
Case Report

Delayed Traumatic Diaphragmatic Hernia Presenting with a Life-Threatening Condition: Tension Gastrothorax with Gastric Perforation

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Diaphragmatic hernia due to blunting or penetrating abdominal trauma is well recognized although it is uncommon. Most of the cases are diagnosed at the time of injury, but there is still a proportion remain undiagnosed. Patient with delayed traumatic diaphragmatic hernia can present in a number of ways to the emergency department, including chronic chest or abdominal discomfort, an acute crisis with hemodynamic instability or respiratory distress. Small diaphragmatic hernias are often not diagnosed until months or years later when the patients become symptomatic. Herniation of abdominal viscera is the most common sequel and failure to detect this underlying injury is associated with significant morbidity and mortality. Herein, we report a case of delayed traumatic diaphragmatic hernia presented with tension gastrothorax leading to gastric perforation. The onset time was 11 months later from the initial trauma episode. The patient was managed successfully by operative repair of diaphragm. Previous chest or abdominal trauma history is important in history taking when emergency department physicians approaching the patient. This case report also emphasizes on the delayed presentation, diagnostic challenges, and the treatment options.

Key words: tension gastrothorax, delayed diaphragmatic hernia

Case Report

Traumatic diaphragmatic hernia is one of the most critical indications for emergent

surgical intervention in emergency department (ED), especially when it is complicated with incarceration of intra-abdominal organs. Acute traumatic rupture of the diaphragm is the indication for early surgical intervention. Although

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early presentation of traumatic rupture may be noticed by experienced emergency physicians, delayed non-specific clinical manifestation of this life-threatening condition may be overlooked. We described a patient with delayed traumatic diaphragmatic hernia that occurred 11 months after the initial trauma complicated with stomach and spleen incarceration resulting in tension gastrothorax which was successfully treated by surgical intervention and antibiotic treatment.

Case Report

A 34-year-old man presented to our ED with the chief complaint of abdominal pain and nausea sensation for about 5 days. The pain was mainly located at the epigastric area and aggravated by food intake. He denied any chest pain, chest tightness, shortness of breath, palpitation or cold sweating. Review of previous medical history showed nothing remarkable except vehicle trauma with fractures of left ilium, left sacrum, right pubis and left C7 transverse process 11 months ago. Initial physi-

cal examination demonstrated mild decreased breath sounds over the left lung field and epigastric tenderness without peritoneal signs. Laboratory examination revealed a remarkably elevated white blood cell count (15330/ μ L) and mild elevated serum lipase level (268 u/L, normal < 170). Abdominal sonography showed moderate fatty liver, common bile duct dilation, and left pleural effusion. The patient was admitted with the tentative diagnosis of acute pancreatitis. In the following two days, the patient still complained of abdominal pain despite the use of analgesics. Hemodynamic instability and dyspnea were then happened where the vital sign showed blood pressure: 93/68 mmHg; respiratory rate: 22/min; heart rate: 141 beats/min and oxygen saturation: 95%. The chest radiograph taken at ward later showed markedly elevated left hemidiaphragm, whiteout of left lower hemithorax, air-fluid level over left upper abdomen with rightward mediastinal shift (Fig. 1). The further computed tomography of the chest and abdomen showed a huge distended stomach with displacement of heart and great vessels,

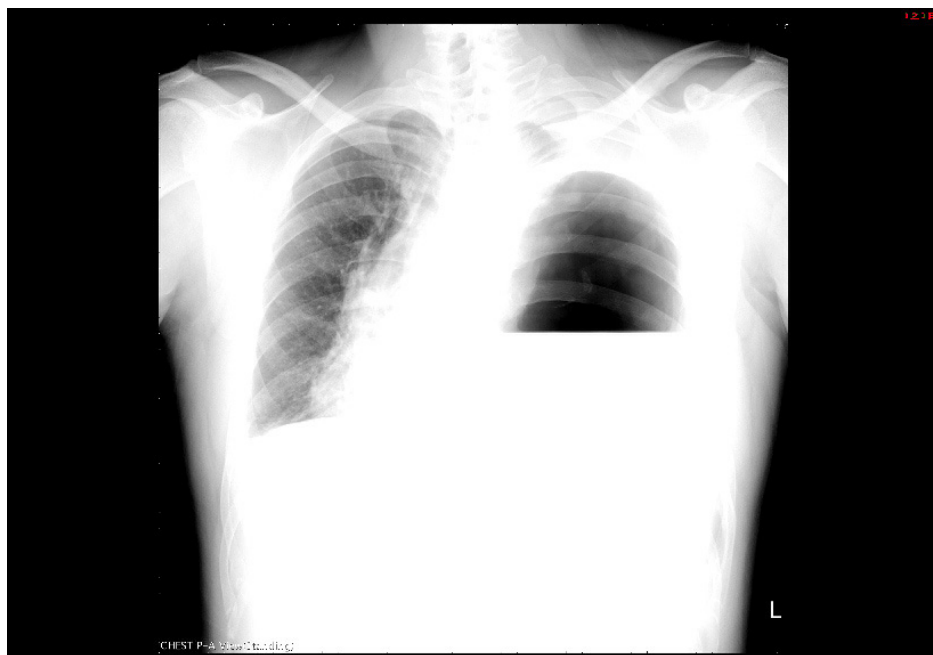


Fig. 1 Chest radiograph showing markedly elevated left hemi-diaphragm, whiteout of left lower hemi-thorax, air-fluid level over left upper abdomen with rightward mediastinal shift mimicking tension pneumothorax.

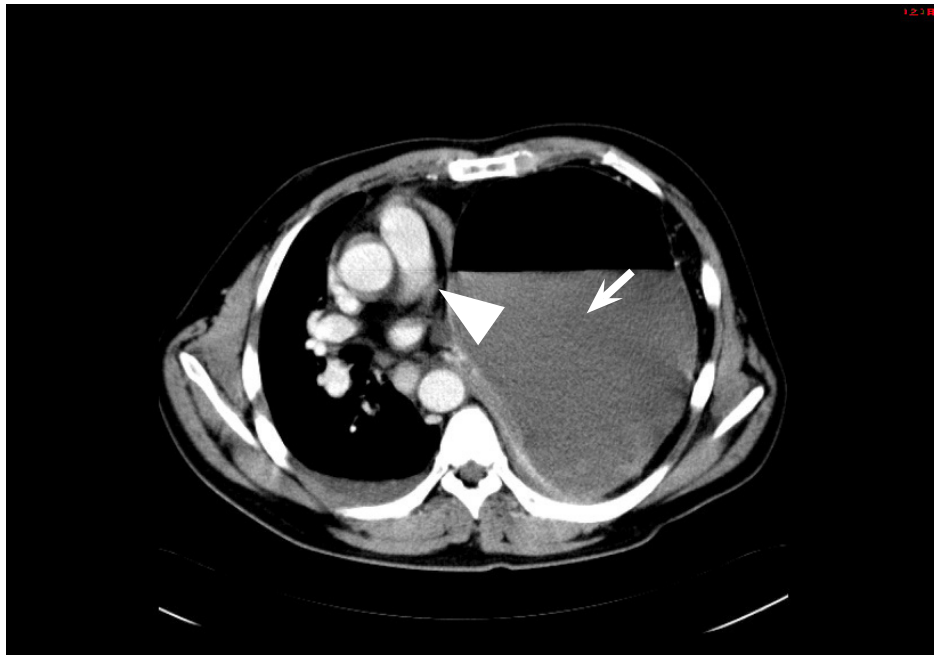


Fig. 2 Computed tomography of the chest and abdomen with enhancement demonstrating a huge distended stomach with displacement of heart and great vessels to the right chest cavity, confirming the diagnosis of tension gastrothorax. Right side pleural effusion was also noted. White Arrow: A enormously distended stomach occupied the left thoracic cavity; Black Arrow: right pleural effusions; White arrow head: displacement of the heart and great vessels to the right thoracic cavity.

confirming the diagnosis of tension gastrothorax (Fig. 2). The findings also suggested that the tension gastrothorax was caused by the diaphragmatic hernia. General surgeon was consulted for left diaphragmatic hernia for which an emergent laparotomy was performed. A large defect (6 cm x 4 cm) over the posterior – lateral portion of phrenic dome, gastric incarceration with gangrenous change and perforation, dirty pleural effusion with food debris at the left pleural cavity were noted intraoperatively. Segmental excision of the necrotic area of stomach with primary anastomosis and transabdominal primary repair of the gastric perforation and diaphragmatic laceration were performed. The patient was discharged 19 days after the procedure.

Discussion

Diaphragmatic hernia is a life-threatening condition. Diaphragmatic injuries are quite

uncommon and often result from either blunt or penetrating trauma. Acute traumatic rupture of the diaphragm may go unnoticed and there is often a delay between injury and the diagnosis. Tension gastrothorax caused by a traumatic rupture of the diaphragm is rare and difficult to diagnose.¹ The incidence of diaphragmatic injury among patients with blunt thoracic and abdominal trauma is about 3% – 5%.² The incidence increases to 10% – 15% if there has been a traumatic chest penetration.² Following blunt trauma, injuries to the left side of the diaphragm are 3 times more common than those to the right side, likely a result of the liver's buffering effect.³ According to the literatures, overall morbidity associated with diaphragmatic injury ranges from 30 to 68 percent and is related to the presence of associated injuries included herniation, diaphragm paralysis, pulmonary complications and biliary fistula.⁴

Patients with traumatic diaphragmatic

rupture may present to ED with various symptoms and signs including no symptoms, non-specific abdominal pain with or without hemodynamic instability, respiratory distress as well as signs of ileus and gastrointestinal bleeding. The onset of symptoms and sign has been reported to vary from days to years, dependent on the mechanism and phase of diaphragmatic hernia. There are three phases of diaphragmatic rupture.⁵ In the initial phase, most patients with diaphragmatic rupture can only be diagnosed accidentally during surgical exploration for concomitant intra-abdominal injuries, while the majority of ruptured diaphragm without intra-abdominal lesions may be ignored. During the delayed phase, visceral herniation is transient and the non-specific symptoms could be neglected. The obstruction phase is associated with visceral incarceration with or without strangulation that leads to gangrenous change or perforation that may be life-threatening. Another critical condition called tension gastrothorax may occur when stomach passed through the site of a diaphragm rupture into thoracic cavity. The accumulation of gastric contents such as air, fluid and foods in the thoracic cavity dramatically increases the intrathoracic pressure which is aggravated by the angulated gastroesophageal junction that functions as a kind of one-way valve.⁶ These processes result in loss of the lung capacity and mediastinal shift with obstruction of venous return that induce respiratory failure, obstructive shock, and cardiac arrest, much like a tension pneumothorax.⁷

In our case, the symptoms and signs first occurred 11 months after the initial trauma episode and the initial presentation at ED was non-specific abdominal pain. Owing to the difficulty of making the connection between the past trauma history and the clinical manifestations, the initial diagnosis was unclear. During the progression of the disease, the onset of hemodynamic instability resulted from tension gastrothorax attracted our attention for

aggressive evaluation and treatment. Our case displaying gastric incarceration through the diaphragm hernia resulting in tension gastrothorax and gastric perforation is rare. Previous history of abdominal or thoracic blunt trauma, abnormal breath and bowel sounds in the chest area may be helpful in making differential diagnosis in our case.

Delayed diagnosis and treatment of diaphragmatic rupture can lead to high mortality rate from 3% to 30%.^{8,9} Although the definitive treatment for tension gastrothorax is operative repair, the choice of whether to perform a thoracotomy or laparotomy depends on the preference and experience of the surgeon as well as individualized patient circumstances. While the surgeon can explore other abdominal organ injuries with a laparotomy, it is easier to repair the diaphragm rupture site and allows much quicker resolution of obstructive shock while enabling control of hemorrhage from below the diaphragm via clamping of the descending aorta under extreme circumstances with a thoracotomy.¹⁰ In addition, emergent decompression with a nasogastric tube, possibly aided by endoscopy, can help control the situation. On the other hand, emergency nasogastric tube placement may lead to further hyperventilation and gastric distension if kinking of the tube occurs. Uncomplicated traumatic diaphragmatic hernia diagnosed months or years after trauma may be managed via thoracotomy or thoracoabdominal or transabdominal surgical approaches. Many surgeons prefer a thoracoabdominal approach to gain access to and allow treatment of thoracic adhesions. Peer SM et al. reported that the post-operative morbidity of traumatic diaphragmatic hernia was 24% and mortality was 13.8% in one medical center experience in India which was comparable with the reported mortality of 1 – 28%.¹⁰

In conclusion, the diagnosis of diaphragmatic rupture may be missed when associated respiratory distress or abdominal surgi-

cal condition is absent. The symptoms become aggravated during the obstructive phase when visceral organ incarceration through the diaphragmatic is noted. Once intestinal organ incarceration occurs with gangrenous change or perforation, disease progression and high mortality would be expected. Therefore, early diagnosis with surgical management is important in improving patient's survival. Emergency physicians should always be aware of patients with trauma history presenting with respiratory distress and gastrointestinal complaints for whom diaphragmatic rupture should be included in their list of differential diagnosis.

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