VOLUME - 10, ISSUE - 04, APRIL- 2021 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Radiology

TRAUMATIC DIAPHRAGMATIC HERNIA: A CASE REPORT

Dr Ankit Jishtu M.D Radiodiagnosis ,CH Kandaghat,Solan (H.P).

Dr Pooja Bajaj* M.D Radiodiagnosis,Bhunter Valley Hospital,Kullu (HP). *Corresponding Author

ABSTRACT Traumatic diaphragmatic rupture is an imaging based diagnosis and diaphragmatic hernia leads to life threatening complications.There is significant difference in clinical presentation of diaphragmatic injury as it depends upon time of presentation and associated injuries .Chest radiography is still helpful in early assessment of severe thoracoabdominal trauma and its complications.However , computed tomography (CT) chest and abdomen plays vital role in recognition of injury pattern.So, knowledge of CT signs suggestive of diaphragmatic rupture assists in timely diagnosis and emergency management of patient which can reduce morbidity and mortality significantly .

KEYWORDS : Traumatic diaphragmatic hernia ,Traumatic diaphragmatic injury ,Computed tomography, Emergency laparotomy, Trauma, Hernia

INTRODUCTION

Traumatic ruptures of the diaphragm occur after blunt or penetrating thoracoabdominal injuries. Although the risk of death due to rupture per se is low, when left undiagnosed this condition may cause serious complications and death due to gastrointestinal herniation. Traumatic diaphragmatic hernias may further be subdivided into those which are caused by direct trauma to the diaphragm and those caused by indirect trauma. Direct trauma commonly results from stab or gunshot wounds wherein the diaphragm is actually penetrated by the traumatic incident. Indirect trauma is commonly associated with severe injuries to the abdomen or chest secondary to high velocity accidents. The bursting effect secondary to the sudden compression of the lower chest or upper abdomen causes a rent in the diaphragm with herniation of the abdominal contents into the chest cavity. Blunt diaphragmatic injuries usually present late with intrathoracic herniation of abdominal viscera and carry a mortality rate of 30-60%.[1]

CASE REPORT

The 60years old male presented to our emergency department with h/o fall from 12 feet about 1day back. On presentation he had pain in left side of chest and upper abdomen. He also had difficulty in breathing. On clinical examination the patient's vital signs were as follows: PR 92bpm, BP -108/72bpm, saturation: 53.5 % (Figure 1), afebrile, there was decreased breath sound noted in left side of chest and apical beat was also noted in the center of chest.

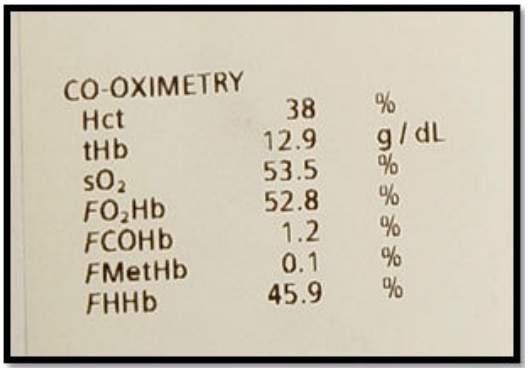

Figure 1:CO oximetry showing reduced saturation and other blood parameters

The patient was stabilized in emergency room. A left sided Inter -costal drain (I.C.D) placement was done as an emergency procedure under local anesthesia. Ryle's tube was placed, patient was catheterized. All routine investigations were sent.Chest x-ray (Figure 2)was obtained in our hospital, after placing chest tube and Ryle's tube.

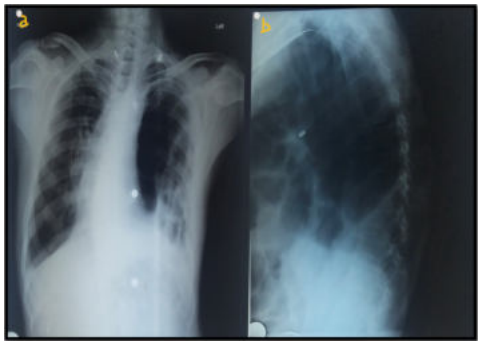

Figure 2(a and b) : Chest X Ray showing bowel shadows in left hemithorax

Patient was shifted for computed tomography of chest and abdomen for confirmation of diagnosis.CT chest and abdomen was suggestive of multiple ribs fracture, pneumohemothorax, subcutaneous emphysema, chest tube in situ, and defect in left diaphragm about 5 x 9 cm, herniation of stomach, small bowel, omentum, transverse colon through the defect into left hemi-thorax pushing mediastinum towards right (Figure 3a, 3b ; 4a, 4b, 4c and 5a, 5b, 5c).

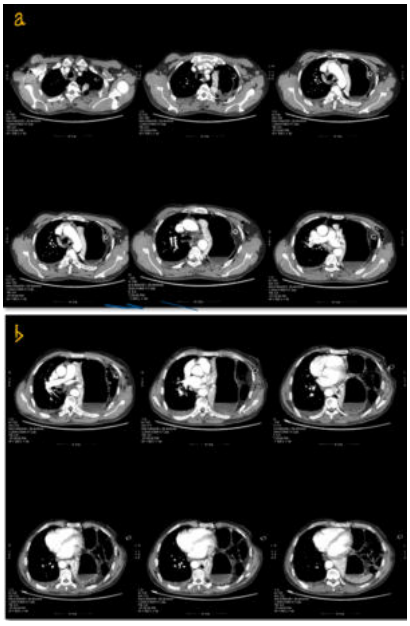

Figure 3: CT section showing herniation of bowel in left hemisphere-thorax ,multiple rib fracture and subcutaneous emphysema

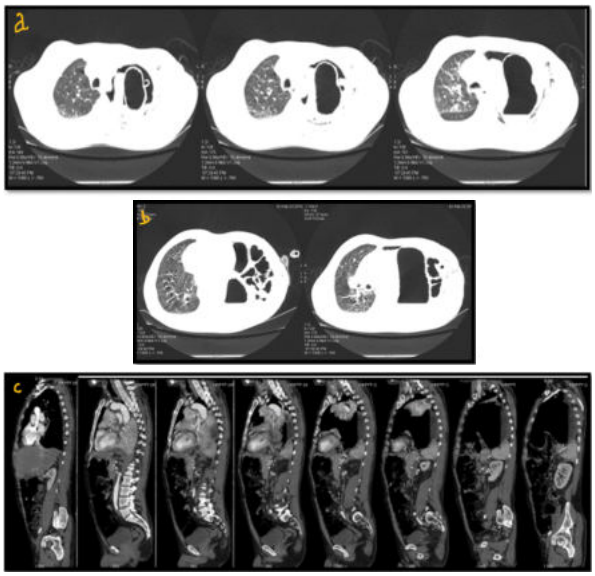

Figure 4:CT section showing defect in left diaphragm.

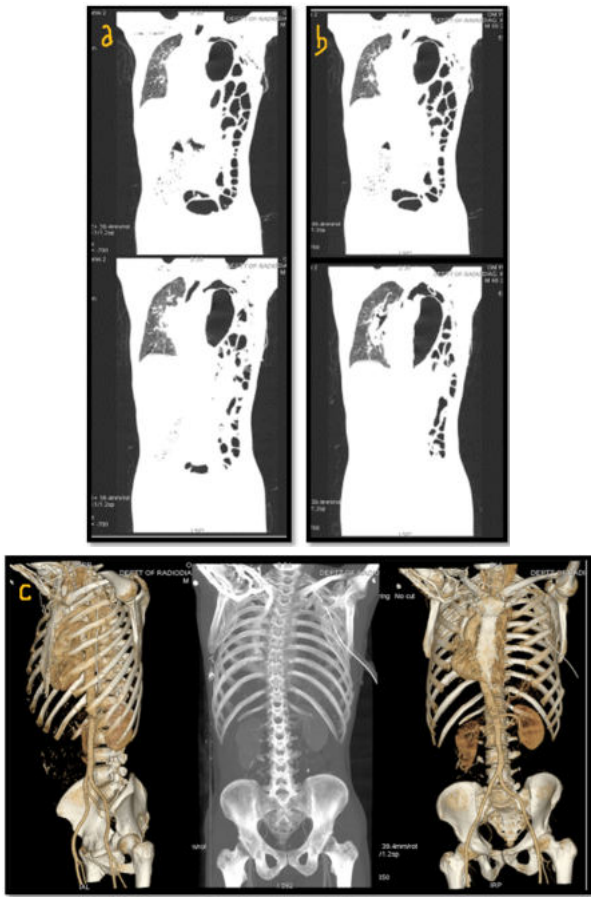

Figure 5: CT section (Lung window and 3D reconstructed images) showing in situ chest tube and herniated stomach ad bowel loops in thoracic cavity .

Hence authors arrived at a confirmatory diagnosis of traumatic diaphragmatic rupture with herniation of intra-abdominal parts into left hemi-thorax.

Patient was taken for emergency laparotomy. Through midline abdomen opened and stomach, small bowel, colon and omentum was reduced back into abdomen (Figure 6a and 6b), blood in hemithorax was evacuated and chest tube repositioned and diaphragmatic defect was closed with 1-0 proline suture

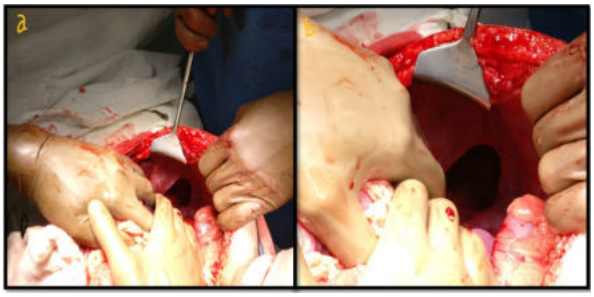

Figure 6 : Intra -operative picture showing rent left diaphragm.

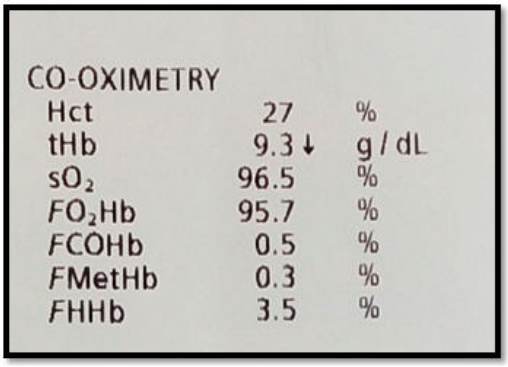

Figure 7: CO- oximetry post operative showing saturation values returning to normal limit

DISCUSSION

Incidence

The incidence rate of traumatic diaphragmatic rupture ranges from 0.8-5percent.[2]Rapid diagnosis is important as progressive herniation of visceral organs into thoracic cavity leads to significant mortality and morbidity.

Etiology

Traumatic diaphragmatic rupture is mainly associated with multiple abdominal and thoracic injuries.It is mainly seen as a result of high velocity trauma in a road traffic accident.[3]It occurs due to shearing of stretched diaphragm at the point of diaphragmatic attachment due to sudden force transmission through viscera in abdomen. Most common site of rupture diaphragm is poster-lateral aspect of hemi-thorax because of its origin from pleura-peritoneal membrane which is structurally weak.[4]Left sided ruptures are more common as compared to right side because of the protective effect of liver.[5]A positive pressure gradient pushes the abdominal contents into thorax.High velocity abdominal injury is associated with increase of pressure gradient in abdomen .

Clinical features

Traumatic diaphragmatic rupture has a variable presentation depending upon time interval for diagnosis.Any patient of blunt trauma or penetrating thoraco-abdominal injury should arouse suspicion of traumatic diaphragmatic rupture.[6]On clinical presentation patient may totally asymptomatic or may have acute presentation like breathlessness due to compression of lung parenchyma in hemi-thorax. There may be symptoms relating to intestinal obstruction or strangulation or perforation due to herniation of bowel loops into thorax.[7]

Investigations

Chest X-ray being the first line imaging examination may show abdominal viscera shadow or gut gases in the thorax which is pathognomic of the diagnosis.An x-ray may not be useful in most of the cases as signs are often masked by associated lung contusion, haemo\thorax, pneumothorax, pleural effusion, atelectasis, emphysema and non-specific elevation of diaphragm.[8]Chest x ray is abnormal in 85%, chest radiographs has low sensitivity for depicting rupture of

diaphragm.it is only 46% sensitive for left and 17 % sensitive for right side.[9]Diaphragmatic discontinuity being the most frequent sign represents direct visualization of injury and free edge of disrupted diaphragm. Other useful signs for diagnosis of diaphragmatic hernia are collar sign and hourglass sign which is seen on coronal section of CT/ MRI (Magnetic Resonance Imaging) and barium studies. Waist-like or collar-like appearance of herniated organs through a breach in diaphragm gives its name. CT chest and abdomen is very useful as it has very high sensitivity and specificity, Helical CT has 100% specificity.[10]It aids to identify contents of hernia and measurement of rent in diaphragm. CT abdomen has additional benefit in ruling out injury to solid organs and other hollow viscus. Minimal invasive procedure like diagnostic laproscopy is very useful in making diagnosis of a rupture diaphragm when in doubt and when other diagnostic measures fail.[11]In order to establish the timely diagnosis familiarity with all CT signs of diaphragmatic injury is required.

Management

In traumatic rupture of the diaphragm patient should undergo timely emergency laparotomy after initial resuscitation is accomplished . Laparotomy has an additional benefit of visualizing the intra-abdominal organs directly. Repair of rupture diaphragm consist of approximation of rent by applying simple sutures, when rent is large a mesh placement is done and can be done by laparoscopic aid.

Conclusion

From our case we can draw a conclusion that rupture diaphragm can be diagnosed easily even with a chest x-ray in background of clinical presentation. Clinical presentation may vary as asymptomatic, acute presentations and delayed presentation. Right sided rupture diaphragmatic ruptures are difficult to be diagnosed clinically and radiologically. All cases of thoraco-abdominal injuries should be investigated with CT chest and abdomen. Presence of even single CT sign of diaphragmatic injury should alert radiologist and other direct and indirect signs should be looked for.

References

1 Nchimi A, Szapiro D, Ghaye B, Willems V, Khamis J, Haquet L, et al. Helical CT of blunt diaphragmatic rupture. AJR Am J Roentgenol 2005;184:24-30.
2 Rossetti G, Brusciano L, Maffetone V, Napolitano V, Sciaudone G, DelGenio G et al. Giant right posttraumatic diaphragmatic hernia: laparoscopic repair without a mesh. Chir Ital. 2005;57:243-6.
3 Meyers BF, McCabe CJ. Traumatic diaphragmatic hernia. Occult marker of serious injury. Ann Surg. 1993;218:783-90.
4 Sangster G, Ventura VP, Carbo A, Gates T, Garayburu J, D'Agostino H. Diaphragmatic rupture: a frequently missed injury in blunt thoracoabdominal trauma patients. Emerg Radiol. 2007;13:225-30.
5 Eren S, Kantarci M, Okur A. Imaging of diaphragmatic rupture after trauma. Clin Radiol. 2006;61(6):467-77.
6 Hanna WC, Ferri, Fata P, Razek T, Mulder DS. The current status of traumatic diaphragmatic injury: lessons learned from 105 patients over 13 years. Ann Thorac Surg. 2008;85:1044-8.
7 Goh BK, Wong AS, Tay KH, Hoe MN. Delayed presentation of a patient with a ruptured diaphragm complicated by gastric incarceration and perforation after apparently minor blunt trauma. Canadian J Emerg Med. 2004;6:277-80.
8 DeBlasio R, Maione P, Avallone U, Rossi M, Pigna F, Napolitano C. Late posttraumatic diaphragmatic hernia. A clinical case report. Minerva Chir. 1994;49:481-7.
9 Reber PU, Schmied B, Seiler CA, Baer HU, Patel AG, Büchler MW. Missed diaphragmatic injuries and their long-term sequelae. J Trauma. 1998;44(1):183-8.
10 Killeen KL, Mirvis SE, Shanmuganathan K. Helical CT of diaphragmatic rupture caused by blunt trauma. AJR Am J Roentgenol. 1999;173(6):1611-6.
11 Warren O, Kinross J, Paraskeva P, Darzi A. Emergency laparoscopy–current best practice. World J Emerg Surg. 2006;1:24.