

Idiopathic Unilateral Diaphragmatic Eventration in an Adult: A Rare Case Presentation

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Abstract: ***Introduction:** Eventration of diaphragm is an abnormal elevation of diaphragmatic musculature while retaining normal attachments to the sternum, ribs and dorsolumbar spine. It can be congenital or acquired. Congenital eventration of diaphragm mostly presents during infancy and only rarely becomes symptomatic during adulthood. Eventration of diaphragm in adults are mostly acquired and due to damage to phrenic nerve by trauma, infections, multiple sclerosis, Guillain-Barre syndrome, nerve compression, radiation therapy, and connective tissue diseases. **Case Report:** We are reporting a rare case of a 44-year-old male having left sided total diaphragmatic eventration. The patient presented with progressive dyspnea, chest pain and cough. Clinical examination and imaging with chest x-ray, ultrasound chest and CECT thorax suggested eventration of left hemidiaphragm for which plication of left hemidiaphragm was performed through an abdominal approach. There were no postoperative complications and he was discharged on the tenth postoperative day. **Conclusion:** Diaphragmatic eventration in adult with no history of trauma is a rare case to be reported in India. The aim of treatment is expansion of intra-thoracic space which is done by plication of the diaphragm.*

Keywords: Eventration of diaphragm, Diaphragmatic plication, Adult diaphragmatic hernia

1. Introduction

Eventration of diaphragm (ED) is an abnormal elevation of diaphragmatic musculature while retaining normal attachments to the sternum, ribs and dorsolumbar spine. It is a rare anomaly where the continuity of diaphragm remains intact. Pathological process can affect either all or only a portion of hemidiaphragm. Symptoms vary according to size of the defect. Large defect may mimic diaphragmatic hernia. It may have a congenital reason or may be acquired^{1, 2}. Congenital eventration of diaphragm mostly presents during infancy and only rarely becomes symptomatic during adulthood. It is a developmental abnormality secondary to hypoplasia of the homolateral lung or diaphragmatic muscular aplasia leading to cardiorespiratory symptoms. The incidence of this anomaly is 1 in 10, 000 live births. They commonly are presented with respiratory manifestations³. This paralysis can be due to a birth trauma or to an injury sustained in surgery on intrathoracic organs.

In adults eventration of diaphragm is mostly because of diaphragmatic palsy through injury to the phrenic nerve that causes dyspnea^{4, 5}. Damage to phrenic nerve can be due to trauma, infections, multiple sclerosis, Guillain-Barre syndrome, nerve compression, radiation therapy, and connective tissue diseases.

Sometimes asymptomatic ED may be treated conservatively, but symptomatic ED whether congenital or acquired, mostly requires surgical treatment^{6, 7, 8}. 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 eventration⁹.

2. Case Report

Case Details

A 44 year old gentleman presented with chief complaint of progressive dyspnea for 2 months along with left sided chest pain, cough and orthopnea. The patient also had low grade fever and epigastric discomfort. He had no history of trauma or any other illness.

On general physical examination the patient had respiratory distress and low grade fever. Chest examination revealed decreased movement in left infra-mammary, infra-axillary, and infra-scapular areas. Vocal fremitus was decreased on the left side. Breath sounds were decreased in the left infra-mammary, infra-axillary, and infra-scapular areas with dull note on percussion starting from left 4th intercostal space. Bowel sounds were heard from left 5th intercostal space.

Other systemic examination were within normal limits. Blood investigation revealed raised C-reactive protein levels (10.7mg/dl). Chest X-ray (Fig.1) showed elevated left hemidiaphragm up to 4th rib with normal gas shadow of bowel underneath. Ultrasound showed paradoxical and limited movement of the left hemidiaphragm with breathing. Also, the left hemidiaphragm was in an upper level compared to the right side showing evidence of viscera migration to the thoracic cavity.



Figure 1: Chest X Ray



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CECT THORAX (Fig.2) showed large defect in the posterior part of the diaphragm on left side with herniation of abdominal viscera like bowel loops (splenic flexure/ adjacent part of descending colon) and spleen. The stomach appeared to be slightly up. Mild sub-pleural reticulation were seen in bilateral lower lobes. Mild thickening of the major fissure on left side was also seen. The findings suggested pleuro-peritoneal hernia on the left side with sequelae of old infection in bilateral lung parenchyma.

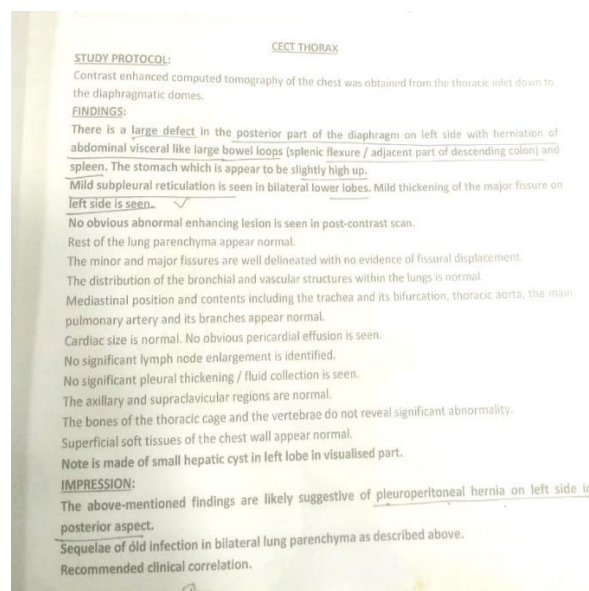


Figure 2: CECT Thorax



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An impression was diagrammatic hernia versus eventration of left hemidiaphragm was made and operative management was considered for treatment for which the patient provided an informed consent.

The patient underwent plication of the left diaphragm through the abdominal left subcostal approach. Intra-operatively, the diaphragm was noted to be thinned out with the central portion of the left diaphragm attenuated and membranous. Eventration of the left diaphragm was visualized with no adhesions with underlying bowel. Transverse colon and spleen was seen to be migrating into the thoracic cavity. The stomach was also a little higher up than normal position.

Plication was done in two layers using 1 no round body prolene suture.

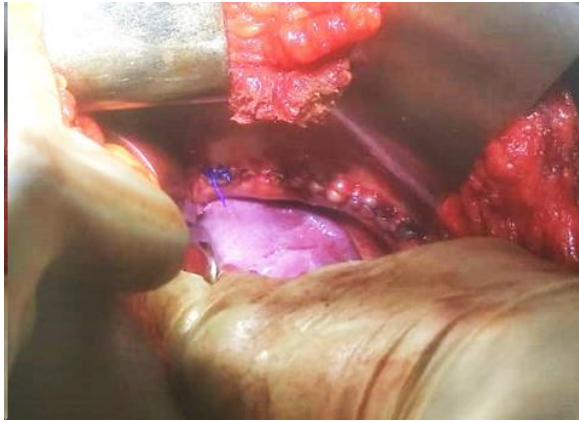


Figure 3: Intra-operative pic showing plicated diaphragm

Postoperatively the patient was started on incentive spirometry and deep breathing exercises. Patient was discharged 10 days post-operatively with the lungs fully expanded. Patient has an unremarkable post-operative course.

After 5 months, patient had followed-up with us and reported no dyspnea, no epigastric pain with full return to activities.

3. Discussion

In adults eventration of diaphragm is mostly because of diaphragmatic palsy through injury to the phrenic nerve that can be due to trauma, infections, multiple sclerosis, Guillain-Barre syndrome, nerve compression, radiation therapy, and connective tissue diseases. Ours was a rare case as the cause of eventration of diaphragm could not be determined. He had no history of any trauma or any major illness other than the symptoms of dyspnea present for 2 months and low grade fever for few days. CECT Thorax also showed sequelae of old infection in bilateral lung parenchyma. We concluded the cause to be idiopathic.

Management of diaphragmatic eventration varies greatly on the symptoms of the patients. Simple cases of diaphragmatic eventration may not require intervention when not associated with adverse symptoms. Plication is indicated if there are symptoms of dyspnea which can be due to decrease ventilation and oxygenation because of paradoxical motion of the affected diaphragm during inspiration and expiration. The abdominal approach is widely accepted approach because this allows ready access to both diaphragms and it permits abdominal exploration for evaluation of other gastrointestinal symptoms experienced by the patient¹⁰. We did an abdominal approach to evaluate the abdomen because the patient had epigastric discomfort. Intra-operatively, splenic flexure and spleen was seen to be migrating into the thoracic cavity. The stomach was also a little higher up than normal position.

Multiple imaging modalities are available for the pre-operative diagnosis of diaphragmatic problems. Chest radiographs are the initial and most commonly performed imaging to evaluate the diaphragm. When chest radiographs are indeterminate to differentiate between eventration and hernia, a CT-Scan with thin sections can evaluate the diaphragm¹¹. It is important to differentiate diaphragmatic

hernia and eventration to be able to plan surgical management pre-operatively. In this patient, the CECT thorax suggested diaphragmatic hernia and correct diagnosis could only be made intraoperatively. We highlight the importance of good physical examination and judicious use of imaging modalities among patients suspected of diaphragmatic eventration.

Complications after abdominal plication of a diaphragmatic eventration commonly include atelectasis and rarely, abdominal compartment syndrome and splenic injury after mobilization of the left upper quadrant abdominal structures^{12, 13}. Thus incentive spirometry, adequate analgesia and deep breathing exercises are usually recommended after plication as was done in our patient.

The aim of surgical repair is to place the diaphragm in a position of maximum inspiration which relieves compression on the lung parenchyma and allows its re-expansion. Literature states that the plicated diaphragm is still immobile and even though elevated, plication prevents paradoxical motion during breathing¹⁴. Potential benefits of diaphragmatic plication are still uncertain in the long term period. But several case reports describe patients to return to a more or less normal way of life with significant improvement of pulmonary function status¹⁵. Thus, follow-up is important in patients who underwent plication of diaphragmatic eventration to assess recurrences and its long term complications. Although the patient had follow-up up only till 5 months, long term benefits in these patients are yet still to be determined. While others argue that since these are cases diagnosed incidentally, the value of surgical repair done in eventration may be limited. But we still recommend surgery once diagnosis is confirmed if not for better lung mechanics but to prevent other complications such as gastric volvulus.

Consent

Although, this is a case report, the patient consented to this publication. No identifying characteristics are presented in this paper that could compromise the patient's anonymity.

4. Conclusion

Diaphragmatic eventration in adult with no history of trauma is a rare case to be reported in India. The aim of treatment is expansion of intra-thoracic space which is done by plication of the diaphragm.

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