A Case of Incarcerated and Perforated Stomach in Delayed Traumatic Diaphragmatic Hernia

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The patient was an emergency transported, 57-year-old man complaining of left thoraco-lateroabdominal pain, with a history of blunt chest trauma 3 months prior. Thoracoabdominal computed tomography (CT) resulted in a diagnosis of diaphragmatic hernia with incarceration and perforation of the stomach, and sameday emergency surgery was performed. The surgery was performed via an abdominal approach, and after manually repositioning the stomach incarceration, the perforated region was resected and the diaphragm sutured closed. Diaphragmatic hernia can be occasionally difficult to diagnose at the time of initial treatment, and may have been overlooked at the initial presentation, 3 months earlier in the present case. When examining a case of blunt force thoracoabdominal trauma, it is important to keep in mind the possibility of diaphragmatic injury. Additionally, during surgery for traumatic diaphragmatic hernia, in cases where manipulation of the abdominal organs is thought necessary, commencing the surgery with an abdominal approach is desirable.

Key words: Traumatic diaphragmatic hernia, Incarceration, Stomach perforation, Delayed diagnosis, Abdominal approach

INTRODUCTION

Onset of traumatic diaphragmatic hernia incarceration is sometimes delayed [1, 2]. Incarcerated abdominal organs can include the greater omentum, small and large intestines, and the stomach, and although it can lead to incarcerated necrosis/perforation, reports of stomach incarceration and intra-thoracic perforation are rare [3]. Thus, we report our encounter with an incarcerated and perforated stomach in delayed traumatic diaphragmatic hernia, which led to the serious progression of pyothorax.

CASE REPORT

The patient was a 57-year-old man, emergency transported to another hospital due to motor vehicle accident trauma in April 2012 where he was hospitalized with a diagnosis of left traumatic hemothorax and multiple rib fractures, conservatively treated, and then discharged. Three months later, he became aware of left thoraco-lateroabdominal pain. Consultation with his previous doctor resulted in a diagnosis of large quantities of pleural fluid on his left side. A thoracostomy tube was placed, and immediately large volumes of digestive fluid drained out. Computerized tomographic (CT) imaging resulted in a diagnosis of left diaphragmatic hernia with incarceration and perforation of the stomach, and he was transferred to our hospital for surgery on the same day.

Upon his arrival at our hospital, the patient presented with fever, elevated respiration and heart rate, and hypoxemia. Biochemical testing revealed elevated levels of serum creatinine (1.19 mg/dl), C-reactive protein (CRP) (13.29 mg/dl), and serum lactate (35 mg/dl). A large quantity of left side pleural fluid and right mediastinal shifting were found via simple chest x-ray (Fig. 1), and diaphragmatic hernia with stomach incarceration was confirmed with thoracoabdominal CT imaging (Fig. 2). A diagnosis of delayed traumatic diaphragmatic hernia with incarceration and perforation of the stomach was made, and same-day emergency surgery performed. Surgery commenced via an epigastric midline incision. There was an approximately 10 cm diameter deficit in the dorsally attached region of the left diaphragm, into which the fundus of the stomach, spleen, and the pancreatic tail were subsiding. Manual repositioning revealed an approximately 1 cm perforation in the greater curvature of the stomach (Fig. 3), and contaminated thoracic cavity was visible from the diaphragmatic hernial opening. The region surrounding the stomach perforation was resected, and the diaphragmatic perforation were suture-closed. The surgery was then completed following installation of drains in the thoracic and abdominal cavities. The operation time was 305 minutes, and estimated blood loss was 883 milliliters.

Postoperatively, the patient was required a ventilator management and continuous antibiotics because of left pyothorax and accompanying sepsis. The patient's condition gradually improved, and he was transferred to other hospital on the 104th day of hospitalization.

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Fig. 1 Simple chest x-ray Mediastinum is shifted to the right.

DISCUSSION

Traumatic diaphragmatic hernia occurs in 0.8–1.6% of blunt force traumas [4]. Classically, diaphragmatic hernia is divided into three phases of presentation: 1) immediately following the accident, 2) the interval phase, and 3) the phase of obstruction or strangulation [5]. The present case involved phase 3. It is thought that the mechanism is not that the diaphragmatic hernia is already present immediately after the trauma but is overlooked and progresses, eventually becoming evident due to incarceration of the abdominal organs. As in the present case, perforation of the stomach may appear as delayed symptom.

According to prior reports, diaphragmatic hernia is frequently overlooked upon initial examination [1, 2, 6] and also in this case, a reevaluation of the thoracoabdominal CT from 3 months prior showed that the diaphragmatic hernia was already present at the time of the trauma. But recently the rates of early discovery are increasing due to developments such as multi-detector CT (MDCT) [7]. Therefore, at the time of initial treatment for thoracoabdominal blunt force trauma, examinations must account for the possibility that there is diaphragmatic injury.

Diaphragmatic hernia can involve incarceration of the stomach and various other organs, particularly on the left side, but becomes fatal upon onset of obstructive shock due to gastrothorax [8-10]. In the present case, the patient was in a pre-shock state from the time he re-consulted with his previous physician until he transferred to our hospital, and any further worsening could have led to cardiac arrest. While tension gastrothorax can often be resolved with nasogastric tube placement to decompress the stomach, the stomach was already decompressed in the present case due to its perforation, and thus a lethal situation was potentially avoided.

With diaphragmatic hernia, regardless of the phase of onset or presence of incarceration/strangulation, surgery is the only treatment. With regard to the approach necessary (thoracic or abdominal), while there are numerous opinions, complications are an important factor in determining prognosis, particularly in emergencies. If there is thoracic organ injury, thoracotomy is preferred. However, if an inspection for abdominal organ injury is necessary, then an abdominal approach should be taken. However, in a chronic stage case, particularly in instances where injury due to intraperitoneal organ incarceration is suspected, the abdominal approach is preferred because it permits resection of eviscerated structures [11].

In the present case, surgery was performed via an abdominal approach through an epigastric midline incision. Fortunately, there was no adhesion between the incarcerated stomach and the thoracic organs, and manual intraabdominal repositioning was possible. Furthermore, considering that there was also a need to resect the portion of the stomach that had perforated,



Fig. 2 Thoracoabdominal CT scan Diaphragmatic hernia with stomach incarceration was confirmed.

surgical success would have been difficult had we only taken a thoracic approach.

CONCLUSIONS

We encountered a case of stomach incarceration in delayed traumatic diaphragmatic hernia that required surgery. At the time of initial treatment for the thoracoabdominal blunt force trauma, examinations must account for the possibility that there is diaphragmatic injury. When performing surgery for traumatic diaphragmatic hernia, if manipulation of the abdominal organs is thought necessary, an abdominal approach is desirable.

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Fig. 3 Intraoperative findings Perforation of the stomach can be seen.

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