

Eventration of Diaphragm: A Case Report and Review of Literature

Marzieh Soheili (1)
Anvar Elyasi (2)

(1) Faculty of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran.

(2) Department of Surgery, Faculty of Medicine, Kurdistan University of Medical Sciences, Kurdistan, Iran.

Corresponding Author:

Anvar Elyasi,

Department of Surgery, Faculty of Medicine, Kurdistan University of Medical Sciences, Kurdistan, Iran.

Email: anvar.elyasi@muk.ac.ir

Abstract

Eventration of diaphragm is an uncommon congenital abnormality which is seen in newborns and adults with different manifestations. It may be unilateral, bilateral, partial or total. This abnormality is more common in males. It is usually seen in the left hemi-diaphragm. Sometimes it has no signs or symptoms. If so, there is no need to do any surgery. But in cases who suffer from any related disease, surgery is necessary.

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Introduction

Eventration of diaphragm (ED) is defined as the abnormal elevation of a hemi-diaphragm. It may have a congenital reason or may be acquired. Congenital eventration is a developmental abnormality secondary to hypoplasia of the homolateral lung or diaphragmatic muscular aplasia leading to cardiorespiratory symptoms. In adults it is mostly because of diaphragmatic palsy through injury to the phrenic nerve that causes dyspnea [1,2]. The incidence of this anomaly is 1 in 10,000 live births. They commonly are presented with respiratory manifestations [3]. This paralysis can be due to a birth trauma or to an injury sustained in surgery on intrathoracic organs.

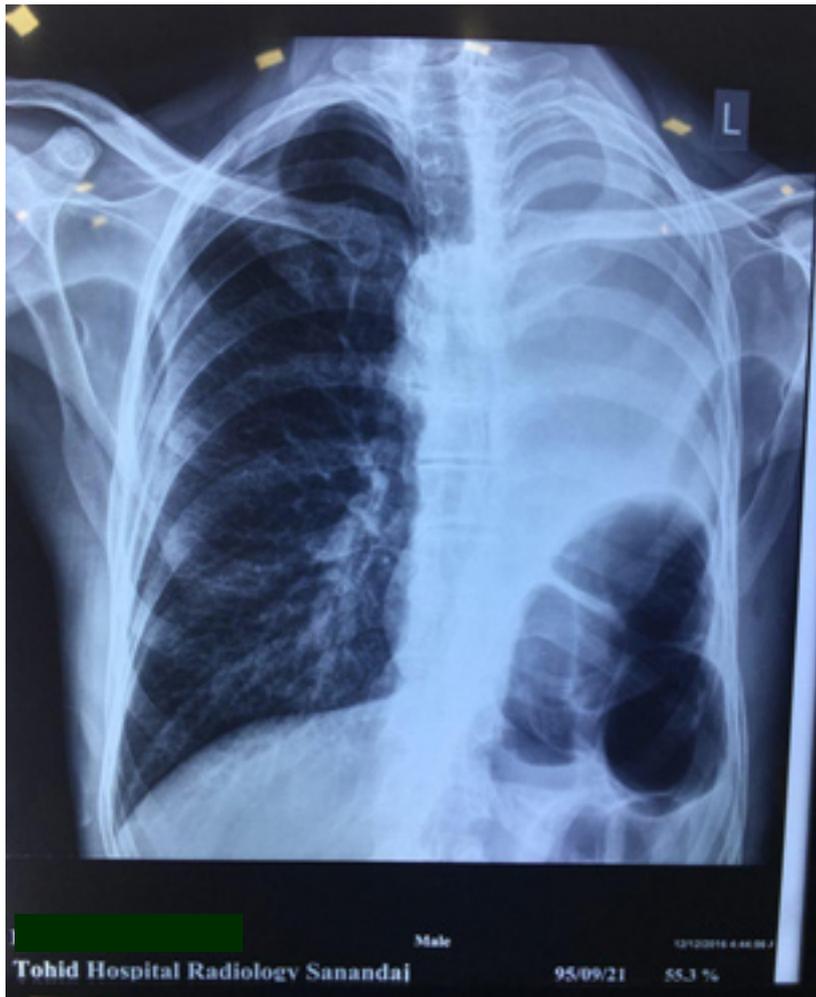
Sometimes asymptomatic ED may be treated conservatively, but symptomatic ED in children whether congenital or acquired, mostly requires surgical treatment [4, 5, 6]. If the abdominal viscera migrate to the thorax, the patient may have gastrointestinal symptoms. Cor pulmonale is the consequence of long-lasting paralysis of the diaphragm. There are also some patients without any explained cause of ED which is considered as idiopathic eventration [7].

Case Report

A 44 year old man suffering from abdominal pain and dyspnea was referred to our hospital. Having had a respiratory infection which was treated some months before, he had a chronic abdominal pain in the left upper side. He was complaining of nausea, vomiting, weight loss and chronic constipation which had made him use analgesics. He also had orthopnea without any cough or fever.

On inspection, the patient had distress as well as decreased sounds and movements in the left lower hemithorax on auscultation. He also had paradoxical thoracic movements. All laboratory tests were normal. In chest X-ray there was a homogenous opacity in the left lower hemithorax. The upper margin of the opacity was completely

Figure 1: PA chest X-ray demonstrating the eventration of left hemi-diaphragm with collapsed parts of left lung



obvious in postero anterior (PA) and lateral view which was demonstrating the eventration of diaphragm (Figure 1).

In ultrasound evaluation, the left hemi-diaphragm was in an upper level compared to the right side showing the evidence of viscera migration to the thoracic cavity. Since the situation of the patient was deteriorating, it was not possible to perform any computed tomography scanning. His distress was worsened so that respiratory arrest occurred. He was quickly intubated and underwent emergency surgery.

Left postero lateral thoracotomy was done via the 6th intercostal space and plication as well as left hemi-diaphragm excision (because he had some redundant parts) was performed. Left colon flexure and spleen in the thoracic cavity were reduced to the abdominal cavity very gently (Figure 2).

In pathologic examination, microscopic evaluation showed fibro-muscular tissue moderate to marked, infiltrated by chronic inflammatory cells associated with congested vessels and interstitial edema. There was no evidence of malignancy in the prepared sections. Post-surgical X-ray showed the left diaphragm in its proper position. The patient was discharged in good health after 5 days. He had no complaint of any related disease during one year of follow up.



Figure 2: Plication and excision of diaphragm at the position of left lateral decubitus through postero lateral incision

Discussion

Diaphragmatic eventration belonged to a manner in which the maximum part of the diaphragm consists of fibrous tissue with minimum amounts of muscle [8]. Rarely, total diaphragmatic eventration is investigated in the right side, but partial eventration is mostly seen in right hemi-thorax [9]. In our patient, a total eventration was seen in the left part of the thorax. In adults, it usually has no signs or symptoms and is found accidentally while assessing the chest through chest X-ray. But the presented case came to our center with abdominal pain and dyspnea. These symptoms are seen usually in obese patients following increased intra-abdominal pressure. Gastrointestinal and respiratory complaints with cardiovascular dysfunctions are related with this anomaly [10]. In some cases diaphragmatic eventration has manifested with gastric volvulus [11], intestinal strangulation [12] and recurrent sigmoid volvulus [13].

Eventration can also be due to injury to the phrenic nerve by neoplasms or surgeries that makes the differentiation in adults difficult. It can be differentiated through standard PA and lateral X-ray(?). In PA view, the eventration is diagnosed by a continuous curve originating from the mediastinum and inserted to the costal flexure [14]. Chest X-ray is a useful method for evaluation of diaphragmatic eventration with no need for respiratory fluoroscopy. CT scan and upper GI series can also be helpful [15]. Sonography is applied in order to differentiate partial eventration of phrenic nerve palsy [14].

Symptomatic ED is treated by surgical treatment through simple plication of the diaphragm [16]. It should not be performed in patients with low-level diaphragm eventrations with no mediastinal shift [17]. Respiratory mechanics are improved after plication when tidal volume and maximal breathing capacity increase through fixing the plicated diaphragm because the paradoxical movement and shift of the mediastinum are reduced [2, 5, 6, 18]. Nowadays, diaphragmatic plication by thoracoscopy has become an appropriate alternative method compared to the open technique which definitely needs advanced facilities and experience [19, 20].

Tiryaki et al evaluated the results of plication in 15 patients suffering from diaphragmatic eventration. They performed a simple and safe Diaphragmatic plication successfully in patients who had failure in conservative treatment. These researchers believe that after operation, most patients had immediate relief of symptoms. In those who had less remission, the symptoms were followed up over one year and had decreased apparently [16]. In some studies, the scientists have reported appropriate motions of diaphragm in long-term observation [6]. In the study of Tiryaki et al, the diaphragm was located normally in fluoroscopic evaluation without any evidence of paradoxical movement. Despite immobilizing the diaphragm, all their patients had not had any recurrence during the follow up [16].

In conclusion, eventration of diaphragm can have different manifestations. So the relevant differential diagnosis is very important. In those who do not have severe signs and symptoms as well as any response to conservative treatment, the choice is plication of diaphragm.

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