

A blunt traumatic diaphragmatic hernia diagnosed at resuscitative thoracotomy**Ikuto Takeuchi, Kei Jitsuiki, Toshihiko Yoshizawa, Kazuhiko Omori, Kouhei Ishikawa, Hiromichi Ohsaka, Yasumasa Oode, Youichi Yanagawa**

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Abstract: A 19-year-old male on a motorcycle collided with a truck, which resulted in a slip-slide accident. The patient was transported to the hospital in a physician-staffed emergency helicopter. Upon arrival at the hospital, he remained in cardiopulmonary arrest. An immediate chest roentgen showed decreased radiolucency of the left thorax, but the line of his left diaphragm was not abnormal. The patient underwent resuscitative thoracotomy for open heart massage, drainage of the hemothorax, and clump of the descending aorta. It was during thoracotomy that a lethal aortic injury was discovered. In addition, by accident, a left blunt traumatic diaphragmatic hernia was also discovered. The lacerated region of the diaphragm was occupied by the wall of the stomach and left lobe of the liver. Unfortunately, the patient did not recover spontaneous circulation. The initial diagnosis of a blunt traumatic injury to the diaphragm is generally difficult, as the early clinical and radiological findings are not clear. While, multi-detector computed tomography (CT) scanning has proven to be useful in diagnosing diaphragmatic injuries. In addition, surgical exploration is vital, and inspecting the diaphragm without considering clinical symptoms is highly recommended in all cases of severe truncal injury. Accordingly, the diaphragmatic injury should be suspected in all thoracoabdominal traumas. Lack of specific signs and symptoms is common and a high index of suspicion is required.**Keywords:** traumatic diaphragmatic hernia; thoracotomy; diagnosis.

INTRODUCTION

The diagnosis of a traumatic diaphragmatic hernia can be challenging on occasion. A delayed onset of symptoms, such as obstruction of the digestive tract and deteriorated circulation or respiration, may indicate the presence of a traumatic hernia of the diaphragm [1-3]. We herein present a case of a blunt traumatic hernia of the diaphragm which was diagnosed during resuscitative thoracotomy.

CASE PRESENTATION

A 19-year-old male on a motorcycle collided with a truck, which resulted in a slip-slide accident. When emergency technicians checked him, he was in cardiopulmonary arrest, and the initial rhythm at the scene was asystole. The patient was transported to the hospital in a physician-staffed emergency helicopter. He had no remarkable medical or family history. Upon

arrival at the hospital, he remained in cardiopulmonary arrest, and the initial rhythm at our hospital was pulse less electrical activity. An immediate chest roentgen showed decreased radiolucency of the left thorax, but the line of his left diaphragm was not abnormal (Figure 1). The patient underwent resuscitative thoracotomy for open heart massage, drainage of the hemothorax, and clump of the descending aorta. It was during thoracotomy that a lethal aortic injury was discovered. In addition, by accident, a left blunt traumatic diaphragmatic hernia was also discovered (Figure 2). The lacerated region of the diaphragm was occupied by the wall of the stomach and left lobe of the liver. Unfortunately, the patient did not recover spontaneous circulation. Postmortem CT also exhibited the discontinuity of the diaphragm and herniation of the stomach and liver.



Fig-1: A chest roentgen immediately after arrival. The chest roentgen revealed a decrease in the radiolucency of the left thorax, but the line of the left diaphragm was not abnormal.

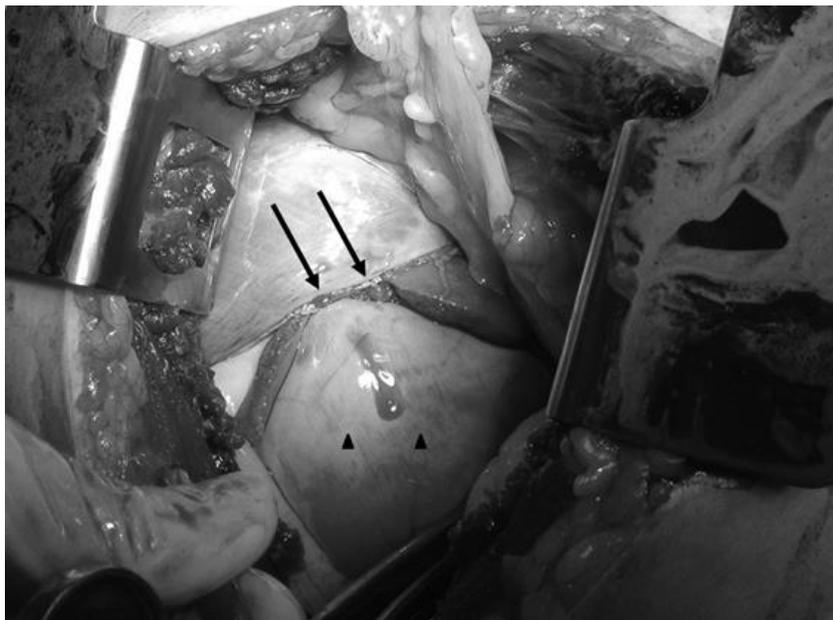


Fig- 2. The findings of resuscitative thoracotomy. Thoracotomy revealed a left blunt traumatic hernia of the diaphragm. The lacerated region of the diaphragm (arrow) was occupied by the wall of the stomach (triangle) and left lobe of liver.

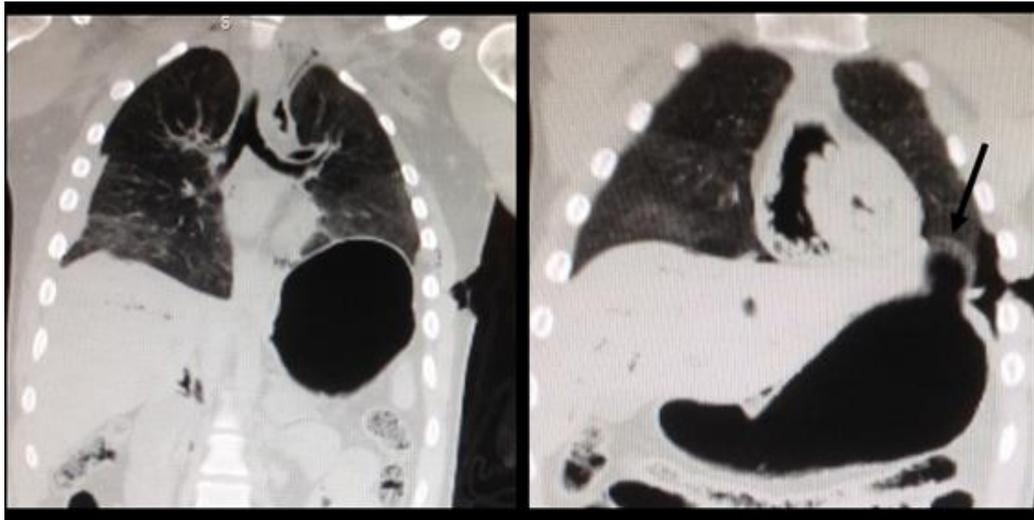


Fig-3: Postmortem CT. Postmortem CT showed the discontinuity of the diaphragm and herniation of the stomach and liver (arrow).

DISCUSSION

A diaphragmatic hernia after blunt trauma is an uncommon and often undiagnosed condition. The incidence of diaphragmatic hernia after any kind of thoraco-abdominal trauma is reported to be between 0.8% and 5%, of which up to 30% present with a delay [1]. The initial diagnosis of a blunt traumatic injury to the diaphragm is generally difficult, as the early clinical and radiological findings are not clear [1]. An initial chest X-ray was diagnostic in only 25%-50% of patients where hemo pneumothorax was visible in the thoracic cavity early after an injury, similar to the findings in the present patient [1]. Less than 2.7% of cases of a diaphragmatic hernia were detected within four months from the initial damage. The inaccurate interpretation of the imaging studies or intermittent and trivial symptoms of the hernia are the main reasons for a missed diagnosis [1]. In some cases, a missed diaphragmatic hernia can be lethal [1].

Multi-detector computed tomography (CT) scanning has proven to be useful in diagnosing penetrating diaphragmatic injuries, with sensitivity, specificity, and accuracy rates of 87%, 72%, and 77%, respectively [4]. Therefore, CT is the diagnostic modality of choice in patients suspected of having a diaphragmatic hernia [2]. The presence of diaphragmatic discontinuity, diaphragmatic thickening, herniation of abdominal organs into the thoracic cavity, collar/hump signs, dependent viscera signs, abnormal elevation 4 cm or more above the dome of the opposite-side hemi-diaphragm, and of associated injuries was recorded, and the relationships of these factors with each other and with the blunt traumatic diaphragmatic hernia were useful as the diagnostic findings for detecting traumatic diaphragmatic hernia. Among these factors, diaphragmatic discontinuity and stomach herniation were seen almost exclusively in cases of left-sided rupture. Sagittal/coronal reconstruction slightly

increased the number of band signs, cases of diaphragmatic discontinuity, and cases of diaphragmatic thickening [4, 5].

Surgical exploration is vital, and inspecting the diaphragm without considering clinical symptoms is highly recommended in all cases of thoracoabdominal injury [6]. Adegboye *et al.*; reported that 51 % (59 patients) was accidentally diagnosed intraoperative (40 patients), or at postmortem (19 patients) among one hundred and sixteen patients with diaphragmatic hernia [7]. While thoracoscopy can be extremely useful in diagnosing hidden diaphragmatic hernia in penetrating thoracoabdominal trauma. The high diagnostic accuracy of thoracoscopy (100%) [6], the minimal invasiveness, and the therapeutic potency of this procedure strongly suggest its utility in clinical practice [6].

CONCLUSION

The diaphragmatic injury should be suspected in all thoracoabdominal traumas. Lack of specific signs and symptoms is common and a high index of suspicion is required.

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