

Late Presentation of Post-Traumatic Diaphragmatic Eventration

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Abstract: A 36 years old male presented to the department of Cardio Thoracic Vascular Surgery (CTVS) with history of chest pain, cough, shortness of breath and fever of 1 month duration. Past history- History of penetrating neck injury on the left side at the base of neck 10 years ago, following which there was a decline in motor function in his left upper limb. He underwent exploration of the wound, following which motor function improved. On presentation his X-Ray chest PA view showed elevated left dome of diaphragm with fundic gas bubble visible in the mediastinum. Plication of the diaphragm was undertaken to relieve the patient of his symptoms and arrest any further complications that may arise as a result of the eventration.

Keywords: Diaphragmatic Eventration, Cardio Thoracic Vascular Surgery, CTVS

1. Introduction

Diaphragmatic eventration (DE) is a pathologic condition defined by a permanent elevation of an immobile hemidiaphragm that cannot participate actively in respiration. Peripheral muscular attachments are normal, the diaphragmatic apertures are sealed appropriately, and there is no interruption in the pleural or peritoneal layers as is seen with diaphragmatic hernias. Instead, a flap of lax diaphragmatic tissue inhibits appropriate muscular excursion with respiration and intrudes into the thoracic cavity displacing its contents along with the mediastinum. The defect can be unilateral, localized, or bilateral. DE may be a congenital anomaly caused by failure of muscularization of the dome of a hemidiaphragm or it may be acquired as a result of dysfunction of the phrenic nerve in cases such as neuromuscular disease, trauma, or iatrogenic injury.

2. Case Report

A 36 years old male presented to the department of cardio thoracic vascular surgery (CTVS) with history of chest pain, cough, shortness of breath and fever of 1 month duration.

Past history- History of penetrating neck injury on the left side at the base of neck 10 years ago (figure-1), following which there was a decline in motor function in his left upper limb. He underwent exploration of the wound (figure-2). Following which motor function was improved.

On examination:

Chest examination revealed decreased movements on the left infra-mammary, infra-axillary, and infrascapular areas.

- Tactile vocal fremitus was decreased on the left infrascapular area.
- Vocal resonance was impaired on the left infrascapular area.

- Breath sounds were decreased in the left infra-axillary and infrascapular areas.
- Bowel sounds were heard in the left side of chest.

Investigations:

Hemogram within normal limits.

HIV and Mantoux test were negative.

Chest X-ray (figure-3,4) showed raised dome of left diaphragm and mediastinal shift to the right side.

CT scan chest confirmed the findings of the eventration of left dome of diaphragm. (figure-5)

2D ECHO:

Dextroposition of Heart

In view of the ongoing COVID pandemic, RTPCR and Rapid antigen test done which were negative.

3. Procedure

After nasogastric tube (NGT) placement and auscultation to confirm placement of tube. Air gush noted in epigastric and 5th intercostal space (mid-clavicular line)

Under general anaesthesia with rapid sequence intubation with double lumen ET (endo tracheal) tube, chest was opened by the left posterior thoracotomy at 6th intercostal space. Pleura opened, eventration of diaphragm noted with parchment thin diaphragmatic layer (figure-6). The stomach extending until the 4th intercostal space. Multiple 3-0 prolene pledgeted sutures taken from the posterior aspect to the anterior aspect and tied sequentially (figure-7). Neat plication of the dome obtained with '9' sutures in toto (figure-8). Haemostasis achieved. Pleural cavity washed with saline. Intercostal chest drain (ICD) placed in pleura, following intercostal (IC) block with 2% xylocaine, pericostal sutures were taken, rib cage closed and rest of the wound closed in layers. Patient extubated on the table and shifted to intensive care unit (ICU) in a stable condition.

He was discharged after 4 days and advised for spirometry exercise, chest physiotherapy and arm exercises. On last follow up he was back to work and asymptomatic.



Figure 1: The old stab injury to the left side of neck with healed scar of the surgery.



Figure 2: Old Operated scar of wound exploration



Figure 3: Chest X- Ray PA view: elevated left dome of diaphragm with fundic gas bubble visible in the mediastinum. Contents of the mediastinum shifted to the right side. Tracheal deviation to right side present.

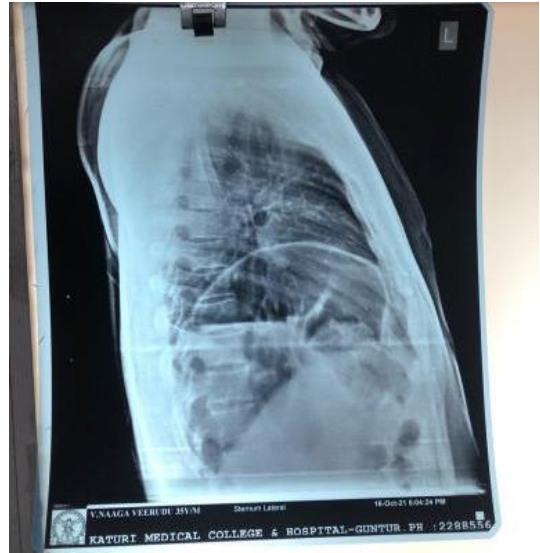


Figure 4: Chest X-ray left Lateral view: elevated left dome of diaphragm with fundic gas bubble visible in the mediastinum



Figure 5: CT chest: showing elevated left dome of diaphragm with fundic gas bubble in the left mediastinum

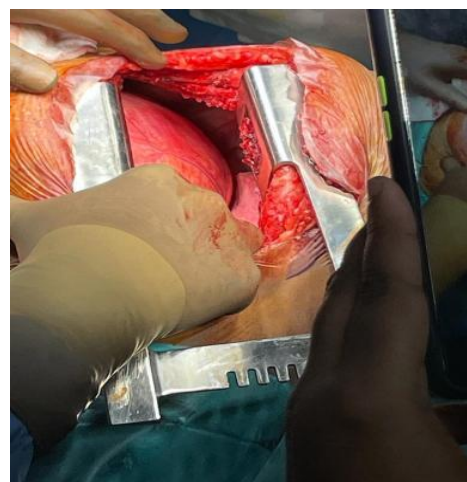


Figure 6: Intra operative view of elevated left dome of diaphragm



Figure 7: Intra operative view of elevated left diaphragm being plicated using pledgetted 3-0 prolene



Figure 8: Intra operative view of left diaphragm after completion of the plication

4. Discussion

Diaphragmatic eventration is an abnormal elevation of a portion or entire hemidiaphragm due to lack of muscle function or nerve function with normal anatomical attachments. The abnormality can be congenital or acquired, thus presenting in both the pediatric and adult populations. The diaphragm is innervated by the phrenic nerve, which originates from the C3, C4, and C5 spinal nerve roots. Patients are asymptomatic and eventration is noted incidentally on imaging. Symptomatic patients typically present with dyspnea on exertion and orthopnea due to the elevated diaphragm and ventilation-perfusion mismatch as well as impaired ventilation.¹ Non-specific gastrointestinal symptoms such as dyspepsia, epigastric pain, belching and nausea may also be present.³

Plication of Diaphragmatic eventration is a safe and feasible treatment that improves respiratory function.

Unlike diaphragmatic hernias, no risk of incarceration or obstruction exists and asymptomatic eventration can be observed. There are several case reports in the literature

describing similar circumstances, where an eventration was not suspected and ultimately diagnosed at surgery.^{4,5}

A diagnostic laparoscopy is an appropriate surgical approach for both diaphragmatic eventration and hernia, with successful repairs described for both. Furthermore, even though eventration is relatively uncommon, one must consider this among the differential diagnoses of diaphragmatic hernia prior to surgery (especially intraoperatively, when things are not clear cut). The diagnosis can be made during laparoscopy if performed by an experienced surgeon. Alternatively, when there is high suspicion for diaphragmatic eventration, a thoracoscopy can be carried out to confirm the diagnosis and prevent unnecessary abdominal dissection.

The preferred treatment for diaphragmatic eventration is plication of the diaphragm. A variety of plication techniques - either from a thoracic or abdominal approach-may be performed, such as thoracotomy, laparotomy, laparoscopy and video assisted thoracic surgery for plication can be administered, either from a thoracic or abdominal approach.^{6,7} Regardless of the technique used, diaphragmatic plication repositions and flattens the diaphragm to its normal position during inspiration while pushing back the abdominal organs to their usual location in the abdomen to allow lung expansion.

5. Conclusion

This case has been presented due to the abnormally late presentation of an eventration, following a stab injury to the left side of the neck. The patient was asymptomatic in the early phase of injury as far as eventration of diaphragm is concerned.

This indicates a partial/complete injury to the left phrenic nerve, following which diaphragmatic paresis progressed to paper thin diaphragm (atrophy) leading to eventration of the ipsilateral dome.

A proper diagnosis with correct surgical repair does much to alleviate the symptoms associated with eventration and prevents further rupture of the paper thin diaphragm, resulting in herniation in to the thorax and associated complications.

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