

## Case Report

# Massive diaphragmatic eventration: plication

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### ABSTRACT

Diaphragmatic eventration (DE) is a distinctive condition characterised by the abnormal elevation or displacement of a portion of the diaphragm, often leading to a protrusion of abdominal contents into the thoracic cavity. Unlike diaphragmatic hernias, eventrations involve a congenital or acquired weakness of the diaphragmatic muscle itself rather than a structural defect. Congenital eventrations typically arise from the incomplete development or muscular hypoplasia of the diaphragm, while acquired forms may result from trauma, surgery, or neurological disorders affecting the phrenic nerve. Clinical manifestations vary widely, with some individuals remaining asymptomatic, while others may experience respiratory difficulties, especially when lying down. The case involves a 65-year-old female with a history of breathlessness exacerbated in the lying position, improved when upright. Examination revealed low oxygen saturation, absent breath sounds on the left chest, and bowel sounds in that region. Chest X-ray and HRCT indicated bowel loops in the left chest due to eventration of the left hemidiaphragm. Surgical intervention involved thoracotomy, identifying a lax left hemidiaphragm, mobilising abdominal contents, and performing plication with proline 1-0. Closure was completed with an intercostal drainage (ICD) in the left thoracic cavity. Postoperative period was uneventful. This case emphasises the significance of prompt diagnosis and surgical intervention in managing DE, showcasing the effectiveness of thoracotomy, hemidiaphragm plication, and ICD placement.

**Keywords:** Thoracotomy, Eventration, Plication

### INTRODUCTION

Diaphragmatic eventration (DE) is an abnormal condition in which a portion or the entire hemidiaphragm elevates due to insufficient muscle or nerve function while maintaining its anatomical attachments.<sup>1</sup> Any disruption in the integrity of the diaphragm can lead to functional impairment and subsequent respiratory distress. Eventrations of the diaphragm are further divided on an anatomical basis as complete, partial, or bilateral. On embryological bases, congenital eventration could be anterior, posterolateral, and medial.<sup>2</sup> DE is a rare entity, incidence being reported less than 0.05% and has male predominance. Incidence of congenital DE is about 1 in 10,000 and has male predominance.<sup>3</sup> Adult DE is usually incidental diagnosis on chest X-ray as most of the cases

are asymptomatic depending on the extent of eventration.<sup>4</sup>

### CASE REPORT

A 50-year-old female presented with complaint of shortness of breath, worsened in supine position. Initial saturation was 85% on room air, improving to 97% with 4 L of oxygen. Vitals were stable, but on auscultation, absent breath sounds were noted in the left lower chest. Chest X-ray revealed a picture reminiscent of diaphragmatic hernia with mediastinal shift to the right. High-resolution computed topography chest was subsequently performed, unveiling massive eventration of the left diaphragm with muscle weakening, yet no evidence of herniation. Pulmonary function test could not be performed as the patient had significant dyspnea.

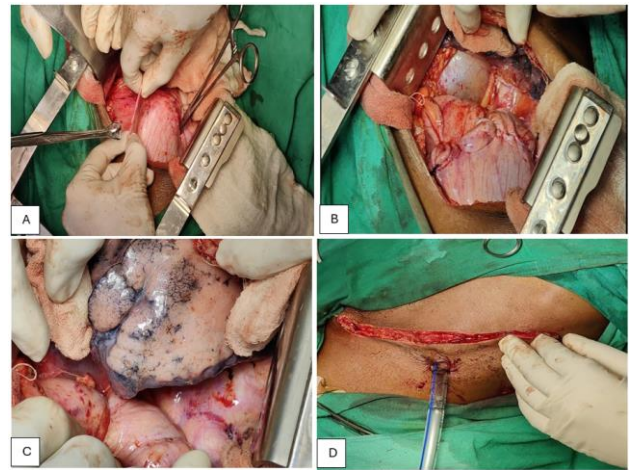


**Figure 1: Chest radiograph showing left hemi-DE with mediastinal shift to right.**



**Figure 2: High resolution computed tomography chest showing massive left DE.**

Elective posterolateral thoracotomy was performed, confirming massive eventration. There was no evidence of any herniation through diaphragm. Plication of the left hemidiaphragm was done using prolene 1-0. A 28 French size ICD tube was placed in the left thorax, followed by closure.



**Figure 3: (A) Weak diaphragmatic muscle; (B) plication of left hemi-diaphragm; (C) fully expanded left lung after plication of left hemi-diaphragm; and (D) placement of intercostal drainage and closure.**

On post operative day one, chest X-ray displayed expanded left lung, with no tracheal or mediastinal shift. Post-operative course was uneventful.



**Figure 4: Plain radiograph taken on post-operative day one showing expanded left lung and no mediastinal shift.**

## DISCUSSION

DE poses diagnostic challenges, often masquerading as other conditions like diaphragmatic hernia. Eventration of diaphragm is a rare pathology usually asymptomatic because the defect is usually small, with some muscle function being preserved and with no compromise of the contralateral diaphragm.<sup>5</sup> In cases of serious and persistent respiratory distress or who need mechanical

ventilation, you must do the surgical fixation of the diaphragm, which is surgical procedure of choice in cases of DE.<sup>6</sup> Diaphragmatic plication is a well-known method used to treat patients with DE in order to allow lung re-expansion on the affected side.<sup>7</sup> Final diagnosis can be confirmed intra-operatively. There are two main techniques to manage diaphragmatic elevation due to eventration or paralysis in open surgery through a thoracotomy access: central imbrication technique and radial plication technique.<sup>3</sup> As reported in references surgical intervention, as performed in this case, involving plication and securing abdominal contents provides symptomatic relief.

## CONCLUSION

Surgical approach for massive DE leading to respiratory symptoms and hypoxia should be considered in the management plan. Diaphragmatic plication can relieve the respiratory symptoms and improve the quality of life of the patient.

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## REFERENCES

1. Gupta P, Wani S, Vishakha K, Patankar R. First ever reported case of right-sided rupture of eventration of the diaphragm: Thoraco-laparoscopic approach. J Minimal Access Surg. 2024.
2. Kocher G, Al-Hurani M, Dorn P, Lutz J. Thoracoscopic diaphragm plication. Multimed Man Cardiothorac Surg. 2020;2020.
3. Guzman JPS, Delos Santos NC, Baltazar EA, Baquir ATD. Congenital unilateral diaphragmatic eventration in an adult: A rare case presentation. Int J Surg Case Rep. 2017;35:63-7.
4. Visouli AN, Mpakas A, Zarogoulidis P, Machairiotis N, Stylianaki A, Katsikogiannis N, et al. Video assisted thoracoscopic plication of the left hemidiaphragm in symptomatic eventration in adulthood. J Thorac Dis. 2012;4(1):6-16.
5. Agarwal AK, Lone NA. Diaphragm Eventration. 2023 Jul 24. In: StatPearls. Treasure Island (FL): StatPearls Publishing. 2024.
6. Pradhan P, Karmacharya RM, Vaidya S, Singh AK, Thapa P, Dhakal P, et al. Case report of eventration of diaphragm due to an unknown febrile illness causing phrenic nerve palsy and other multiple nerve palsies. Ann Med Surg (Lond). 2020;54:74-8.
7. Patrini D, Panagiotopoulos N, Bedetti B, Lawrence D, Scarci M. Diaphragmatic plication for eventration or paralysis. Shanghai Chest. 2017;1:25.

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