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Laparoscopic Repair of Morgagni and Larrey's Hernia, a Rare Presentation: A Case Report and Review Literature

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Abstract

Introduction: The Morgagni hernia is one of the rarest hernias, with the overall incidence rate of 3% of all the diaphragmatic hernias. Laparoscopic repair has proved to be successful in the repair of this hernia. The minimal access surgery entails the benefits of the early ambulation and less necessity of analgesia with early postoperative recovery. The defect closure can be done with primary closure or using the prosthetic mesh which may be composite or polypropylene. The recurrence rate is not yet exactly known in cases of primary repair. Some studies favor the use of prosthetic mesh in all the cases of diaphragmatic mesh repair.
Case Presentation: A 75 year old lady presented with complaints of abdominal pain for 4 to 5 months and vomiting for 1 month along with a history of intermittent fever. Physical examination revealed tenderness in the epigastrium. She was resuscitated and posted for the laparoscopic diaphragmatic hernia repair with prosthetic composite mesh placement.
Conclusions: The Morgagni hernia repair with minimal access surgery may be a boon in the surgical field. This is a rare case of hernia in both the Morgagni's and Larrey's space, demonstrating all the benefits of minimal access surgery. Further randomized control trials may be needed to prove the exact advantages of minimal access surgery vs open surgery.

Keywords: Case Report, Diaphragmatic Hernia, Laparoscopic Repair, Morgagni Hernia

1. Introduction

Congenital diaphragmatic hernia is the rare disorder, which includes the Bochdalek hernia, esophageal hiatus hernia and Morgagni hernia. The commonest type of congenital diaphragmatic hernia are Bochdalek which could be seen among the infants. The Morgagni hernia presents as defect in the anterior and medial part of the diaphargm. Giovanni Battista Morgagni, was the first anatomist from Italy who reported the defect in cadavers in 1769. Later in 1828, Larrey devised the surgical approach to pericardial sac through the same triangular defect which was on the left side of the triangular defect.

The defect occurs due to non-fusion of anterior pleura peritoneum and deficiency in the process of muscle formation. This hernia is caused by the retrosternal space, with the incidence rate of about 1 - 3% (1-3).

Most of the Morgagni Hernias are congenital but there are some reported cases with the previous normal X-rays, where the hernia occurred in the later stage of life through previous defects in the diaphragm.

Morgagni hernia can occur on both sides which is rare, and the more common one is on the right side mostly occurring at the level of 7^{th} rib. The superior epigastric artery passes in the retrosternal space. The defect on the left side is called Larrey's hernia. The right sided defect occurs in 90% of cases whereas left sided defect occurs in 8% patient and the bilateral one occurs in 2% of patients (2).

Mostly half of these patients are asymptomatic. In these cases the diagnosis is made by the routine chest radiogram.

The symptom of the patients vary according to the size and content of hernia. Mostly the patient presents with the symptoms of nausea, vomiting, recurrent chest infection and chest pain (3).

Other complications include the intermittent volvulus of the stomach, incarceration and strangulation of the bowel. In all cases of diaphragmatic hernia surgery must be done.

We here present a rare case of bilateral retrosternal hernia. The incidence rate of this type of hernia is less than 2%

of all diaphragmatic hernias. The patient had atypical presentation of gastric outlet obstruction with fullness in the epigastrium relieved on vomiting (4). Laparoscopic repair of the hernia defect was done using composite mesh.

2. Case Presentation

A 75 year old lady presented with complaints of abdominal pain for 4 to 5 months and vomiting for 1 month. She had a history of intermittent fever. On examination she had tenderness in the epigastrium region. Along with the above complaints she suffered oliguria proceeding to an anuric state 7 days back for which catheterization was done outside. She had been managed conservatively and the urine volume was restored and urea and creatinine levels which were high initially, (16/05/17: urea - 105 mg/dL, creatinine - 4.9 mg/dL) improved considerably over two days (18/05/17: urea - 82 mg/dL, creatinine - 0.9 mg/dL).

Various necessary investigations were done. Initial lab test showed Hb of 10.8 g/dL, TLC of 6990 g/μL, Total protein of 6.6 g/dL and Albumin of 3.2 g/dL. Right lateral chest X-ray revealed colonic haustration. She had left ventricular ejection fraction (LVEF) of 70%; however USG of Whole abdomen (19/05/17) revealed a normal study. CT chest and abdomen (20/05/17) revealed herniation of antrum of stomach, first part of duodenum, hepatic flexure and major part of transverse colon through right anterior paramedian part of the diaphragm along with large amount of adjoining fat with obstructive dilatation of gastric lumen proximally. There was a small hernia on left side in the diaphragm in left anterior paramedian position containing fat and small part of transverse colon.

Day 1 of admission - She was advised liquid diet. Arachitol, Thiamine and Neurobion injection prescribed. Then after she was started on duolin nebulisation and low molecular weight heparin (LMHW). Finally blood sample was sent for coagulation profile and viral serology.

Day 2 of admission - She continued to have multiple episodes of vomiting, therefore Ryle's tube was inserted which lead to approximately 1000 mL of aspiration. Postassium replacement with serum electrolyte monitoring was done.

Day 3 of admission - Around 5000 mL bilioius aspiration was done through Ryle's tube over 24 hours and simultaneously intravenous potassium supplementation performed. Serum electrolyte disturbance was balanced. Patient was posted for operation theatre next day.

Day 4 of admission - Patient was taken up for surgery. After CECT abdomen (which was suggestive of stomach and transverse colon herniation in the retrosternal area. Laparoscopic mesh hernioplasty done for bilateral Morgagni's and Larrey's hernia. Ports were placed after creation on pneumoperitoneum using veress needle. Bilateral retrosternal defect in diaphragm Rt » Lt with part of stomach, duodenum (proximal first part) (Figure 2), transverse colon (Figure 3), hepatic flexure and omentum as part of contents were noted. Division of falciform ligament with adhesiolysis were done around the neck of hernia and the contents were reduced. The dissection around the neck of the sac was difficult as the content of the sac was densely adherent to the surrounding .We found a plane that opened up after dividing the falciform ligament. The adhesions around the neck were divided by using ultrasonic blade. Care was taken to keep the active blade away from the bowel and liver. After dividing these adhesions, whole contents of hernia were easily reduced. The hernia sac was taken out and Composite mesh of size15$\times$10 cm (Ventralight ST mesh) was fixed on muscle of diaphragm and anterior abdominal wall bridging the defect. 2 - 0 ethibond & 1 - 0 prolene over anterior abdominal wall (transfascial stitches) and absorbable tackers (Figure 4) was applied. Jackson Pratt drain was kept in the pouch of Morrison. Haemostasis was achieved considerably. Postoperatively, patient was shifted to ICU for proper monitoring and a bedside chest X-ray was advised.

Day 5 of admission - After the time that Patient was found to be hemodynamically stable, chest physiotherapy with spirometery was initiated. Abdomen was soft non tender and bowel sounds were present.

Day 6 of admission - Ryle's tube was omitted and patient was started on clear liquids after that patient was transferred to HDU.

Day 7 of admission - Drain and catheter was omitted also IVF was stopped. Soft diet was started which the patient tolerated well. At the end of the day blood was sent for sodium and potassium level exam.

Day 8 of admission - Patient discharged after checking the blood electrolyte level.

Follow up for six month was done. Endoscopy was performed during the period of follow up, which was normal.

3. Discussion

The first Morgagni hernia was described by Giovanni Battista Morgagni in the year of 1769, who was an Italian anatomist and who anatomist performed postmorten on the patient of head injury and found herniation of the bowel in the retrosternal region. Congenital failure of fusion of septum Transversum in diaphragm with the costal arches is the rare casue of retrosternal Hernia of Morgagni. The defect in retrosternal hernia mostly occurs at 7th rib level on the both sides of the xiphoid process. Here the superior epigastric arteries pass. Similar defect can also detected on the left side. The defect on the right side is

Table 1. Patient Timeline

Day of Admission	Intervention	Result
1	Arachitol 6,00,000 unit i.m, Thiamine, Neurobion; Nebulisation with Duolin, and started the low molecular weight heparin	General weakness improved.
2	Ryles tube insertion	Decompressed stomach; Decreased abdominal distention
3	Electrolyte replacement	Correction of hypokalemia
4	Taken up for surgery; Repair of Morgagni and Larrey's hernia with mesh hernioplasty done	Symptom of vomiting relieved; Abdominal distention relieved
5	Electrolyte checked; Ambulate out of bed; Chest physiotherapy and spirometery started	Better
6	Ryles tube removed; Orally liquid diet started	Better, all previous symptom relieved
7	Soft diet started; Catheter out; i.v fluid stopped	Tolerated the diet; Better
8	Discharge	Discharged in stable condition
6 month	Endoscopy	Normal

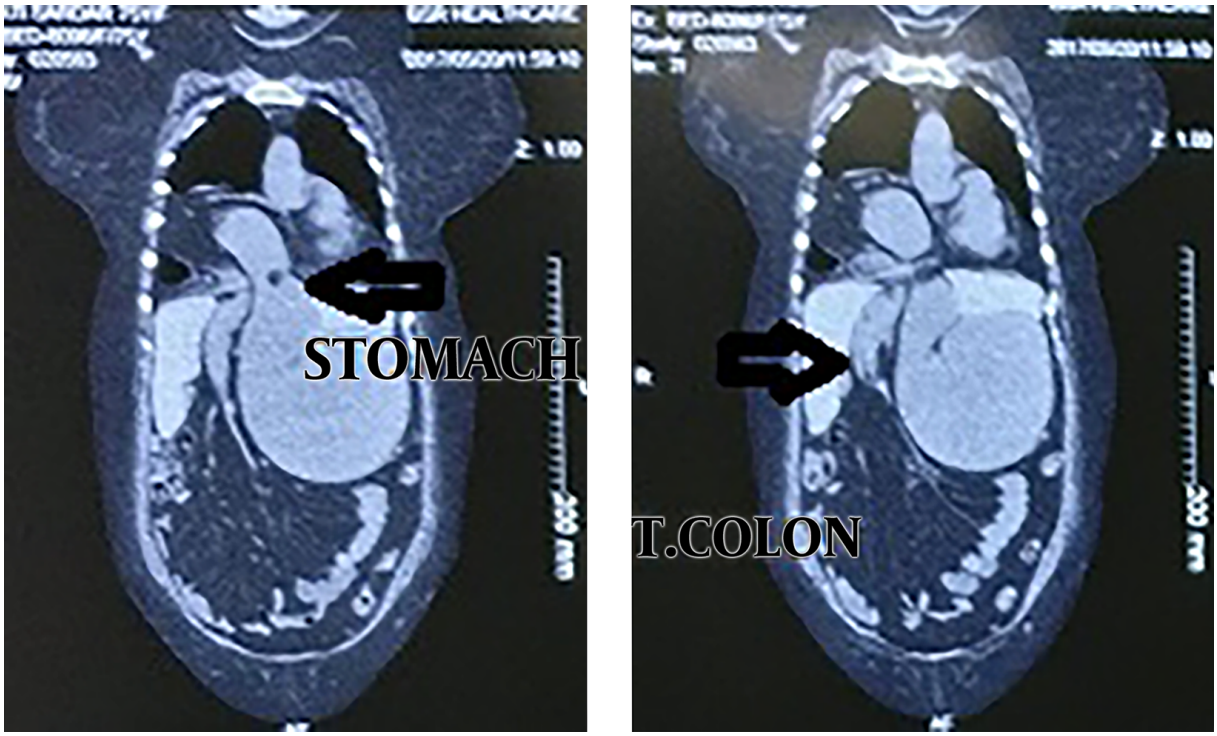

Figure 1. CECT abdomen suggestive of herniation of stomach and transverse colon in defect

called Morgagni Hernia and on the left named as Larrey's Hernia. Most of the presentation is asymptomatic with vague symptoms of indigestion and nonspecific respiratory symptoms. Other differential also include cystic lesion arising from the pleuropericardium, pleural mesothelioma, pericaridal fat pad, tumors arising from the anterior chest wall, thymus, and mediastinum (2).

Morgagni Hernia may be associated with some of the inheritable condition like Down syndrome, pentalogy of Cantrell, Noonan syndrome, turner syndrome (5).

The progressive age can cause the weakness of the diaphragm and the increase in pressure of abdomen during the pregnancy, trauma and obesity may attribute to the Morgagni hernia. Mostly the patient don't have any symptom and some time the presentation may be breathlessness due to the respiratory compromise and pleural infec-

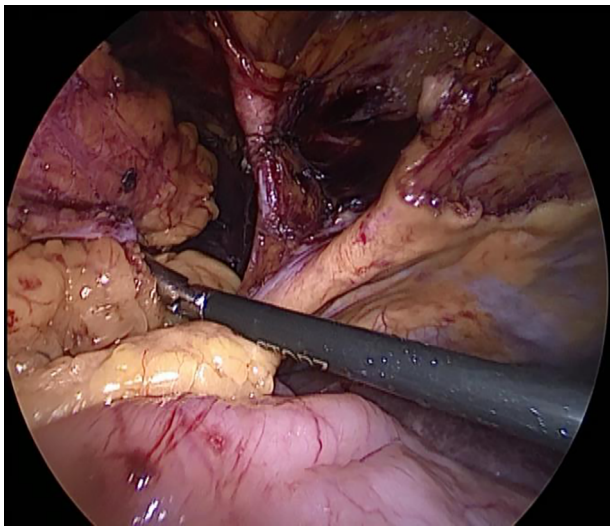

Figure 2. Stomach in Morgagni hernia

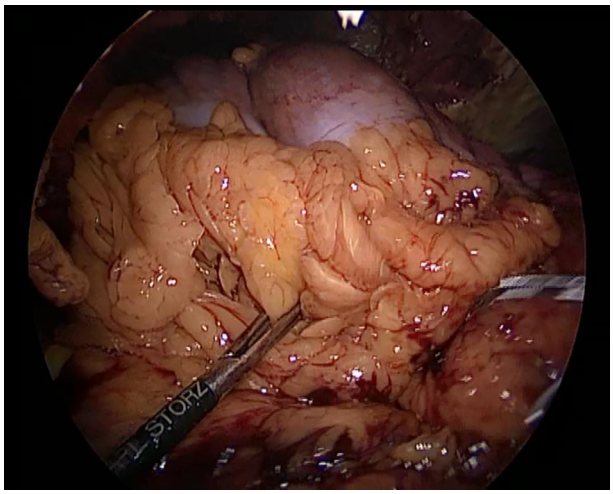

Figure 3. Colon in hernia sac being reduced

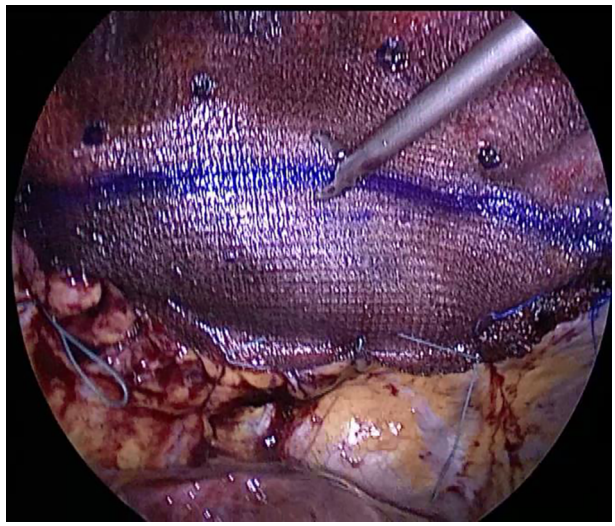

Figure 4. Mesh fixation polypropylene mesh with transfacial sutures, absorbable tackers, and ethibond continuous sutures

tion (6). The number of cases of Morgagni hernia may be much more than in the recent literature as most of these are asymptomatic.

Diagnosis require chest X-ray PA view and lateral chest X-ray, besides CECT scan and MRI scan are more specific. Surgical treatment is advised even for the asymptomatic cases as there is risk of either intestinal incarceration, strangulation.

As a matter of fact, our patient was a high risk patient, considering age and general condition, however surgical intervention was indispensable. Open repair of the Morgagni hernia can be established via abdominal and thoracic approach. The minimally access technique using laparoscopy will minimize the postoperative pain and ensure the early mobilization of the patient, also decreasing the morbidity of open surgery.

The transabdominal approach is preferred as it results in easy reduction of the content in case of bilateral hernia. In this situation, the hernial contents are reduced to anatomical position in the abdomen. Sometimes the hernial sac can be dissected followed by excision, and closure of the defect with non-absorbable nylon suture in interrupted fashion. Paris et al. performed the excision of sac by extraperitoneal and preperitoneal subxiphoid approach which allows the dissection of sac from the pleura (7).

The transthoracic approach which was defined by Chin and Duchesne (8), provided wide exposure and easy repair. Kilic et al. performed thorocotomies on 16 patients for the repair of Morgagni hernia with no recurrence rates (9). Thorocotomy was indicated in nonconclusive cases.

There is still controversy regarding the excision of the sac and also about the use of Prosthetic mesh. Primary suture repair of the defect is depended on suitable quality of tissue. The weak diaphragmatic musculature may lead to some difficulties in repairmen. This is the reason that even if the defect is closed primarily the suture closure should be reinforced with mesh. Composite mesh is preferred of the normal polypropylene mesh.

Kuster et al. in 1992 became the first person to perform the Morgagni hernia repair by laparoscopy. Laparoscopy plays an effective role to confirm diagnosis and repair her-

nia of Morgagni. The hernia sac was dissected by using laparoscope. Its content was reduced by dissecting around the sac and dividing the adhesions. In this surgery the sac was not removed and closure of defect was done by using non absorbable suture. This was strengthened by placing the Prosthetic mesh over the closure site. This minimal access technique of laparoscopic repair provide the advantage of fast recovery for the patient (10). The procedure is safe in children who present with this problem that has not been diagnosed on CT scan.

In a review literature 44 patients had Morgagni hernia which was operated upon laparoscopically. Most of the patients had transverse colon as the content up to 80%, followed by omentum (13%), and few cases had small intestine (5%), stomach, round ligament and liver in less than 3% cases.

Excision of the sac provides the advantage of reduction of tissue trauma and decrease in visceral injury. It also decreases the chances of seroma formation as the serous membrane is stripped off. Furthermore the chances of recurrence is also declined in this situation.

Previous studies reported that early reherniation does not occurs in cases where hernia sac was excised in paraesophageal hernia (11). Retro Xiphoid Sternocostal hiatus defects can be successfully repaired with Laparoscopic technique of herniorraphy (11).

3.1. Conclusion

Presentation of adult patient with both Morgagni and Larrey's hernia is rare and would be asymptomatic for long time. Also the herniation of stomach with large intestine in the sac is rarely encountered. The diagnosis can be confirmed by contrast studies or laparoscopy. The latter one provide both the diagnostic along with therapeutic benefits. Furthermore, minimal access approach gives all the benefits of early recovery, less wound infection, less need of analgesia and early discharge. The visualization is good with the laparoscopic approach. Still further randomized trial is needed to compare the effectiveness of open vs laparoscopic approach.

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