

## Case Report

# Minimal Access Surgical Repair of Morgagni Hernia: The Fate of the Unresected Hernia Sac

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### ABSTRACT

**Treatment of retrosternal diaphragmatic (Morgagni) hernia is composed of a simple surgical closure of the retrosternal opening either conventionally by open abdominal or thoracic approaches, or more recently, by using minimal access surgery (MAS). Clinical experience using the latter approach is very limited in children. Removal of the hernia sac is a controversial issue, since the sac is said to carry the risk of cyst formation or show spontaneous resolution. This issue represents a 7-year-old boy with Morgagni hernia that was successfully repaired by the MAS approach. The hernia sac was not resected because of adhesion to the adjacent tissues. The patient was readmitted with fluid accumulation within the remaining sac 2 months after the operation. A complete spontaneous resolution was observed within 2 months under conservative follow-up. To our knowledge, the temporary complication described in this paper has not been published in the literature.**

### INTRODUCTION

**M**ORGAGNI HERNIA is the most common form of retrosternal insertion anomalies. It is quite an infrequent form of all surgically treated diaphragmatic hernias, bearing an overall incidence between 1% and 6%. It is mostly discovered incidentally but is more symptomatic in children than adults. Most published papers recommend surgical repair under elective conditions following the establishment of a diagnosis regarding the rare, but possible, risk of strangulation and incarceration.<sup>1-7</sup> Confirmation of the defect by computed tomography (CT) is recommended following an incidental diagnosis by a chest roentgenogram.<sup>1,4,6</sup> Treatment is composed of the simple surgical closure of the retrosternal opening either conventionally by open abdominal or thoracic approaches, or more recently, by using minimal

access surgery (MAS). The defect may be repaired by primary sutured closure, primary placement of a mesh, or by a combination of both.<sup>1,3,4,5,7</sup> A successful laparoscopic repair in a 7-year-old boy is reported in this paper, and the fate of the remaining hernia sac and management of its complication during the follow-up period is also reviewed.

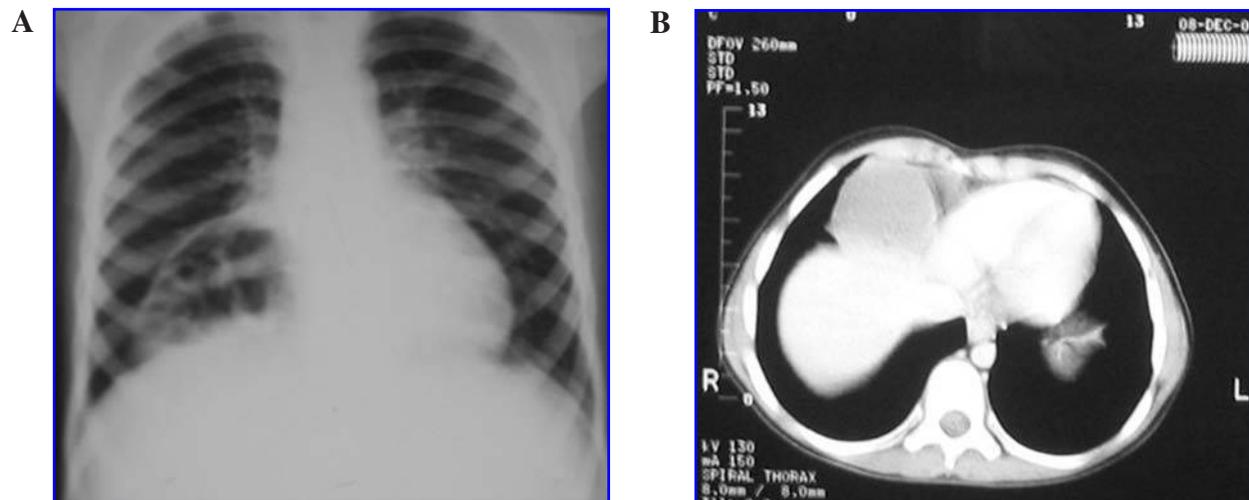
### CASE REPORT

A 7-year-old boy was admitted with an incidental diagnosis of Morgagni hernia. He had complaints of exercise-induced respiratory distress and fatigue. An anteroposterior and lateral chest roentgenogram revealed a right-sided hernia, showing intestinal segments in the anterior mediastinum with a mild mediastinal shift to the

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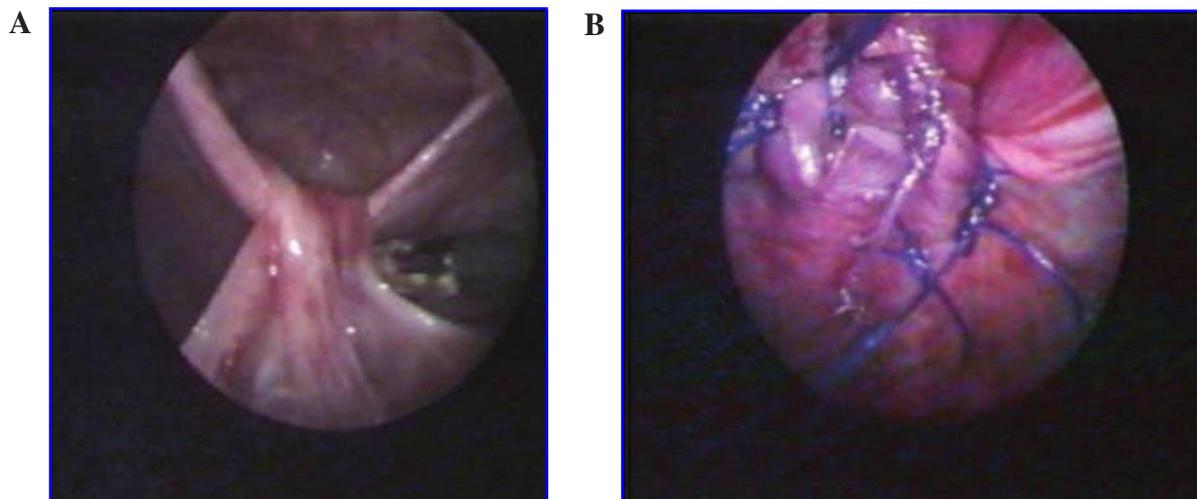
**FIG. 1.** A chest roentgenogram (anteroposterior view) reveals (A) a large right-sided diaphragmatic hernia with a shift of the mediastinum to the left side. (B) The presence of postoperative fluid collection is apparent 2 months later.

left. A CT scan confirmed the diaphragmatic defect, with multiple bowel loops and omental fatty tissue filling the anterior mediastinum (Fig. 1).

A 5-mm 0-degree telescope was introduced through an umbilical port by using the Hasson technique. The surgeon was positioned between the legs, with the first assistant stationed to the right. Under direct vision with the patient positioned in the reversed Trendelenburg position, an examination of the intraperitoneal cavity revealed a 4 × 5 cm right-sided diaphragmatic defect, which was posterolateral to the xiphoid process. Under gentle traction, the greater omentum and transverse colon were initially reduced with the help of a bowel grasper. The falciform ligament was taken down by using electrocautery

dissection. A trial of hernia sac eversion resulted in failure, and the sac was left *in situ* to avoid injury to the adjacent tissues.

An external hitch suture through the full thickness of the anterior abdominal wall, passing through the posterior rim of the defect and returning back out through the abdominal wall, was necessary to enable a safe repair. We managed to obtain a secure closure of the defect by using six interrupted synthetic 0 nonabsorbable sutures that were tied up intracorporally (Fig. 2). The hitch suture was removed following the closure of the defect, and port sites were closed in the usual fashion. Total operative time lasted 75 minutes, and the patient was discharged on the 3rd day after an uneventful recovery. He



**FIG. 2.** Intraoperative view of the retrosternal defect (A) before and (B) after complete closure.

was readmitted with complaints mimicking an upper respiratory infection after 2 months. A control CT scan showed extensive fluid collection within the remaining hernia sac but no evidence of recurrence (Fig. 2). A conservative follow-up as an outpatient was regarded as sufficient, as the patient had no signs or symptoms of infection or dysphagia. The fluid accumulation resolved spontaneously, leaving a small remnant of the sac at 4 months postoperatively (Fig. 3).

## DISCUSSION

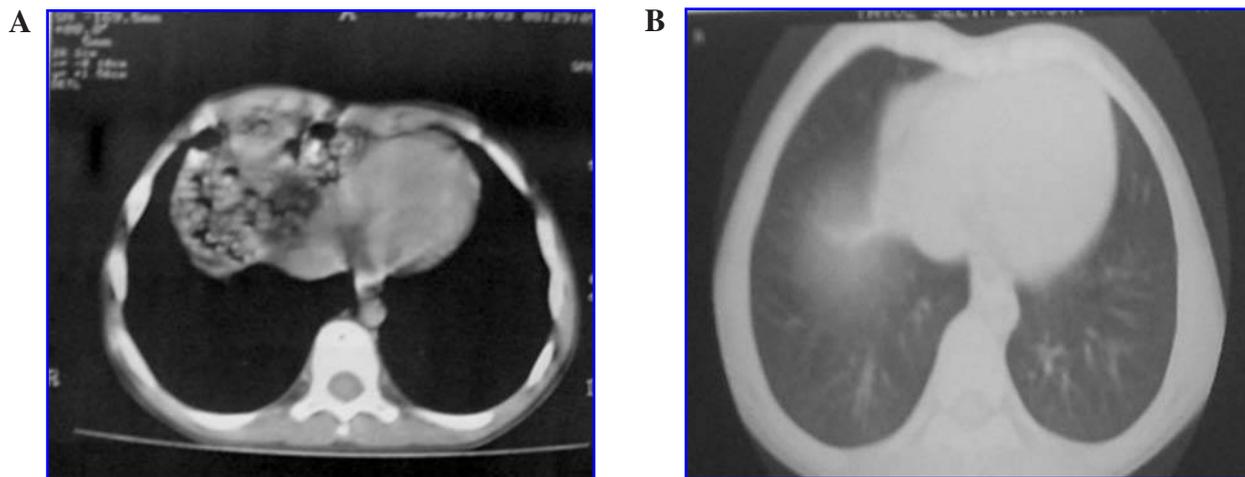
Foramen Morgagni (sternocostal hiatus) is a small anterolateral gap placed on each side of two muscular slips that are attached behind the xiphoid process. Failure of fusion of the sternal and crural portions of the diaphragm causes hernia formation.<sup>1</sup> A Morgagni hernia seldom causes symptoms such as vomiting, epigastric distress, coughing, and may be the cause for recurrent respiratory infections.<sup>1,5,6</sup> Symptoms may be episodic owing to a spontaneous reduction of herniated viscera. Any condition that increases intra-abdominal pressure may cause early clinical manifestations, especially in adults.<sup>4,7</sup> Asymptomatic patient will have a diagnosis established incidentally by chest radiography. Thorax CT or magnetic resonance imaging and upper gastrointestinal series not only confirm the diagnosis, but also establish the relationship of the sac with adjacent structures and give detailed information about the size of the defect.<sup>1,7</sup> A hernia sac is present in most cases, and omental content of the hernia sac is mostly diagnosed as an intrathoracic mass. A hernia must be confirmed by a barium enema in children and this may reveal the presence of malrotation and the type of organ filling the defect.<sup>1,3,5,6,7</sup> Our pa-

tient had no symptoms related to the hernia, and the chest roentgenogram showed the presence of retrosternal bowel loops, which were further confirmed by CT.

The difficult operative procedure in obese patients and better surgical view during the removal of pleural and pericardial adhesions of the sac have been reported in favor of a transthoracic approach.<sup>7,8</sup> Surgical intervention has been more recently carried out by the transthoracic or abdominal approach by using MAS.<sup>1,3-7</sup> The possible presence of bilaterality, malrotation, adhesions or congenital bands, acute infarction of viscus, or extensive pleural or pericardial adhesions are all regarded as relative contraindications for a transthoracic MAS approach.<sup>1,4,6,8</sup> The possibility of postoperative ileus, the need for a chest tube, and the morbidity of a formal thoracotomy must also be taken into consideration.<sup>3,6</sup> Technical advances have enabled this approach as a feasible, safe procedure in children.<sup>1,3,5</sup> We propose a controlled deflation of abdominal pressure during the suturing procedure, since the surgeon may miss the presence of an abdominal overdistension, which is actually beneficial during the initial exploration phase.

The choice of leaving the hernia sac in place is controversial, and the decision is left to the discretion of the surgeon. While some researchers advocate a resection to avoid the complications of a potential cavity, others prefer to leave it in place because of the risks, such as tension pneumothorax or pneumomediastinum, bleeding due to adhesions, and pleural or pericardial injuries that may complicate laparoscopy.<sup>1,4,6,7</sup> A trial of hernia sac eversion resulted in failure in our case; therefore, we had to leave the sac in place to avoid injury to the adjacent tissues.

An increased risk of cyst formation from the remaining intrathoracic sac has been emphasized by some researchers. There is no available literature to demonstrate that leaving a



**FIG. 3.** Computerized tomography of the sac obtained (A) before surgical intervention and after the resolution of fluid collection. (B) Note the small remnant of sac visible at the right anterior aspect of pericardium at the postoperative 4th month.

loculated space-occupying lesion in the chest might result in recurrence or cyst formation.<sup>1,2,4,5</sup> Liquid accumulation may occur as a result of overproduction of the peritoneal lining of the sac wall or backflow of abdominal peritoneal fluid through the interrupted suture line, in case of peritoneal inflammation during any infective process, such as upper respiratory tract infection. This process may resolve in time; moreover, spontaneous obliteration of the remnant sac is often expected. The collection in our patient disappeared spontaneously in 2 months without causing major complaints. We may conclude that this is mostly a benign process and our patient might offer clinical evidence regarding the aforementioned thesis of the fate of the remnant sac.

### CONCLUSIONS

We advocate for laparoscopic treatment as the preferred method as an efficacious, suitable, and safe procedure in children. Cosmetic results and a postoperative course are better than open surgery. Leaving the hernia sac *in situ* seems preferable, in spite of the risk of cystic formation, provided that these patients are screened by a serial chest roentgenogram until obliteration is evident.

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