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Left Diaphragmatic Eventration in a Case of Blunt Trauma to the Chest: Traumatic or Congenital?

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Abstract

Road traffic accidents are the most common cause of trauma. The chest area is mainly affected in trauma cases due to road traffic accidents. Diaphragmatic eventration is a rare condition in which the muscles are upraised, but they maintain their continuity and anatomical attachment to the original coastal margins. We present an intriguing case report of a 30-year-old male who presented with symptomatic left diaphragmatic eventration due to blunt trauma to the chest with an alleged history of road traffic accidents, which might be congenital or traumatic in causation. Chest examination of the patient revealed reduced air entry on the left side and the presence of bowel sounds in the left lower chest area. CT scan was suggestive of a colonic shadow on the left side. Plication of the diaphragm was performed for correction. The unclear etiology of this case makes it a diagnostic dilemma. This patient's clinical presentation was such that it could be easily confused with a chance of diaphragmatic paralysis or diaphragmatic rupture. The importance of good clinical examination and proper radiological imaging is a must to confirm any diagnosis.

Keywords: Diaphragmatic Eventration, Road traffic accident, Fluoroscopy, Diaphragmatic Plication.

Introduction

Road traffic accidents are, without any doubt, the most constant and, generally, the most common cause of trauma. Injury and deaths due to road traffic accidents (RTA) are significant public health problems in developing countries. More than 85 % of all deaths and 90 % of disability-adjusted life years were lost from road traffic injuries **[1]**. Road traffic accidents prompt the death toll and property. Road traffic accidents are many times associated with trauma to the chest. Diaphragmatic eventration (DE) is an atypical condition in which the muscles are perpetually upraised but retain their continuity and anatomical attachment to the original coastal margins **[2,3]**. We present a case report of blunt trauma to the chest which may have exposed a congenitally present or resulted in a presently acquired rare complication– eventration of the left dome of the diaphragm with minimal pleural effusion, multiple fractures involving the left scapula and distal part of the right radius.

Case Presentation

A 30-year-old male, referred from a local hospital, presented with an alleged history of road traffic accidents, difficulty breathing, and decreased oxygen saturation. The side-to-side collision of a truck and motorcycle led to the admission of the patient to a local hospital for four days just after the accident, where he complained of chest pain and upper gastrointestinal tract obstruction symptoms. At admission, SpO2 was down to 88%, for which the patient was given immediate oxygen support at the rate of 1-2 L/min. The patient was well-oriented to time, place, and person, with a Glasgow Coma Scale(GCS) score of 15 (E4V5M6), and there were no signs of cyanosis, oedema, or icterus. Chest examination revealed decreased air entry on the left side and the presence of bowel sounds in the left lower chest area. CT scan (computed tomography) was suggestive of colonic shadow on the left side **(Figure 1 and 2)**, and ultrasonography of the thorax revealed eventration of the left dome of the diaphragm and minimal pleural effusion. The patient had no history of symptoms of diaphragmatic eventration before the accident. Plication of the diaphragm was performed to correct the eventration of the left dome of the diaphragm. X-ray imaging of the required regions was done, and there was a left scapula fracture **(Figure 3)** with an inability to lift the corresponding upper limb, which was suggestive of a brachial plexus injury. There was also a right distal radius fracture **(Figure 4)**, which was managed conservatively. Intermaxillary fixation and closed reduction were performed by the dental surgeon to control the rupture of the mandible and the right condyle **(Figure 5)**, which led to facial nerve injury during the procedure. Regular dressing of the wounds was done, and the patient was kept under observation until he recovered.

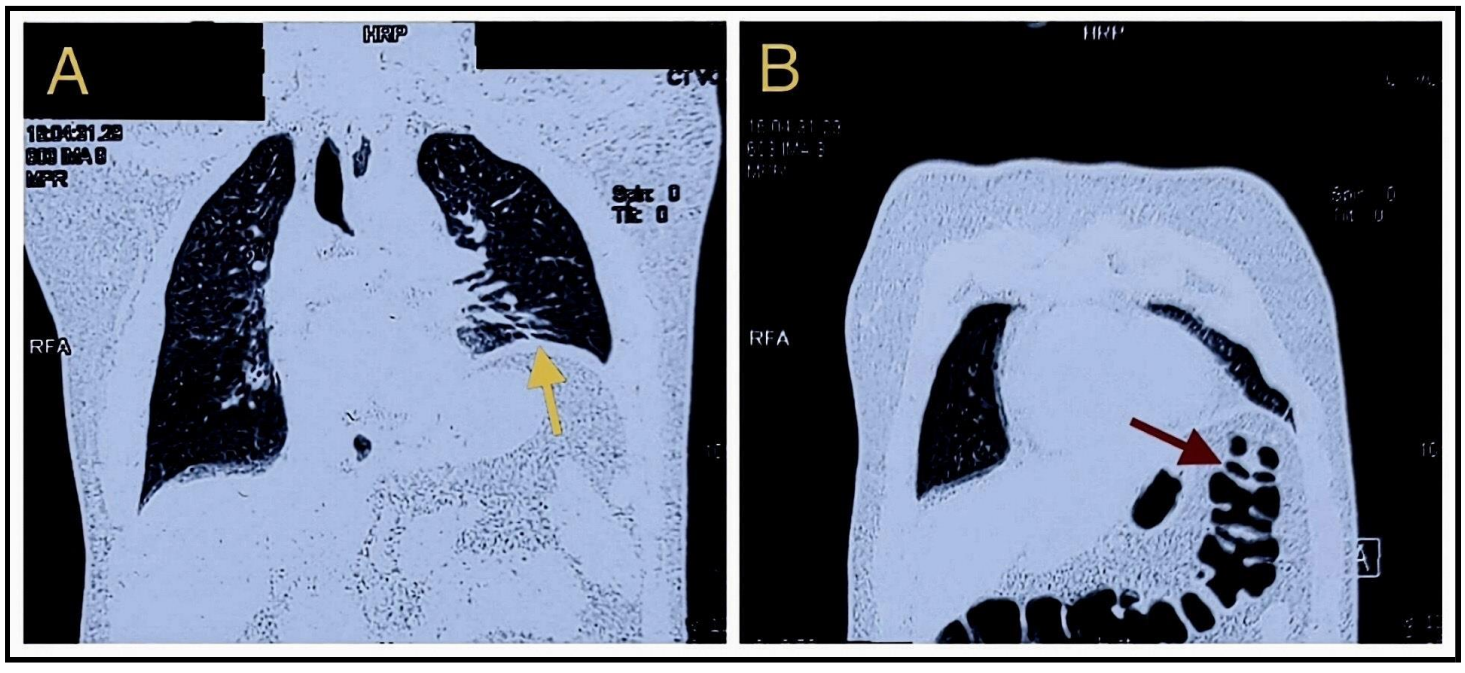

Figure 1: Computed Tomography (Coronal) in the Lung Window, showing left diaphragmatic eventration (yellow arrow in A) and colonic shadow (brown arrow in B).

Figure 2: Computed Tomography (Axial) in the Lung Window, which shows lung field only on the right side and not on left side due to left diaphragmatic eventration, which has caused the left lung to be pushed up.

Figure 3: X-Ray showing Fracture of the left Scapula.

Figure 4: X-Ray showing Fracture of the Right distal radius.

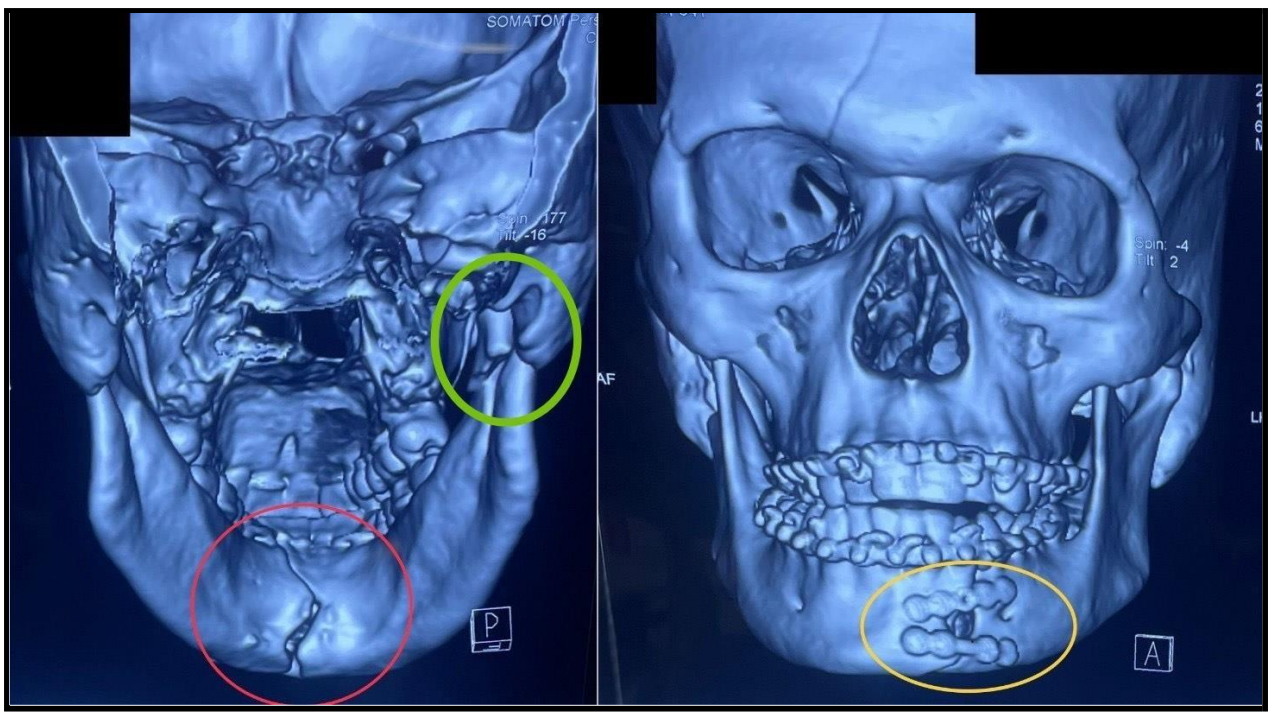

Figure 5: 3-Dimensional Reconstructed Computed Tomography showing fracture of the mandible (red circle in posterior view and yellow circle in anterior view) and fracture of the right condyle of the mandible (green circle in posterior view).

Discussion

The trauma literature is copious with fascinating and engaging case reports of blunt trauma to the chest leading to diaphragmatic rupture, hernia or paralysis, etc. Still, we are not acquainted with any case report involving the symptomatic unilateral diaphragmatic eventration caused likely due to blunt trauma to the chest with an alleged history of road traffic accidents. Diaphragmatic eventration (DE) is an atypical condition in which the muscles are perpetually upraised but retain their continuity and anatomical attachment to the original coastal margins **[2,3]**. It is rare and seldom do patients present with symptoms of respiratory distress **[2,3]**, which mostly gets revealed in asymptomatic adult patients due to an ongoing workup of some other condition. Eventration may be complete, partial, right-sided, left-sided, or even bilateral **[4-6]**. Eventration of the diaphragm could be a result of the following etiologies:- (a) Previous operation or disease; (b) Congenital/ Idiopathic; (c) Trauma.

Balci AE et al. conducted a study among 28 patients of diaphragmatic eventration. They concluded that DE in myotonic dystrophy was 3.5 %; in poliovirus infection, it was 7.1 %; in trauma suspect, the same was 14.2 %; congenital was 25 %; and in cases of previous operations, it was 50 % **[7]**. This translates into the rarity of DE caused due to blunt trauma in a road traffic accident. Our case presents a diagnostic dilemma as the patient either had an asymptomatic congenital

diaphragmatic eventration, which was accidentally exposed after the blunt trauma, or the trauma was the causative factor of the diaphragmatic eventration. The solution to this dilemma is even more complicated due to the absence of previous radiological imaging of the patient. Zheng de Wu et al. conducted a retrospective study to summarize the diagnostic aspect and management plan of congenital diaphragmatic eventration in children. The study reported that out of 177 children, 86 (48.5 %) presented with specific symptoms. Only one child was raised with a bilateral case; all others had unilateral eventration. Diaphragmatic plication was performed on all symptomatic patients, and none had any recurrence **[8]**.

Radiological imaging plays a crucial role in diagnosing the case of DE as it can be perplexing to diagnose and can easily be confused with diaphragmatic rupture. Trauma to the chest causing hematoma, subpulmonic collection, lung contusion, or diaphragmatic rupture may also imitate this condition, making the diagnosis even more challenging **[9]**. Multiplanar CT can be used for the exact diagnosis. Thoracoscopy is considered the gold standard in some literature **[10]**. Ultrasonography may be used in diagnosing partial eventration and differentiating it from diaphragmatic nerve interruption. Fluoroscopy is considered for the investigation of diaphragmatic paralysis **[6]**.

Once the diagnosis is confirmed, surgical intervention, i.e., plication of the diaphragm, benefit symptomatic patients. Asymptomatic diaphragmatic eventration does not require surgical management, and the treatment of choice in such a case is conservative management **[11]**. Our patient presented with signs of respiratory distress and hence was surgically managed. Plication was performed to correct the eventration.

Conclusion

Symptomatic unilateral diaphragmatic eventration due to blunt trauma to the chest in a patient with an alleged history of road traffic accidents is very rare. The singularity of this case in terms of it being etiologically exceptional and its similarity in terms of clinical presentation with diaphragmatic paralysis, diaphragmatic rupture, or a congenital eventration makes it noticeable. Either the patient had an asymptomatic genetic case of diaphragmatic eventration, which was exposed due to recent blunt trauma to the chest, or the eventration was likely caused by the blunt trauma, which makes it a diagnostic dilemma. We highlight the importance of a high-grade apprehension, thorough history taking, a good clinical examination, and multiple imaging modalities to arrive at a final diagnosis.

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