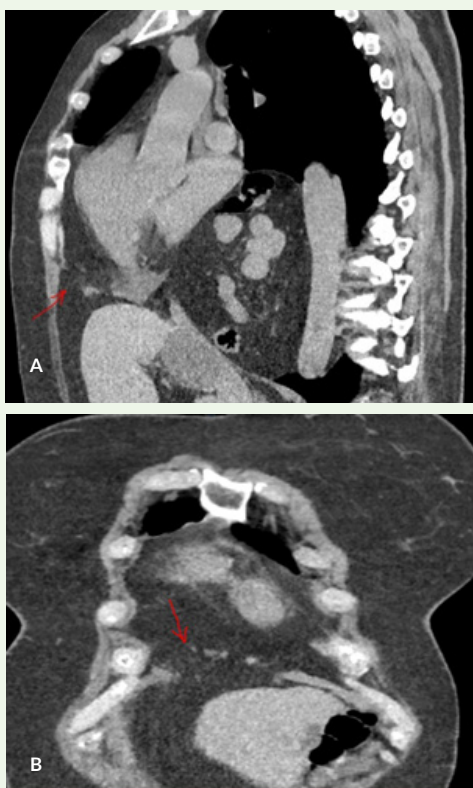
## CASE PRESENTATION

Patient X, a 56-year-old female, was admitted to the surgical department with complaints of intermittent discomfort in the epigastric region and progressively worsening exertional dyspnea that had developed over the past year. She had no history of smoking or significant alcohol consumption. Her past

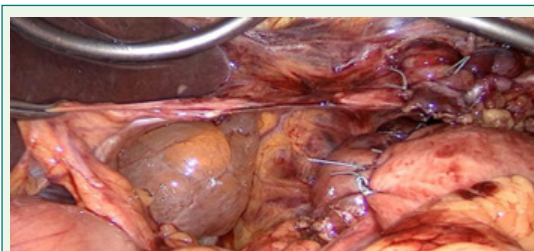
medical history was significant for well-controlled hypertension and mild obesity (BMI 32 kg/m<sup>2</sup>). She had no prior history of gastroesophageal reflux disease (GERD), chronic pulmonary disease, or abdominal surgeries.

The patient's dyspnea had been investigated by a pulmonologist and cardiologist to rule out primary cardiac or pulmonary causes. An echocardiogram showed normal left ventricular function with no evidence of valvular disease or pulmonary hypertension. Pulmonary function tests revealed a mild restrictive pattern, which was not typical for obstructive lung disease. A subsequent chest X-ray revealed an unusual retrocardiac air-fluid level, prompting a CT scan for further evaluation. Further investigation with CT of the chest and abdomen revealed two distinct findings: first, a large type III/IV paraesophageal hiatal hernia with prolapse of the stomach, colon, and omentum into the posterior mediastinum; and second, a Morgagni's diaphragmatic hernia through which omental fat was prolapsing into the anterior mediastinum (see **Figures 1 and 2**). These CT findings confirmed the diagnosis of combined hernias and explained the patient's symptoms—the epigastric discomfort from the hiatal hernia and the dyspnea from the cumulative mass effect of both hernias on the lungs.

The patient underwent elective laparoscopic surgery. The procedure comprised: laparoscopic reduction of the herniated organs, excision of the hiatal hernia sac, posterior crurorrrhaphy, and a Nissen fundoplication



**Figure 2 (A, B) |** Native CT images in frontal and sagittal planes demonstrate a Morgagni's diaphragmatic hernia (red arrow)



**Figure 4** | Intraoperative view of the formed fundoplication wrap following anterior and posterior crurorraphy. A cyst in the left hepatic lobe adjacent to the inferior vena cava is also noted.

(in the Chernousov modification) to prevent postoperative reflux and fix the stomach below the diaphragm. Intraoperatively, a Morgagni hernia was identified and repaired primarily using interrupted non-absorbable sutures. Given the identified simple cyst in the left lobe of the liver, it was deroofed, and its capsule was partially excised (see **Figure 3**). Drainage of the abdominal cavity was performed.

**Surgical Technique:** Laparoscopic access to the abdominal cavity was established. Intraoperatively, a large defect of the oesophageal hiatus was identified, through which a large hernial sac prolapsed into the thoracic cavity within the paraesophageal space into the posterior mediastinum and lower parts of the thoracic cavity, extending almost to the costophrenic sinuses.

The contents of the hernial sac included fat from the lesser and greater omentum, loops of small intestine, the transverse and descending colon with its splenic flexure, the stomach, and the duodenum. The abdominal organs were reduced into the abdominal cavity. The oesophagus was noted to be shortened, and

its abdominal portion was absent. The course of the oesophagus was traced using a thick 36 Fr nasogastric tube; the tube was guided instrumentally through the oesophageal curves into the gastric lumen. The oesophagus was dissected free from the descending thoracic aorta and the highly positioned pleural sinuses to achieve adequate intra-abdominal length. The stomach and gastroesophageal junction were reduced to an abdominal position.

During surgery, a cyst in the left lobe of the liver, topographically related to the inferior vena cava, was identified. Complete evacuation of the cyst contents followed by excision of its capsular membrane was performed, as visualised in **Figure 4**.

Upon revision of the subxiphoid space, a diaphragmatic defect with prolapse of a parasternal lipoma into the anterior mediastinum was discovered. Excision of the lipoma followed by repair of the Morgagni hernia using autologous tissues was performed (**Figure 5**). Drainage of the abdominal cavity was performed at the final stage.

Postoperatively, the patient was monitored in the intensive care unit; the abdominal drain was removed on postoperative day 1. On postoperative day 2, oesophageal radiography with an oral water-soluble contrast agent was performed: the swallowing act was unimpaired, the oesophagus was patent throughout, no areas of narrowing or dilation were identified, cardia function was preserved, and contrast evacuation was unimpeded. No evidence of contrast extravasation was detected, and gastroesophageal reflux was absent. Given an



**Figure 5 (A, B)** | Identification of a Morgagni's diaphragmatic hernia was followed by meticulous dissection and complete excision of a parasternal lipoma from the anterior mediastinal compartment.

uncomplicated postoperative course and the absence of early postoperative complications (Clavien-Dindo grade I), the patient was discharged from the hospital on the fifth postoperative day.

## DISCUSSION

The presented clinical case demonstrates a rare combination of two distinct diaphragmatic pathologies: a large paraesophageal hiatal hernia and a Morgagni hernia. Such cases are extremely rarely described in the world literature, making this observation particularly valuable for surgical practice.<sup>[1,2,11]</sup> Our literature review confirms the scarcity of such reports, reinforcing the need to document management strategies and outcomes. The successful application of a single-stage laparoscopic approach to correct this complex combined pathology deserves special attention.<sup>[4]</sup> This approach enabled comprehensive treatment of both defects, addressing the patient's dyspnea and epigastric discomfort in a single intervention. As the intervention results showed, the laparoscopic technique allows all necessary stages of the operation: reduction of abdominal organs, excision of the hernia sac, repair of both diaphragmatic defects, and an additional unplanned intervention (deroofing of a simple liver cyst). The absence of intra- and postoperative complications confirms the safety and feasibility of this approach in carefully selected patients.<sup>[10,11,38]</sup>

An important aspect is the necessity for thorough preoperative diagnosis. In this case, computed tomography played a key role in identifying both hernia types, ruling out other mediastinal pathology, and precisely planning the surgical strategy. The patient's symptoms were successfully correlated with the imaging findings, and alternative cardiac and primary pulmonary causes were systematically excluded before surgery. Modern imaging methods allow for accurate assessment of anatomical features and the scope of the intended intervention.<sup>[13,16]</sup> The postoperative course confirmed the effectiveness of the chosen treatment method. The day 2 control

radiocontrast examination demonstrated the adequacy of the performed reconstruction and the absence of gastroesophageal reflux. The patient's early discharge (day 5) aligns with modern trends in enhanced recovery after laparoscopic interventions.<sup>[3, 18, 0]</sup> This observation underscores the importance of an individualised approach to treating complex and rare diaphragmatic hernias. The combined use of various surgical techniques (Nissen fundoplication, crurorrhaphy, and primary tissue repair) enabled optimal functional and anatomical outcomes.

## CONCLUSION

Large hiatal hernias combined with Morgagni's diaphragmatic hernia represent an extremely rare surgical condition. The laparoscopic approach in diaphragmatic hernia surgery is currently the gold standard and the method of choice for anti-reflux surgery combined with diaphragmatic hernia repair. As demonstrated in this case, a single-stage laparoscopic approach reduces hospital stay length and minimises postoperative complications. In the presented clinical example, the key principles of surgical treatment for diaphragmatic hernias were adhered to: atraumatic reduction of abdominal organs, elimination of gastroesophageal reflux via fundoplication, and anatomical reconstruction of both the oesophageal hiatus and the anterior parasternal defect, which is critical for a successful long-term outcome.

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**Abbreviations list:** Chronic obstructive pulmonary disease (COPD), Computed Tomography (CT), Diaphragmatic hernia, hiatal hernia (HH), Gastroesophageal Reflux Disease (GERD), Ischemic heart disease (IHD), Ultrasonography (US).

**Conflict of interest:** Authors have nothing to declare.

**Funding:** Nothing apart from personal fund.