CASE REPORT

Tension gastrothorax secondary to trauma in the emergency room: A case report

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ABSTRACT

In tension gastrothorax, the abdominal contents are displaced into the thorax, leading to a mediastinal shift that arises from the pressure placed on the intrathoracic region. This condition is often due to a congenital or acquired (secondary to surgery) diaphragmatic defect and is rarely seen secondary to trauma. A 40-year-old man presented to the emergency department after an in-vehicle traffic accident. He had no active complaint other than mild chest pain. On auscultation, breath sounds were audible in the left lung base and bowel sounds were heard. Computed tomography of the thorax revealed left-sided diaphragmatic hernia. The jugular vein was distended, and the patient became desaturated in the emergency room. Nasogastric decompression was performed, and the saturation improved. The patient underwent open surgery. Traumatic tension gastrothorax should be considered in the differential diagnosis of acute-onset severe respiratory failure. It can be diagnosed by rapid clinical and radiological evaluation.

Keywords: Case report; diaphragmatic rupture; tension gastrothorax.

INTRODUCTION

Trauma-related deaths are common worldwide and the fifth most frequent cause of death in the United States.[1] Among these fatal cases, traumas of the thorax rank third.[2] A significant number of trauma-related deaths occur in the pre-hospital setting, and most patients who reach the hospital die in the emergency department.[3] A rare cause of thoracic trauma–related mortality is tension gastrothorax, defined as the herniation of the abdominal organs into the chest cavity from a ruptured diaphragm secondary to trauma.[4]

In patients with chest pain secondary to trauma, the preliminary diagnosis is guided primarily by the clinical symptoms and physical examination findings, which may include Charcot fractures, tension pneumothorax, and solid organ injury. In patients requiring urgent care, in addition to first-line imaging modalities, the procedures needed to achieve presumptive diagnoses depend on the symptoms.

Acute gastrothorax is post-traumatic in origin in approximately 15% of all cases of gastrothorax, but it is often overlooked because of its rarity. In trauma patients, it may result from a diaphragmatic defect.[4] In this paper, we discuss a case in which a patient presented with chest pain after trauma to the thorax and developed traumatic gastrothorax. By discussing this rare traumatic complication, including the challenges faced in the emergency setting, our aim is to contribute to

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the management of acute gastrothorax, as the condition may lead to acute hemodynamic impairment.

CASE REPORT

A 40-year-old man presented to the outpatient clinic of the emergency service following an in-vehicle traffic accident. While driving, he lost control of the car and crashed into concrete barriers. The front wall of his chest hit the steering wheel upon impact. He complained of mild chest pain on the left side.

His Glasgow Coma Scale score was 15. His blood pressure was 100/60 mm/Hg, his pulse was 113/min, his respiratory rate was 27/min, and his finger saturation was 88% on the pulse oximeter. He was mildly anxious. There was no evidence of mild hyperemia on the skin. His medical history included the use of amlodipine as an anti-hypertensive agent and a home nebulizer for chronic obstructive pulmonary disease, secondary to which he had developed finger clubbing. In the systemic examination, breath sounds were audible in the upper lobe, but not in the lower lobe, of the left lung, and bowel sounds were heard with unclear dullness on percussion. Physical examination revealed crepitus on the right side of the thorax. The patient's bed was cordoned off based on suspicion of gastrothorax.

His arterial blood gas showed non-compensatory type I respiratory failure with normal base deficit levels. He had stable vital signs. Computed tomography (CT) of the thorax revealed a large volume of intra-abdominal air in the left hemithorax and a left-sided diaphragmatic hernia, causing a mediastinal shift. Pneumothorax was present on the right side (Fig. 1). Acute traumatic gastrothorax was considered. A chest tube was placed for the pneumothorax on the right. The patient's oxygen level indicated desaturation and his jugular vein was distended 30 min after chest tube insertion. Breath sounds were audible in the right, but not the left, lung. Based on suspicion of gastrothorax and the presence of a minimal shift, nasogastric decompression was performed, which improved his oxygen saturation. An emergency thoracotomy was then undertaken. Two-thirds of the abdomen and bowel segments were observed to have shifted to the thoracic region, secondary to an 11-cm diaphragm rupture. The possibility of solid organ injury and intestinal perforation was investigated. No pathology was detected, and the herniated abdominal organs in the thoracic cavity were reduced to the abdominal cavity. The diaphragm was sutured with non-absorbable material. After two days in the intensive care unit and seven days in an emergency service room, the patient was discharged without any problem. Written consent from the patient and approval from the hospital for the presentation of this case report were obtained.

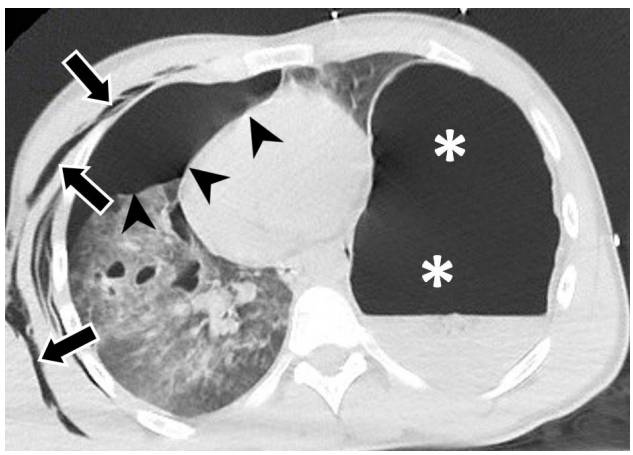

Figure 1. Transverse thorax CT section in the lung window demonstrates pneumothorax (arrowheads) and increased density in the right lung due to pulmonary parenchymal contusion. Subcutaneous emphysema under the skin and between muscular structures in the right thoracic wall is demonstrated (arrows). The structure in the left hemithorax containing air-fluid levels (asterisks) is herniated stomach and it causes minimal mediastinal shift to the right.

DISCUSSION

In tension gastrothorax, the abdominal contents are displaced into the thorax, leading to a mediastinal shift caused by the pressure placed on the intrathoracic region.[5] Most cases are congenital or develop due to a diaphragmatic defect secondary to surgery. Congenital diaphragmatic hernia (CDH) occurs in one in 2,500–4,000 live births. The majority of cases are diagnosed at birth or shortly thereafter in infants with respiratory distress.[6,7] However, in approximately 10% of patients with CDH, symptoms develop at a later time.[8,9]

Gastrothorax secondary to trauma is very rare, and only 0.8–1.6% of blunt abdominal traumas causes diaphragmatic injuries.[10] Diaphragmatic rupture has clinical effects on the circulation and respiration. Displacement of the abdominal organs into the thoracic area results in the displacement of the mediastinum. The clinical signs include hemodynamic impairment secondary to the reduction of venous return to the heart and respiratory symptoms, such as shortness of breath and tachypnea, indicative of tension pneumothorax due to the restriction of pulmonary expansion.

In the supine position, the diaphragm provides all of the tidal volumes. Hemidiaphragm losses decrease pulmonary function by 25–50%. This effect explains the development of cyanosis shortly after our patient's arrival at the emergency department. The absence of breath sounds in the basal left lung and the presence of audible bowel sounds led us to consider the diagnosis of traumatic tension gastrothorax.

Grimes[11] defined three phases characterizing the clinical severity of diaphragmatic rupture: acute, latent, and obstructive. The acute phase refers to polytrauma, specifically multiple intra-abdominal and chest traumas. The latent phase is characterized by the diaphragmatic rupture in the absence of hernia. In the obstructive phase, the diaphragmatic hernia causes

obstruction and the patient develops distension and strangulation. Our patient initially presented with acute-phase diaphragmatic rupture, and signs indicating gastrothorax became evident somewhat later. Gastrothorax can be diagnosed by thoracic CT in a patient with an elevated hemidiaphragm seen on an X-ray. The patient, in this case, was diagnosed based on the CT findings.

Tension gastrothorax is treated surgically by the primary repair of the diaphragmatic rupture. In dyspneic patients, nasogastric tube insertion may be the first choice for the immediate decompression of tension gastrothorax. An awareness of the risk factors and clinical presentation of tension gastrothorax can help to quickly and successfully manage this life-threatening clinical situation.

In conclusion, although traumatic tension gastrothorax is rare, it should be considered in the differential diagnosis of acute-onset severe respiratory failure. Traumatic tension gastrothorax can be diagnosed by rapid clinical and radiological evaluation. Abdominal decompression will correct the associated hemodynamic impairment.

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

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OLGU SUNUMU - *ÖZET*

Acil serviste travmaya sekonder tansiyon gastrotoraks: Bir olgu sunumu

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Tansiyon gastrotoraks, abdominal içeriğin toraksa yer değiştirmesi ve intratorasik bölgeye uygulanan baskı sonucu mediastinal kayma ile seyreden klinik bir durumdur. Genellikle doğuştan veya edinilmiş (cerrahiye sekonder) diyafragma defekti nedeniyle olup, nadiren travmaya sekonder görülür. Kırk yaşında erkek hasta, araç içi trafik kazası sonrası acil servise başvurdu. Hafif göğüs ağrısı dışında aktif bir şikayeti yoktu. Oskültasyonda sol akciğer tabanında solunum sesleri ile birlikte bağırsak sesleri duyuldu. Çekilen bilgisayarlı toraks tomografisinde sol taraflı diyafragma hernisi izlendi. Kısa süre sonra desatürasyon ve juguler venöz dolgunluk gelişen hastaya nazogastrik dekompresyon uygulandı. Ardından açık cerrahi girişim amaçlı ameliyata alındı. Akut başlangıçlı ciddi solunum yetersizliğinin ayırıcı tanısında travmatik tansiyon gastrotoraks düşünülmelidir. Hızlı klinik ve radyolojik değerlendirme ile tanı konulabilir.

Anahtar sözcükler: Diyafragma rüptürü; olgu sunumu; tansiyon gastrotoraks.

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