Acquired Diaphragmatic Hernia

There are two main subtypes of diaphragmatic hernias: congenital and acquired. Congenital diaphragmatic hernias occur during intra-uterine development. In contrast, acquired diaphragmatic hernias are acquired after birth. Acquired diaphragmatic hernias typically occur due to trauma. Clinical features include the presence of bowel in the chest, respiratory distress, and abdominal pain. Diagnosis is made with chest X-ray or CT scan. Surgery is the definitive treatment. If surgery is not performed, the herniated bowel may incarcerate or perforate. It is important to avoid chest tubes since placement may inadvertently perforate the bowel in the chest.

PLAY PICMONIC

Etiology

Trauma

Trauma-spike

Patients can develop an acquired diaphragmatic hernia after a traumatic diaphragmatic rupture. This can occur as a result of penetrating trauma or blunt abdominal trauma. Penetrating trauma can be seen in cases involving gunshot or stab wounds. Blunt abdominal trauma can be seen as a result of motor vehicle accidents.

Clinical Features

Bowel in the Chest

Bowel-Bowls in Chest

In this disease, loops of bowel, or other intra-abdominal contents, protrude through the damaged diaphragm into the thoracic cavity. Recall that the net intra-thoracic pressure is negative, this allows the intra-abdominal contents to herniate more easily. Conversely, the negative intrathoracic pressure prevents herniation of the intra-thoracic organs into the abdominal cavity.

Respiratory Distress

Lungs Shooting Flare-gun

The protruded bowels occupy space in the thoracic cavity and can compress the lungs. This can lead to reduced lung expansion with subsequent respiratory distress. The protruded bowels can also exert pressure on other intra-thoracic organs such as the heart. This can lead to inadequate cardiac diastolic filling with subsequently low stroke volume. As a result, compressive cardiogenic shock can also occur.

Abdominal Pain

Abdominal Pain-bolts

Diffuse abdominal pain is a common finding in these patients. The pain can be the result of the displacement of abdominal contents as well as due to the strangulation or obstruction of the intra-abdominal organs.

Diagnosis

Chest X-ray

Chest X-ray

Chest X-ray is typically used in the workup of this disease. Loops of bowel are typically seen on the left side of the chest since the right side is protected by the liver. In some cases, a previously inserted nasogastric tube may be visualized above the diaphragm and in the left side of the chest. If the herniation is large, it can compress the mediastinum leading to a contralateral mediastinal shift. Recall that the right hemidiaphragm is physiologically higher than the left. However, in acquired diaphragmatic hernias, the left hemidiaphragm can appear higher.

CT Scan

Cat Scanner

A CT scan can only be used in hemodynamically stable patients with associated abdominal or chest trauma. The CT findings will mimic those found on chest X-ray, namely: intra-abdominal contents located on the left side of the chest, defects in the diaphragm, and nasogastric tube located in the left hemithorax. CT scan can also be helpful in identifying the potential location of incarcerated bowels.

Management

Surgery

Surgeon

The definitive treatment for this condition is surgical repair. Most commonly, surgical correction through the abdomen is used. However, a surgical approach through the chest may also be used in select cases.

Considerations

Bowel Incarceration or Perforation

Bowel-bowl Incarcerated with Perforations

In acquired diaphragmatic hernias, the protruded loops of bowel may become incarcerated or perforate. This can be due to interrupted arterial blood flow or venous return and subsequent ischemia and necrosis.

Avoid Chest Tube

Avoid-sign Chest Tube

Given the similarities on imaging, clinical presentation, as well as a common history of a motor vehicle accident, acquired diaphragmatic hernias can easily be mistaken for a pneumothorax. Recall that a pneumothorax requires treatment with a thoracostomy chest tube. In cases of acquired diaphragmatic hernias, attempting to place a thoracostomy chest tube may inadvertently perforate the herniated intra-abdominal contents. This can lead to inoculation and dissemination of the bacterial flora normally found in the gut directly into the thoracic cavity. Therefore, special attention should be given to distinguishing these two medical conditions.
