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Diaphragmatic hernia in adults - A clinical profile and management in a tertiary Centre

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Abstract

Diaphragmatic hernia (DH) is a herniation of abdominal structures into the thoracic cavity through a diaphragm atic defect. DH is primarily divided into congenital and acquired form.

Traumatic diaphragmatic hernia (TDH) is uncommon and often obscured by multiple associated injuries, posing a diagnostic and therapeutic challenge. Diaphrag Matic injury should be suspected in all patients with penetrating and blunt chest and abdomen injury.

Al though not immediately life-threatening, diaphragm a tic rupture can have serious long-term con sequences if left untreated. Although un common, congenital dia phragma tic hernia (CDH) can also be present in adults and is frequently misdiagnosed or overlooked.

Because surgery is the primary treatment for DH, pre operative imaging of the diaphragmatic defect, hernia content, and associated complications with other organ pathologies is critical.

A hospital-based observational study of DH patients admitted in the General Surgery, and the CTVS depart ment of Assam Medical College and Hospital (AMCH) from January 2021 to May 2022 was included. Data was collected through a detailed history and clinical examination.

All patients underwent radio logical evaluation followed by surgery, post-operative period and follow-up till six months was recorded.

A total of 9 cases were studied. Six of them were TDH, one each of Morgagni's hernia (MH), Para esophageal

hernia (PEH) and eventration of the diaphragm (ED). The mean age of patients included in the study was 42.11 years, 7 were male and 2 females. All patients under went surgical repair and had good post operative recovery.

Diagnosis of diaphragmatic hernia is sometimes overlooked. The CT scan is the most effective diagnostic tool.

When a TDH is diagnosed, emergency surgical repair is the mainstay of treatment. The surgical approach chosen is heavily influenced by associated injuries and trauma-related syndromes. The abdominal route may be used for suspected abdominal injury.

Keywords: Morgagni hernia, Para esophageal hernia, Eventration of diaphragm, thoracotomy, laparotomy, laparoscopy

Introduction

Diaphragmatic hernia (DH) is a herniation of abdominal structures into the thoracic cavity through a diaphragm atic defect. DH is primarily divided into congenital and acquired form.[1]

The overall incidence of diaphragmatic injury in blunt trauma is 0.8-5.8%, and it is around 17% in thoraco-abdominal-penetrating trauma.[2,3]

Traumatic diaphragmatic hernia (TDH) is uncommon and often obscured by multiple associated injuries, posing a diagnostic and therapeutic challenge.

Diaphrag Matic injury should be suspected in all patients with penetrating and blunt chest and abdomen injury.[4] Although not immediately life-threatening, diaphragm a tic rupture can have serious long-term consequences if left untreated.

Al though uncommon, congenital diaphragmatic hernia (CDH) can be present in adults and is frequently mis diagnosed or overlooked.

Because surgery is the primary treatment for DH, pre operative imaging of the diaphragmatic defect, hernia content, and associated complications with other organ pathologies is critical.

Materials and method

A hospital-based observational study of DH patients admitted in the General Surgery, and the CTVS department of Assam Medical College and Hospital (AMCH) from January 2021 to May 2022 was included. Data was collected through a detailed history and clinical examination.

All patients underwent radiological evaluation followed by surgery, post-operative period and follow-up till six months was recorded.

Results and discussion

A total of 9 cases were studied. Six of them were TDH, one each of Morgagni's hernia (MH), Para esophageal hernia (PEH) and eventration of the diaphragm (ED). The mean age of patients included in the study was 42.11 years, 7 were male and 2 females.

All patients under went surgical repair with good post operative recovery and no recurrence during 6 months follow up period.

There were 6 TDH cases, of which 4 were due to road traffic accidents and 2 cases of fall from height. There were no penetrating DH cases. All cases were male patient with mean age of 37.5 years. The injury primarily affects males (male: female = 4:1) in their third decade of life and is frequently caused by blunt trauma (75%).[5]

Respiratory distress and chest pain were the most common presentation followed by decreased breath sound on affected side and abdominal pain.

All the cases were on the left side. When the tear is caused by blunt trauma, it affects 75% of patients on the

left side, 23% on the right side, and 2% on both sides.[6]It could be because the liver protects the right side.

TDH tears are difficult to diagnose in an emergency setting with available diagnostic tools unless they are ac companied by intra - abdominal herniation. US (ultra-Sono graph) may be used for evaluation of the diaphragm and associated injuries of abdominal organs.[1]

Incorrect diagnosis is frequently caused by incorrect interpretation of the chest X-ray or by intermittent hernial symptoms.[7]

Despite its limitations, chest x-rays are still used to diagnose diaphrag matic injuries. CT has a sensitivity of 71% (78% on the left and 50% on the right) and a specifi city of 100%.[8]

Figure 1: radiological investigations showing presence of bowel in the thoracic cavity

Five cases were acute (three thoracotomies, two laparo to mies), and one patient was delayed presentation, who underwent a thora coabdominal approach.

The surgical approach chosen is heavily influenced by associated injuries and trauma-related syndromes.[9] The stomach, omentum, small intestine, colon, and spleen were among the hernial contents.

After reducing the herniated organs, the diaphragmatic defect was repaired with non-absorbable suture and mesh reinforcement (figure 2).

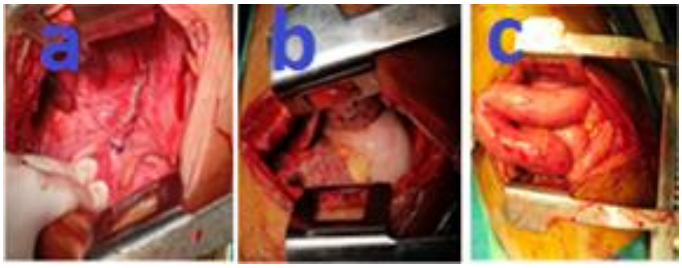

Figure 2: Intraoperative findings: a) primary repair of the diaphragmatic defect. B and c) Bowel loops in the thoracic cavity.

Laparotomy is the best mode of diaphragmatic repair in cases of acute herniati on caused by abdominal trauma. It permits concomitant treatment of any intra-abdominal injuries, and the reduction of acutely herniated viscera can be easily undertaken by this approach.

A thoracotomy approach is likely indicated for patients with significant hemothorax and continuing blood output from a chest tube, and the diaphragm can be easily repaired through this approach. Patients with significant intra-abdominal and intrathoracic bleeding can be treated with a thoracoabdominal approach, though this slightly increases the procedure's morbidity.

A thoracic approach is frequently considered optimal for patients with delayed rupture.

Abdominal viscera in the chest frequently causes significant adhesions to intra thoracic structures, which can be difficult to remove from an abdominal app roach.[10]

Case

A 30 years old female presented with dysphagia, intermittent epigastric pain, early satiety for 2-month, respiratory distress for 2 weeks. History of lower segment caesarean section (LSCS)one and half years back and significant weight loss for 2 months. After the work up we proceeded with laparotomy as patient presented with obstructive symptoms.

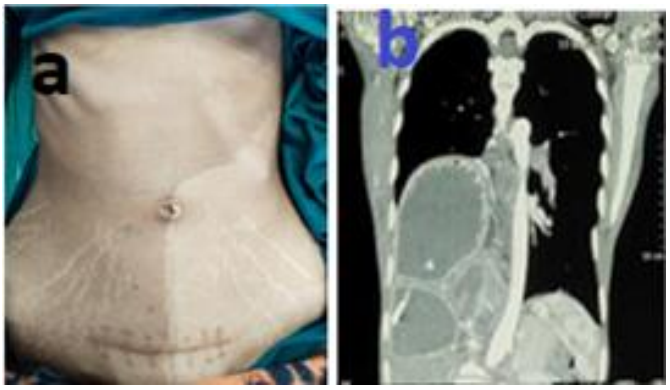

Figure 3: a) clinical examination showing scaphoid abdomen with post op LSCS scar; b) CT thorax shows presence of herniated stomach and bowel loops in thoracic cavity.

Intraoperative finding

Gastro esophageal junction, grossly dilated stomach and transverse colon was high up with thinning of right hemidiaphragm. Depending on the size of the defect, different abdominal organs can herniate into the thoracic cavity. After reducing the herniated contents and mobile zation of upper part of greater and lesser curvature, hiatus is repaired followed by 360 Nissen fundoplication (figure 4).

PEH affects about 1% of the population. Many patients present with intermittent acute symptoms and a history of cardiac consultation. Symptoms are caused by a gastric or distal o esophageal obstruction, or by gastroes ophageal reflux caused by LES incompetence.[11]

While surgery is required for symptomatic DHs, asymptomatic DHs may be planned for surgery later. The surgery aims for a complete reduction and excision of the sac, including a reduction of the herniated stomach and 2 to 3cm of the distal o esophagus to the abdominal cavity. The enlarged hiatus is closed with interrupted sutures with fixation of stomach into the abdomen and /or fundoplication.[11]

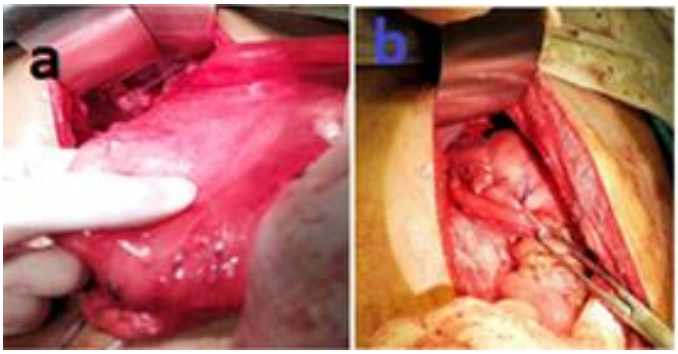

Figure 4: Nissen's fundoplication after reduction of hernial contents.

Case

70 years old female presented with vague pain over epigastric region for 3 years. No history of trauma to chest, no respiratory distress. It was late presentation with mild Abdominal pain and discomfort without significant GI and respiratory symptoms.

X ray plain picture abdomen did not reveal any signifi cant finding, except mild right sided pleural effusion. Contrast enhanced CT scan of the abdomen and thorax showed anterior wall defect in the midline with herniating non dilated bowel loops, omental fats (figure 5).

Figure 5: a) x-ray showing minimal pleural effusion in right side b) and c) showing anterior wall defect

We proceeded with exploratory laparotomy with a midline incision. The defect in the anterior part right to the midline of the diaphragm was palpated and it was found that a large part of the greater o mentum entered to the thorax cavity with parts of small and large intestine. There was a band of adhesion was attached to the right

side of the defect from the jejunoileal part. The band was ligated carefully and the o mentum was gently pulled down with fingers to visualize the defect with the bowel loops. After proper reduction and examination of the anatomy of the defect, the defect was closed with pro lane 2-0 sutures taking bites on the two edges of the defect with continuous locking suturing (figure 6). The repair is then reinforced with mesh. Finally, the small intestine and large intestine was examined for any abnormalities or injury and abdomen was closed in layers after proper haemostas is was achieved. The patient was allowed orally the very next day and mobilized. Her recovery was uneventful and post operative blood parameters and chest X-ray was with in normal limit.

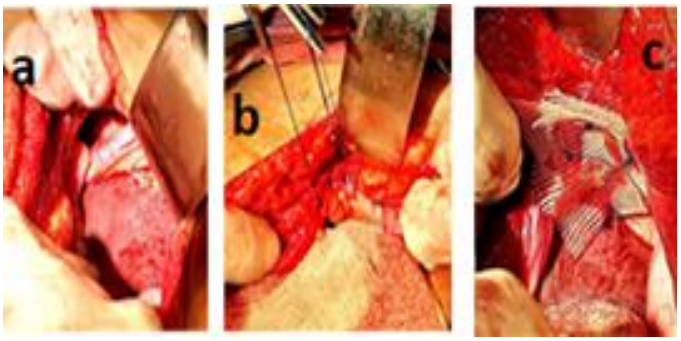

Figure 6: a) Defect (MH) in anterior diaphragm b) Primary repair with non-absorbable suture c) Rein force ment of the defect with mesh placement

MH is a rare CDH. It is located between the costal and sternal portions of the diaphragm in its anterior aspect. MH account for about 3% of all diaphragmatic hernias, usually presenting in infancy and childhood. MH is a rare clinical entity in adults without a recognized prevalence or natural history whose clinical presentati on can be perplexing.[12]

MH should be corrected even in asymptomatic patients because of the potential for incarceration and strange lation.[13,14]

Case

54 years male presented with intermittent and gradually progressive breathing difficulty for 10 years which aggravates on lying down and exertion. Decrease air entry on left lower thorax. No past h / o trauma or surgery. After evaluation, diaphragm plication and reinforcement with dual mesh done laparoscopically.

Figure 7: a) and b) showing eventration of diaphragm c) showing thin out diaphragm

ED are congenital developmental defects in the diaphragm's muscular portion; normal attachments to the sternum, ribs, and or so lumbar spine are preserved. They are uncommon (incidence 0.5%), more common in men, and more likely to affect the left hemidiaphragm.[15]

Surgical repair is indicated only in cases of progressive exertional dyspnea, recurrent respiratory infections, orboth.[16]

Conclusion

Diagnosis of diaphragmatic hernia is sometimes over looked. The CT scan is the most effective diagnostic tool. US may be useful in assessing diaphragm integrity and associated abdominal pathologies, particularly in TDH. Because the diaphragm is constantly moving, diaphragm tic ruptures almost never heal without surgical repair.

When a TDH is diagnosed, emerge ncy surgical repair is the mainstay of treatment. The surgical approach chosen is heavily influenced by associated injuries and trauma-related syndromes. The abdominal route may be used for suspected abdominal injury.

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Abbreviation

CDH – Congenital Diaphragmatic Hernia

CT – Computed tomography

CTVS – Cardio Thoracic and Vascular Surgery

DH- Diaphragmatic Hernia

ED - Eventration of Diaphragm

LES – Lower Esophageal Sphincter

MH – Morgagni Hernia

PEH – Para Esophageal Hernia

TDH – Traumatic Diaphragmatic Hernia

US – Ultrasonography