DIAGNOSTIC DILEMMA OF A DIAPHRAGMATIC HERNIA

Salman Yahya\textsuperscript{1}, Sonia Zafar\textsuperscript{1}, Hafsa S. Babar\textsuperscript{2}

\textsuperscript{1} Department of Anesthesia and Pain Management and \textsuperscript{2} Department of Radiology, Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore, Pakistan

Received: 04 July 2018, Accepted 17 September 2018

Abstract

Diaphragmatic hernia post esophagectomy is a rare complication but a reality in its existence. It is typically difficult to diagnose but highly depends on keeping high index of suspicion. In our case report, a 45 year old male who underwent esophagectomy for esophageal carcinoma, remained disease free and stable in his 9 months follow up, suddenly presented in the emergency department with the symptoms of shortness of breath, chest pain, vomiting and tachycardia. The case was typically complicated by the initial treatment given for acute ischemia and cardiogenic shock. Radiological findings proved to be helpful and turning point in the diagnosis and overall management.

Key words: Esophagectomy, Diaphragmatic hernia.

Introduction:

Diaphragm is our major muscle of respiration and its excursion along with chest wall expansion creates the negative intrathoracic pressure required for inhalation. This same pressure can cause prolapse of retroperitoneal or intra- abdominal contents into the thoracic cavity through any diaphragmatic defect, either congenital or acquired. [1]

Aetiology for acquired diaphragmatic rupture is mostly penetrating or blunt injury but it can also be iatrogenic following cardiothoracic and abdominal procedures. [2] The complications arising from rupture to herniation of contents can lead to significant morbidity and mortality. This rare condition is often misdiagnosed because of its unusual clinical manifestations and delayed recognition can lead to complications such as strangulation, infarction and perforation. Prompt diagnosis and surgical repair is recommended and traditionally, repair is done by laparotomy or thoracotomy, or both.

3 stage esophagectomy is a well-known procedure done for tumors of the upper thoracic oesophagus where esophagectomy can be performed through a right thoracotomy, then by simultaneous left cervical and abdominal incisions the stomach can be prepared and delivered up to the neck for anastomosis (McKeown's procedure). [3]

Case Report:

A 45-year-old male, presented in February 2017, with complaint of progressive dysphagia and epigastric pain for 6 months was diagnosed with Squamous Cell Carcinoma of distal oesophagus. On endoscopy, the tumor was found to be starting at 31cm from the incisors and extending down to 38 cm with the GO junction present at 40cm. Subsequent staging with PET CT scan showed a cT3N1Mx tumor. Neoadjuvant chemotherapy and radiation followed by surgical intervention was suggested as the course of treatment by the multidisciplinary tumor board. He proceeded to neoadjuvant therapy with Carboplatin and Paclitaxel along with radiotherapy but regimen was withheld on fifth cycle due to complaint of non-herpetic rash and low platelet count. He was fed enterally with a PEG tube and repeat PET-CT scan showed stable disease. Following a period of nutritional support, the patient proceeded to surgery after re-assessment.

Laparoscopic 3 stage Esophagectomy was successfully done in August 2017. Patient was discharged on 7th postoperative day with 2 days stay in the intensive care unit. He was kept on 3 monthly
surveillance and follow up both by the oncologist as well as surgeon.

He remained asymptomatic and disease free on each follow up till he presented in the emergency department with complaint of epigastric and left sided chest pain for last 4 days accompanied by 3 – 4 episodes of non-projectile vomiting per day, constipation and orthopnoea. Pain was continuous, dull, moderate to severe in intensity and not associated with exertion. On examination, patient was frail, cachectic, conscious, oriented but short of breath and unable to lie flat. He was found to be tachycardiac (heart rate 156 beats/min), hypotensive with systolic pressure around 80 mmHg and hypoxic, saturation 84% on 4-liters of oxygen. There was decreased air entry in left lower and middle zone and abdomen was soft but tender in left hypochondrium with sluggish bowel sounds.

Initial ECG showed T wave inversions and ST segment depression in leads V2 – V3, Trop I value was 0.7 with ejection fraction of 40-45% on echo raising the suspicion of cardiogenic shock secondary to ischemia. 2 litres of crystalloids were rushed to the patient, oxygen through BIPAP, Clopidogrel and Aspirin 300mg each were given immediately in the emergency department after cardiology input. ABGs showed respiratory alkalosis.

Chest X-ray (Figure 1) depicted whiteout left lung with a few air fluid levels and mediastinal shift. Treatment was then shifted on lines of hypoxemic respiratory failure secondary to massive pleural effusion and urgent pleural tap was planned.

CT chest and abdomen with contrast finally revealed strangulated diaphragmatic hernia containing small bowel loops in left hemithorax with collapse of left lung and mediastinal shift (Figure 2).

Patient was optimized to the best possible levels with transfusions and fluid resuscitation and shifted to operating room for Laparoscopic repair of 4 cm defect in diaphragm, segmental resection of gangrenous bowel, ileostomy and left sided chest tube insertion was done. Awake arterial line was placed and rapid sequence induction was done which remained uneventful. The situation started to improve quickly once the gangrenous gut was removed and defect repaired.

Figure 1: CXR showing gut loops in the left hemithorax (shown as X) and significant white-out left lung and mediastinal shift (shown as ←)

Figure 2: Coronal, sagittal and cross sectional reformatted images through chest and abdomen demonstrate multiple hypo-enhancing bowel loops extending into the left hemithorax. Large left pleural effusion is most likely secondary to compromised bowel loops.

The postoperative period was complicated by intraabdominal hematoma formation causing haemoglobin level to drop from 7.5 g/dL to 5.1 g/dL within a few hours. Patient underwent exploratory laparotomy on the same day on double pressor supports (Noradrenaline + Phenyl epinephrine), along with ventilatory support, to find out the source of bleeding. Lab reports showed a decreasing trend of platelet count with fall from 70 to 47 despite...
transfusion of packed red blood cells preoperatively as well as mega unit and whole blood transfusion post re-exploration. He remained in intensive care unit for 3 days after abdominal washout and later postoperative recovery was gradual but remained uneventful.

Discussion

Trans-hiatal hernia is a rare, most often missed or misdiagnosed complication of thoracoabdominal procedures. [4] All patients having history of surgical intervention on oesophagus, complaining of nonspecific epigastric pain, suspicion of hiatal or diaphragmatic hernia should always be considered. The list of differentials must consider diaphragmatic hernia, on the basis of high clinical index of suspicion and past history, for early and effective management. [5]

Ruptures are typically located in the posterolateral aspect of the hemi diaphragm because this area is embryologically weaker and more on the left side as the right diaphragm can withstand greater changes in the intraabdominal pressure gradient due to its protection by the liver. [6]

Small diaphragmatic tears may enlarge over time, allowing herniation of abdominal organs such as stomach, spleen, colon, small bowel or liver into the thoracic cavity leading to mediastinal shift causing respiratory and circulatory disturbances. [7] This masks the primary underlying pathology and plays a huge part in greater incidence of complications. And thus, delayed diagnosis can be catastrophic for such patients. Price et al. [8] in a large case series of 2,182 patients, who underwent esophagectomy, found 15 patients (0.69%) required surgical exploration for symptomatic diaphragmatic hernia as initial surgery complication.

Imaging plays a crucial role. Chest x-ray may demonstrate an elevated hemidiaphragm, distortion of the diaphragmatic margin, visceral content in the thorax, loculated left pneumothorax, mediastinal shift, and when a nasogastric tube is in place, it can be seen in the thorax. A chest CT scan has 61–71% sensitivity and 87–100% specificity for acute and chronic diaphragmatic herniation. [9]

In our case, CT scan findings proved to be the turning point of our treatment strategy. Uncertainty in the course of management was the main causative factor of postoperative complications encountered in this case. Significant bleeding caused by high loading dose of antiplatelet and antithrombotic agents given initially resulted in repeated transfusions added further nuisance.

For surgical repair, laparotomy is preferred for unstable patients, with associated intra-abdominal injuries whereas thoracotomy can be done for stable patients without intraabdominal injuries, contralateral diaphragmatic injuries or a delayed diagnosis. [10]

Conclusion

Surgeons, emergency physicians and intensivists should maintain a high suspicion for diaphragmatic hernia especially a patient presenting with dysphagia, shortness of breath or chest pain related symptoms and who already has underwent upper gastrointestinal or diaphragmatic surgeries. Radiological follow-ups and keeping low threshold for suspicion of such defects is emphasized to detect hiatal herniation at an earlier stage.

References

5. Testini, M., Girardi, A., Isernia R. et al.. Emergency surgery due to diaphragmatic hernia: