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First case of bilateral diaphragm eventration successfully repaired through an abdominal approach following lung transplantation

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First case of bilateral diaphragm eventration successfully repaired trough an abdominal approach following lung transplantation

A 61-year-old male patient with bilateral lung transplantation was admitted to the outpatient clinic with increasing respiratory distress for a month. Bilateral diaphragm eventration was observed in his examinations. Bilateral diaphragm plication was successfully performed abdominally in the patient who had a complaint despite supportive treatment. The respiratory capacity of the patient returned to normal.
The abdominal approach may be a good alternative option in cases where intrathoracic surgery cannot be performed due to adhesions in patients with eventration after lung transplantation.

KEY WORDS: Acquired eventration, Diaphragm, Lung transplantation

Introduction

The diaphragm is the primary muscle of respiration, and its weakness can lead to respiratory failure. The diaphragm's eventration is used to describe an abnormal elevation of part or whole of the hemidiaphragm. The abnormality can be congenital or acquired, thus presenting in both the pediatric and adult populations [1]. Phrenic nerve injury may occur from cardiothoracic surgery, leading to diaphragmatic paralysis or disfunction. Intrathoracic nerve injury is a condition that can be encountered during lung transplantation. The reported rates of high as 40% in combined heart-lung transplantation [2].

Multiple imaging modalities are available for diagnosis. Chest radiographs are the initial and most commonly performed imaging study to evaluate the diaphragm. When chest radiographs are indeterminate, spiral CT (computerized tomography) with thin sections or magnetic resonance imaging is the next choice [3]. Bilateral diaphragm eventration after lung transplantation is rare and usually does not require surgery. The main purpose in cases requiring surgery is to expand the intra-thoracic space as much as possible.
To our knowledge, we present this first case with bilateral diaphragm eventration after lung transplantation underwent plication by abdominal approach.

Case Report

A sixty-one-year-old man with bilateral lung transplantation history in December 2018 due to interstitial pulmonary fibrosis. One year after transplantation, partial decortication was performed by left thoracotomy secondary to pleural effusion. Progressive shortness of breath started one month ago, and 3-5 lt / min oxygen use was needed per day. There was a 21% decrease in the

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pulmonary function test in FEV 1 and a 50% decrease in the 6-minute walking test. Pulmonary CT angiography was performed because of high d-dimer and proBNP levels. Pulmonary embolism was not detected, but an elevation in both diaphragms and atelectasis due to compression in bilateral lower lobes was observed. Echocardiography revealed that the right atrium was under compression. A bilateral diaphragm plication was successfully performed in February 2021. The chest x-ray on the first day showed an improvement in lung capacity (Fig. 1). The inserted thoracic drainage was removed regularly. Follow-up of the patient continues on the 8th postoperative day.

Discussion

The clinical presentation of diaphragmatic eventration has a variable spectrum, depending on the type of eventration function of the diaphragmatic dome [11]. In adults, the most common form of presentation is asymptomatic. Asymptomatic patients are managed conservatively. Patients with symptoms require surgery, as in the present case [4].

The indications for surgical plication are respiratory distress, unresponsive to conservative treatment, dyspnea that is not due to another process, life-threatening or recurrent pneumonia, and inability to be removed from mechanical ventilation [5].

Morrison published the first report of a surgical repair in 1923. Since then, several series were published describing different techniques and results of diaphragmatic plication. This is a well-established treatment for the condition, and several studies have demonstrated it to be a safe procedure with good long-term results. With this technique, the muscle is fixed in the position of maximum inspiration, decreasing the ventilatory work. Plication can be done through the abdominal or thoracic route. Many studies have shown that thoracoscopic plication is as efficient as abdominal laparotomy or laparoscopic plication. We choose transabdominal surgery because of previous thoracic surgeries. Few outcome data are available on the results of open transabdominal plication in adults. Advantages of an open transabdominal approach include a laparotomy which is generally less morbid than a thoracotomy is utilized, single-lung ventilation is not necessary, and it allows access to both sides of the diaphragm with one incision [6].

Versteegh et al [7] showed that surgical treatment by plication of the diaphragm could be done with excellent long-term results in patients with unilateral or bilateral diaphragm paralysis, regardless of the etiology of phrenic nerve dysfunction. Celik et al [8] reported that diaphragmatic plication for unilateral diaphragm paralysis improves the quality of life in the long-term period. Maziak et al [9] reported that 185 patients who underwent lung transplantation were retrospectively evaluated, and 6 of them have diaphragmatic paralysis. And all have had acceptable lung function. Sano et al [10] retrospectively analyzed 49 patients with lung transplantation. Phrenic nerve paralysis (unilateral in 3 patients and bilateral in 1) was found in 4 patients. All of these paralyzes were transiently recovered. We experienced a case in which plication of the bilateral diaphragm with laparotomy resulted in adequate objective improvements in the pulmonary function in a patient with bilateral lung transplantation.

Conclusion

Diaphragm eventration may cause respiratory distress after lung transplantation. Bilateral diaphragm plication

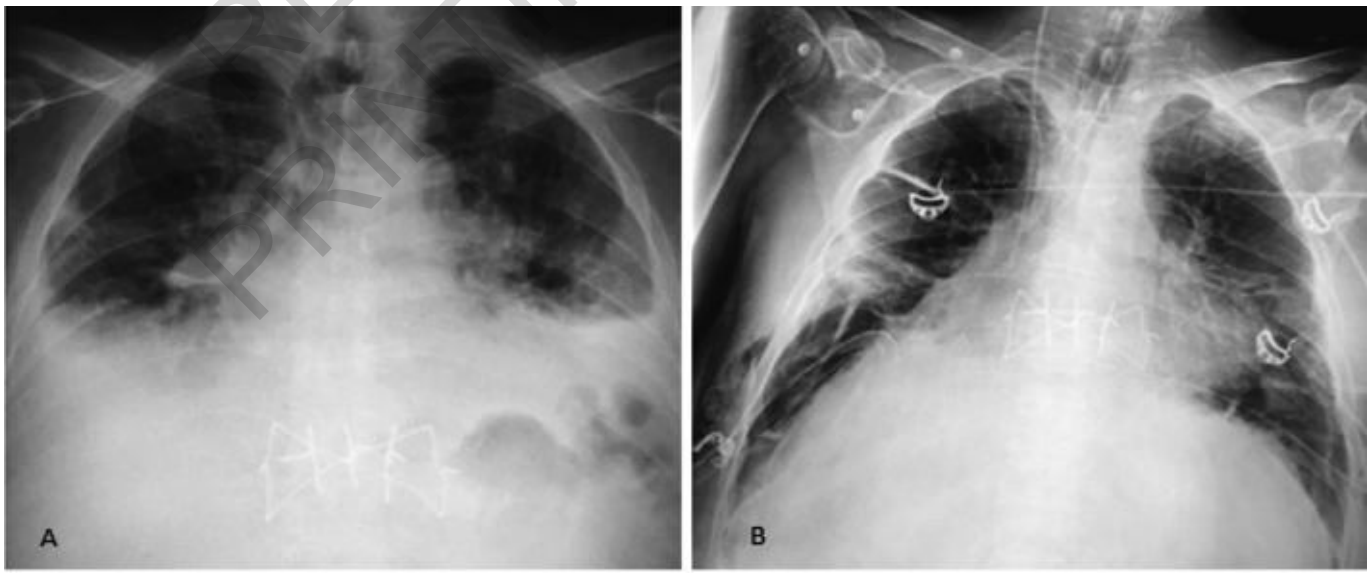

Fig. 1: A) Preoperative chest X-ray, B) Postoperative first-day chest X-ray.

should be considered in these patients. The abdominal approach may be a good alternative option in cases where intrathoracic surgery cannot be performed due to adhesions in patients with eventration after lung transplantation.

Riassunto

Un uomo di 61 anni, già sottoposto a trapianto polmonare bilaterale è stato ricoverato in ambulatorio per una crescente difficoltà respiratoria che durava da un mese. Studiando il caso è stata osservata un'eventazione bilaterale del diaframma. La plicatura bilaterale del diaframma è stata eseguita con successo con accesso addominale nel paziente che presentava difficoltà respiratroia nonostante il trattamento di supporto. Dopo l'intervento la capacità respiratoria del paziente è tornata alla normalità.
L'approccio addominale può essere una buona opzione alternativa nei casi in cui la chirurgia intratoracica non può essere eseguita a causa di aderenze in pazienti con eventration dopo trapianto di polmone.

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