



Case Report: Surgical Plication for Diaphragmatic Eventration in a 73-Year-Old Male with Significant Symptomatic and Pulmonary Function Improvement

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Abstract

Diaphragmatic eventration (DE) is a rare condition characterized by abnormal elevation of the hemidiaphragm due to congenital or acquired causes. This leads to impaired pulmonary function and progressive dyspnea in symptomatic cases. While many cases are incidentally discovered, symptomatic DE requires surgical correction to restore lung function and improve quality of life. This report presents a case of significant clinical and functional improvement following surgical plication for chronic left-sided DE.

Keywords: Diaphragmatic eventration; Pulmonary Function

Introduction

Diaphragmatic eventration (DE) is a pathological condition characterized by abnormal elevation of the hemidiaphragm due to congenital hypoplasia or acquired phrenic nerve dysfunction. Unlike diaphragmatic paralysis, DE maintains the continuity of the diaphragm's muscular and connective tissue layers while exhibiting paradoxical motion during respiration [1].

Most cases of DE are identified incidentally on chest radiographs or computed tomography (CT) scans. However, symptomatic cases can lead to progressive respiratory compromise, necessitating surgical correction. Diaphragmatic plication is the preferred treatment for symptomatic DE and has been shown to significantly improve dyspnea and pulmonary function [2,3]. This report highlights a case of chronic left-sided diaphragmatic eventration in an adult male, emphasizing the clinical improvement following surgical correction.

Case Report

A 73-year-old male presented to a regional respiratory clinic with a three-year history of progressive dyspnea (MRC Grade 3), exercise intolerance, and intermittent chest tightness. He reported

significant limitation in physical activity, with an inability to walk more than 100 meters without stopping due to shortness of breath. He also experienced difficulty speaking in full sentences during episodes of dyspnea. The patient denied orthopnea, paroxysmal nocturnal dyspnea, or similar previous episodes.

The patient had a history of hypertension, cervical spine fusion (C2–T1) following a motor vehicle accident, bilateral pneumothorax requiring pleurodesis, radiculopathy, and hyperlipidemia. He was a retired painter and coal miner with prolonged exposure to volatile organic compounds (VOCs), silica, and dust. He had no history of smoking or significant second-hand smoke exposure. His medications included atorvastatin (20 mg daily).

On presentation, the patient appeared visibly dyspneic at rest with accessory muscle use. His blood pressure was 135/80 mmHg, heart rate 86 bpm, respiratory rate 22 breaths per minute, and oxygen saturation was 94% on room air. Chest auscultation revealed decreased breath sounds over the left lower lung field, with dullness on percussion.

Pulmonary function testing demonstrated preserved forced expiratory volume (FEV1) and forced vital capacity (FVC), with an FEV1/FVC ratio suggestive of mild airflow limitation. The

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diffusion capacity of the lungs for carbon monoxide (DLCO) was moderately reduced.

High-resolution computed tomography (HRCT) of the chest confirmed significant elevation of the left hemidiaphragm with associated lung compression. No evidence of diaphragmatic rupture or abdominal organ herniation was identified. The heart size appeared normal, and surgical clips were visible at the gastroesophageal junction from a presumed prior hiatal hernia repair (Figure 1).



Figure 1: High-resolution computed tomography (HRCT) showing marked elevation of the left hemidiaphragm with adjacent lung compression. Surgical clips are visible at the gastroesophageal junction from a presumed prior hiatal hernia repair.



Figure 2: Preoperative chest radiograph demonstrating chronic elevation of the left hemidiaphragm with reduced lung volume.

A preoperative chest radiograph demonstrated chronic elevation of the left hemidiaphragm, consistent with diaphragmatic eventration (Figure 2). A fluoroscopic sniff test showed normal movement of both hemidiaphragms, ruling out phrenic nerve

palsy and further confirming the diagnosis (Figure 3). Postoperative imaging, including a chest radiograph taken four months after surgical intervention, revealed complete resolution of the left-sided diaphragmatic eventration, with the diaphragm restored to its normal position and no recurrence of elevation (Figure 4).



Figure 3: Fluoroscopic image showing normal movement of both hemidiaphragms during quiet respiration, ruling out phrenic nerve palsy.

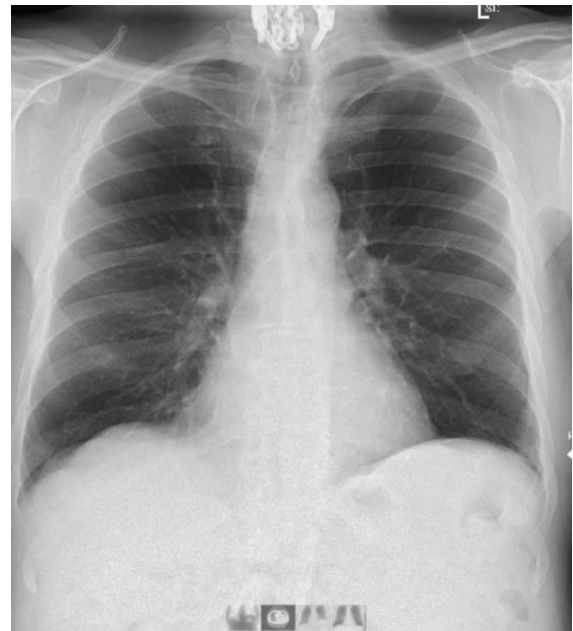


Figure 4: Postoperative chest radiograph showing complete resolution of the left-sided diaphragmatic eventration and normalization of the diaphragm's position.

Surgical Intervention and Outcome

The patient underwent a left thoracotomy with diaphragmatic plication eight months after his initial presentation. Intraoperative



findings confirmed a thinned but intact diaphragm without evidence of rupture or malignancy. Multiple non-absorbable sutures were used to restore diaphragmatic tension and improve lung expansion.

At the four-month follow-up, the patient reported significant symptomatic improvement, with a return to baseline physical activity (MRC Grade 0). Repeat pulmonary function tests showed improved FVC and FEV1, indicating enhanced lung capacity. Postoperative imaging confirmed that the diaphragm remained in its normal position, with no evidence of recurrence.

Discussion

Diaphragmatic eventration is an uncommon but important cause of dyspnea in adults. It can result in significant respiratory compromise if left untreated. While conservative management may be appropriate for asymptomatic cases, symptomatic patients benefit from surgical diaphragmatic plication [4]. This procedure restores diaphragmatic function and reduces paradoxical movement, leading to improved pulmonary function and quality of life.

Thoracotomy remains the gold standard for plication in cases requiring optimal tactile feedback and precise diaphragmatic tensioning. Although video-assisted thoracoscopic surgery (VATS) offers reduced postoperative morbidity, its tactile limitations make it less favorable in complex cases [5].

In this case, postoperative imaging and clinical follow-up confirmed the success of the intervention. The complete resolution of the diaphragmatic elevation and restoration of pulmonary function highlight the efficacy of surgical correction in symptomatic DE.

Conclusion

This case illustrates the significant clinical and functional improvement that can be achieved through surgical correction of diaphragmatic eventration. Early diagnosis and timely referral are crucial for optimizing outcomes. Increased awareness of this condition, particularly in regional settings, can prevent diagnostic delays and ensure better patient care.

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