

## CASE REPORT:

# TRANS-FASCIAL SUTURING TECHNIQUE FOR LAPAROSCOPIC REPAIR OF MORGAGNI HERNIA IN ADULTS

By

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## BACKGROUND

Morgagni hernia in adults are relatively rare. It was first described in the 1700s and is the least common type of diaphragmatic hernias, contributing only 1–6% of all diaphragmatic hernias (Mir et al., 2016). Is a rare condition and has a wide range of symptoms, and the diagnosis of Morgagni hernia may be difficult. Differential diagnosis consists of thoracic disorders such as mediastinal lymphoma, mediastinal masses, or pericardial cysts, diaphragmatic disorders such as fat pads, hiatal hernias, traumatic rupture, or neoplasms, and abdominal disorders including right hepatic lobe shrinkage (Ekici and Moray, 2015). Usually, Morgagni hernia is asymptomatic and discovered incidentally with chest X-ray done for other pathologies. The usual treatment may be an open approach via thoracotomy or by laparotomy (Shakya, 2015).

Many authors advice surgical repair for Morgagni hernia, even if they are asymptomatic. The main indications for an operation are the expected complication risks including incarceration or strangulation of hernia contents. This indication may be true for children and young patients, but older asymptomatic patients with a high American Society of Anesthesiologists Physical (ASA) status, who are at high risk for surgical and anesthetic problem may be subjected to a close follow-up (Ekici and Moray, 2015). Laparoscopy is an excellent way to confirm diagnosis and to repair non-complicated hernia of Morgagni (Jakhmola and Kumar, 2015).

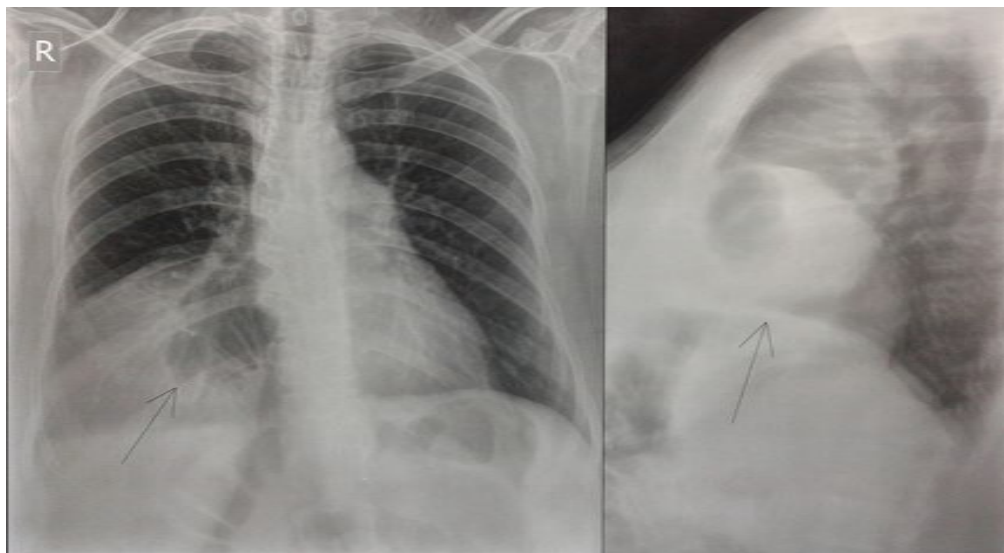
We report a 45 years old female patient with asymptomatic Morgagni hernia, which was successfully managed with laparoscopic hernioplasty.

## CASE PRESENTATION

We reported a 45 years old female patient with asymptomatic Morgagni hernia presented to out-patient clinic of the Gastro-Entrology Center in Damietta. She was presented with a retro-sternal chest pain, epigastric discomfort (not related to food, precipitated with lying down flat and relieved with passing stool or flatus) and dyspepsia. Also, there was dyspnea with effort.

Examination revealed decreased air entry at the base of right lung. Cardiologi-

cal examination was free. Hematological tests revealed no abnormalities. Chest X-ray was done for diagnosis. It revealed elevation of right copula of diaphragm, and there was gas shadows within the chest above the diaphragm (*Figure 1*). Ultrasonography showed that bowel loops were seen in the right para-cardiac region denoting diaphragmatic hernia i.e. Morgagni hernia. Chest and abdomen CT scan was done to confirm diagnosis; revealed anterior diaphragmatic defect about 10X5 cm with bowel loops above the diaphragm (*Figure 2*).



**Figure (1):** Preoperative chest X-ray, postero-anterior and lateral views, revealed bowel loops above the diaphragm.



**Figure (2):** Preoperative CT Scan, revealed diaphragmatic defect with bowel loops above the diaphragm with effusion and collapsed right lung (there is also right side post-nephrolithotomy incisional hernia).

Laparoscopic mesh repair was decided: Preoperative third generation cephalosporin was injected. Under general anesthesia, the patient was placed in the reverse Trendelenburg position. Open method was used to introduce the optical port above the umbilicus between upper two-thirds and lower one-third of a line from umbilicus to xyphoid process, then insufflating carbon dioxide to get abdominal pressure of 14 mmHg. Two acting ports, one 10 mm and the other 5

mm, were inserted in mid-clavicular lines in both sides above the level of optical port. Sub-xyphoid 5 mm port was inserted for assistance.

A 30-degree, 10-mm camera was used for visualization. After abdominal exploration, two defects were defined at both sides of the diaphragmatic retrosternal area, the right was larger one containing part of transverse colon and greater omentum, and smaller left one

containing part from greater omentum (Figure 3).

The herniated transverse colon and greater omentum were taken back into the abdomen after decreasing intra-abdominal pressure to 12 mmHg. The defects were repaired with a simple interrupted sutures technique using trans-fascial 0 polypropylene sutures with fascial closure instrument (Figure 4). The repaired defect was enforced with tension-free polypropylene mesh 7x15 cm, which was fixed with polygalactine sutures using fascial closure instrument and intra-corporal suturing (Figure 5).

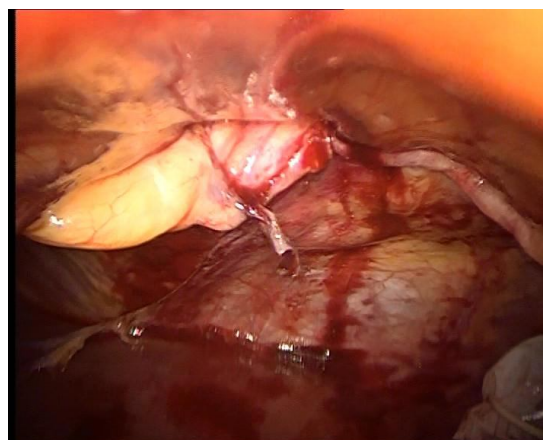
Closure of the port sites was done with sutures after insertion of tube drain which was removed 24 hours postoperative

(Figure 6). The time of operation was 125 minutes. An eight hours postoperatively, chest X-ray was done which revealed complete inflation of the right lung without complications (Figure 7). Also, forty-eight hours postoperatively, chest X-ray was done which revealed minimal right side pleural effusion. It was subsided spontaneously within one week postoperatively.

The patient was discharged from hospital four days postoperatively. The recovery was quick and uneventful, and she returned to normal daily activity ten days after the operation. She was symptom-free, no recurrence and had no complications during the one year follow-up period.



**Figure (3):** Morgagni hernia including part from transverse colon and greater omentum.



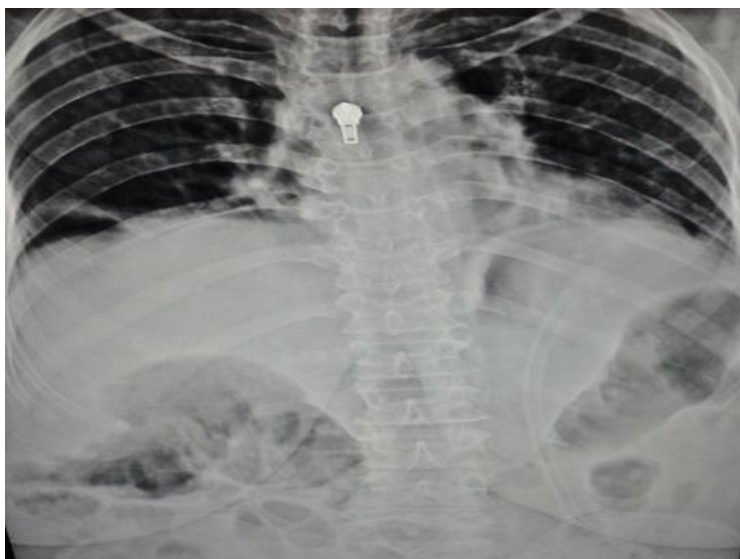
**Figure (4):** Morgagni hernia after closure of the defect with trans-fascial polypropylene sutures.



**Figure (5):** Polypropylene mesh was used to reinforce the repair.



**Figure (6):** Postoperative appearance of four port sites and tube drain.



**Figure (7):** Chest X-ray, postero-anterior view, eight hours postoperatively, revealed complete inflation of the right lung.

## DISCUSSION

The foramen of Morgagni is a space in the retro-xiphoid sterno-costal hiatus through which herniation of omentum, colon, stomach, or other viscera may occur (**Shakya, 2015**). Morgagni hernia is more common on the right side at the level of the seventh rib on either side of the xiphoid in a space where the superior epigastric vessels pass. Defects may also occur on the midline, or bilaterally (**Godazandeh and Farzad, 2016**).

Most patients with Morgagni hernia present later in life as a result of progressive changes in intra-abdominal pressure caused by pregnancy, obesity, trauma and attenuation of the diaphragm from aging. The paracardiac shadow is usually found incidentally on chest radiographs, index of suspicion should be high, and diagnosis can be established with CT scan or magnetic resonance imaging (**Shakya, 2015**).

The right treatment of choice is dependent on accurate diagnosis of Morgagni hernia. A Morgagni-Larrey hernia diagnosis can be made by an abdominal or chest X-ray and upper gastrointestinal series. CT scan is the preferred method for an accurate diagnosis in adults and children (**Minnecci et al., 2004**).

Many authors advice surgical repair for Morgagni hernia, even if they are asymptomatic. The main indications for an operation are the expected complication risks, including incarceration or strangulation of hernia contents. This indication may be true for children and young patients. But older asymptomatic patients with a high American Society of Anesthesiologists Physical (ASA) status, who are at high risk for surgical and anesthetic problem may be subject to a close follow-up (**Ekici and Moray, 2015**).

The main types of Morgagni hernia repair techniques: 1) open thoracic repair; 2) laparoscopic thoracic repair; 3) open abdominal repair; and 4) laparoscopic abdominal repair. Open thoracic repair is the traditional treatment for patients with Morgagni hernia. Open thoracic repair is reported to have favorable results, but also thoracotomy and single-lung ventilation are the major disadvantages of this technique (**Ekici and Moray, 2015**).

Laparoscopic thoracic repair of Morgagni hernia is effective as the open repair technique with extra benefits like; lower postoperative pain, shorter hospital stay, and lower morbidity rate. The thoracoscopic technique requires a mini-thoracotomy (3 - 5 cm) and two or three port placements. Single lung ventilation and a limited work area are the disadvantages of this technique. Moreover, it is difficult to expose both sides of the diaphragm, compared to the abdominal approaches (**Nakashima et al., 2011**).

Some authors advised a trans-thoracic approach as it provides a wide exposure and easy repair of the hernia sac. Other study included 16 patients managed with thoracotomy, all with smooth recoveries and no recurrence of symptoms. Some authors described a patient who had to undergo a second operation for intestinal obstruction after the initial thoracic procedure failed to diagnose bilateral hernia of Morgagni (**Loong and Kocher, 2005**).

Laparotomy has the advantage of exposure of both sides of diaphragm. Laparoscopic abdominal repair offers different advantages, including less pain than the above-mentioned three approa-

ches; it avoids single lung ventilation; provides a large abdominal space to work; and extremely good visualization of both the diaphragm and the abdominal organs. Smaller incisions in laparoscopy cause less complication, such as incisional hernias and wound infection (**Horton et al., 2008**).

The first reported laparoscopic repair for Morgagni hernia was in 1992. Since then, there have been 25 cases reported in the available literature: 21 adults and four children (**Loong and Kocher, 2005**).

The hernia sac can be easily viewed through the laparoscope. The hernia contents can then be easily reduced. The sac is usually not removed and the defect is closed with silk sutures and reinforced with a mesh stapled onto the diaphragm. Other advantages of laparoscopic repair are reduction in trauma, a faster recovery and faster return to normal diet and activity (**Loong and Kocher, 2005**).

However, there are some controversies regarding important aspects in the laparoscopic repair. One exists regarding the need for sac excision. There have been concerns against removal of the sac as this may result in massive pneumomediastinum and damage to the pericardium or mediastinal structures may occur during the dissection of the sac, which are life threatening (**Shakya, 2015**).

Another controversy exists whether prosthetic material should be used or not. In Morgagni hernia, the diaphragmatic musculature is weak and attenuated. Therefore, use of a suitable prosthesis would help in decreasing the recurrence, which may be possible with primary repair. Though in the literature, no patients with primary repair have had

recurrences, still no long-term clinical or radiological follow-up has been recorded in these studies (**Godazandeh and Mortazian, 2012**).

Since Nineteenth, the use of a prosthetic mesh is becoming more popular. If the defect is small, it can be easily sutured. A mesh overlapping the edges of the defect can be easily manipulated with laparoscopic instruments and it provides a good tension-free repair (**Ekici and Moray, 2015**).

**Godazandeh and Farzad (2016)** concluded that Morgagni hernia must be a differential diagnosis of persistent GI symptom. Their experience and the review of the literature 4 Case Reports in Surgery indicate that laparoscopic repair of the Morgagni hernia is a safe approach and hernial sac can be excised or left in situ.

In our case study, we consider a simple chest radiograph is most-likely to reveal an asymptomatic hernia of Morgagni when done for unrelated problems and the diagnosis was confirmed with CT scan. We think when investigations are non-diagnostic; confirmation by laparoscopy may be needed. Follow up after operative repair can be done clinically and with a chest radiograph.

Although the operative time was long (125 minutes), it will be reduced with increased experience and raised learning curve with such cases. We didn't remove the sac to avoid postoperative respiratory complications. It is better to close the defect before application of the mesh to prevent recurrence of hernia, as it act as anatomical barrier against the negative intra-thoracic pressure.

We found that, laparoscopic repair of Morgagni hernia have many advantages; as it is diagnostic when there is doubt, less traumatic to tissues, with good exploration of the abdominal cavity and hernia contents, permits easy reduction of the contents, in addition to feasibility of closure of the defect and application of mesh. Also, there is no incidence of incisional hernia or wound infection, and finally rapid recovery of the patient and early return to work.

We concluded that, chest radiograph can diagnose asymptomatic Morgagni hernia. It is not advisable to remove the hernial sac. Closure of the defect before application of the mesh is better to prevent recurrence. Laparoscopic hernioplasty for Morgagni hernia is feasible and give favorable results.

## REFERENCES

1. **Ekici Y and Moray G (2015):** Laparoscopic Mesh Repair of Giant Morgagni-Larrey Hernia with Three Ports: A Case Report. *J Minim Invasive Surg Sci.*, 4(3): e30212.
2. **Godazandeh G and Farzad M (2016):** Laparoscopic Repair of Morgagni Hernia: Three-Case Presentation and the Literature. *Case Reports in Surgery*, Volume 2016, Article ID 4268539, 4 pages.
3. **Godazandeh G and Mortazian M (2012):** Laparoscopic repair of Morgagni hernia using polyvinylidene fluoride (PVDF) mesh. *Middle East J Dig Dis.*, 4:232–235.
4. **Horton JD, Hofmann LJ and Hetz SP (2008):** Presentation and management of Morgagni hernias in adults: A review of 298 cases. *Surg Endosc.*, 22(6):1413–20.
5. **Jakhmola CK and Kumar MV (2015):** Laparoscopic mesh repair of Morgagni hernia in an octogenarian patient: Case report. *Medical Journal Armed Forces India*, 71: 79-81.



6. **Loong TP and Kocher HM (2005):** Clinical presentation and operative repair of hernia of Morgagni. *Postgrad Med J.*, 81:41–44.
7. **Minnecci PC, Deans KJ, Kim P and Mathisen DJ (2004):** Foramen of Morgagni hernia: Changes in diagnosis and treatment. *Ann Thorac Surg.*, 77(6):1956–9.
8. **Mir IS, Mudasir FH, Shiekh V, Tajamul R and Suhail N (2016):** Laparoscopic repair of adult retrosternal morgagni hernia with interlocking barbed suture. *Int Surg J.*, 3(3):1697-1699.
9. **Nakashima S, Watanabe A, Hashimoto M, Mishina T, Obama T and Higami T (2011):** Advantages of video-assisted thoracoscopic surgery for adult congenital hernia with severe adhesion: Report of two cases. *Ann Thorac Cardiovasc Surg.*, 17(2):185–9.
10. **Shakya VC (2015):** Simultaneous laparoscopic management of Morgagni hernia and cholelithiasis: Two case report. *BMC Research Notes*, 8:283.

## إصلاح فتق مورجاني وتركيب شبكة بالمنظار الجراحي عن طريق أخذ غرز جراحية خلال أغشية جدار البطن في البالغين

أيمن علوان- جمال المعداوي- محمد أبو ميرة- نجاح سالم- المتولي رجب- محمد خليفة

قسم الجراحة العامة- كلية طب الأزهر

يعتبر فتق مورجاني من الأنواع القليلة ويمثل 1-3% من أنواع فتق الحجاب الحاجز. ويمثل المنظار الجراحي طريقة ممتازة للتشخيص والعلاج لفتق مورجاني الغير مصاحب بمضاعفات.

وحالة البحث مريضة عمرها 45 عام ، وكانت الشكوى من ألم خلف عظمة القص مع ضيق في التنفس، وأظهر فحص القلب خلوها من إعتلال القلب ، وتم عمل اشعة عادية ومقطعية التي أظهرت فتق مورجاني الذي تم التعامل معه ، ووضع شبكة بنجاح عن طريق منظار البطن الجراحي.

وخلص البحث إلي أن إصلاح فتق مورجاني وتركيب شبكة عن طريق منظار البطن الجراحي ممكن ومتاح و نتائجه مشجعة.