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Rare Case of Liver -Gall Badder Herniation - Post Traumatic Diaphragmatic Hernia

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Abstract: ***Post-traumatic diaphragmatic hernia in adults is usually caused by blunt trauma and may remain asymptomatic and undiagnosed for many years. Right-sided tears are significantly less likely than left-sided tears because of the protective effect of the liver however if they occur, they are associated with high mortality and morbidity. The rupture of the right side of the diaphragm and the presence of a gallbladder in the thoracic cavity are rare. It should be suspected in symptomatic patients and/or with unusual shadows in the thoracic region after recently sustained injury or with a history of injury. We report a case of 55 year old female asymptomatic patient with post traumatic rupture on the right side of her diaphragm and herniation of her liver and gallbladder into the thorax. Diagnosis was made with abdominal thoracic CT scan and definitive management required surgery through trans abdominal route. Reduction of herniating liver and gall bladder into abdominal cavity and repair of defect with synthetic non absorbable sutures and reinforced with non absorbable mesh.***

Keywords: Blunt chest trauma, Right diaphragmatic hernia, liver -gall bladder herniation

1. Introduction

Rupture of diaphragm and herniation of abdominal viscera though uncommon is a well recognized result following blunt or penetrating injuries to lower chest and upper abdomen. The incidence is however rising because of the increasing number of road traffic accidents in the last few years, together with better pre-hospital and hospital resuscitation of severely injured patients and improved diagnostic facilities.[1] High index of clinical suspicion is required because of the missed diagnosis and potential for delayed presentation. We report a case of an poly-trauma patient who did not have respiratory complaints but was diagnosed with a rupture on the right side of her diaphragm with herniation of her liver and gallbladder into the thorax during her hospital stay.

2. Case Presentation

A 55 year old female, presented with history of poly trauma due to road traffic accident, admitted to the emergency department. The patient was vitally stable, fully conscious oriented with no signs of head injury. Her respiratory rate was 20 per minute with absence of respiratory sounds in right middle and lower zones of right chest however she was maintaining 95 to100 percent oxygen recorded on pulse oximeter. Clinically her abdominal examination did not suggest any abdominal internal injury. There was palpable fracture of right radio-ulna and right femur. The patient was initially stabilized after which she underwent the following investigations.

Chest X ray was suggestive fracture of right side 10^{th} 11^{th} 12^{th} rib on postero-lateral aspect with blunting of right costophrenic angle (Fig.1) with under lying collapse of right lung. An inter costal drainage tube inserted on right side through 5^{th} inter costal space in mid axillary line for right hemothorax immediately.500cc of hemorrhagic fluid was drained.

Abdominal thoracic ultrasound examination revealed liver contusion. Since patient was haemo-dynamically stable and had no significant abdominal findings she was kept conservative. *Extremity X ray :* Right radio-ulnar fracture and right fracture femur. Splinting of her right forearm for right radius ulna fracture and S.T. pin insertion and traction of right lower limb for right sided femur fracture done.

Daily intercostal drainage tube was monitored for output, column movement and air leak. Inter costal drainage output decreased from approximately 250 cc(sero-hemorrhagic) per day to about 50cc (serous) per day by the tenth post trauma day.
On post trauma day ten: Patient was maintaining 95 to 100 percent oxygen saturation with no respiratory distress . There was absent breath sounds on right middle lower zones. X Ray Chest suggested a persistence abnormal shadow in right thoracic cavity which was reported as lung contusion by radiologist (Fig.2).



Figure 1: Chest X-ray showing blunting of right costo phrenic angle and rib fracture.

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Figure 2: Chest X- ray after 10 days showing persistent shadow in right thoracic cavity

Since in doubt about persisting abnormal shadow, computed tomography of abdomen and thorax done. *Computed tomography*: suggested 5.7 x 7.8 cm sized defect in antero medial aspect of right dome of diaphragm with herniation of liver and gall bladder into right thoracic cavity. CT also revealed 3.5 x 6 x 3.7 cm sized laceration in segment VI of liver and ill defined contusion in lower lobe of right lung. (Fig.3)

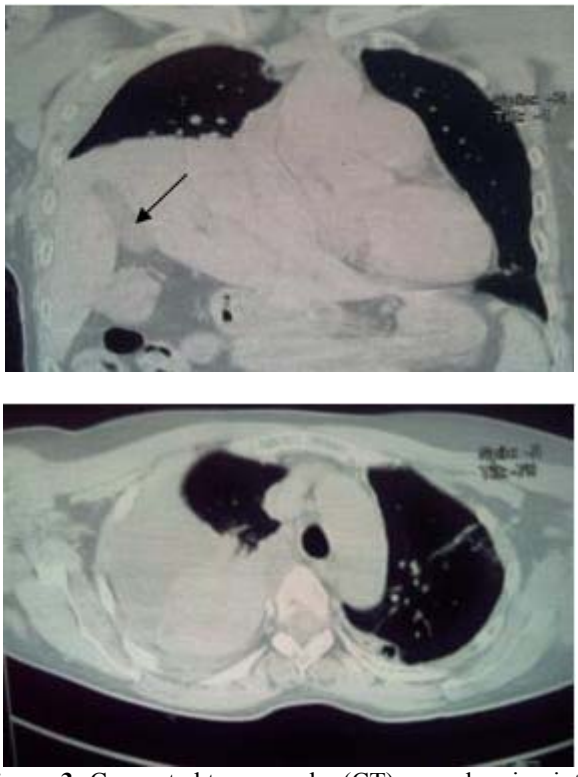


Figure 3: Computed tomography (CT) scan showing intra thoracic displacement of right lobe of liver with gall bladder (arrow in figure) containing multiple gall bladder stones.

The patient underwent surgical intervention via an abdominal approach. Intra operative findings confirmed that gallbladder and 70 percent of liver had herniated into the thoracic cavity.(Fig.4) Liver was made free of attachments and organs were placed back into the abdominal cavity. The defect in the diaphragm, measuring approx 8 X 8 cm in antero medial aspect was repaired primarily with prolene no 1-0 interrupted sutures and reinforced with a 15 x15 prolene mesh graft.(Fig.5,6) A right-sided chest tube drain and an abdominal drain in morrisons pouch were kept. During mobilization of liver into abdominal cavity, patient developed intra operative hypotension for which she was managed with ionotropic support intra operatively and in immediate post operative period. Postoperative recovery was uneventful, The chest drain was removed once output decreased to less than 50 ml and lung was fully expanded by the 5th postoperative day. (Fig.7). Patient underwent definitive surgery for orthopaedic problems on post operative day 10by the orthopaedic department.



Figure 4: Liver being mobilized from thoracic cavity



Figure 5: Diaphragmatic defect closed with prolene sutures



Figure 6: Prolene mesh reinforcement over defect

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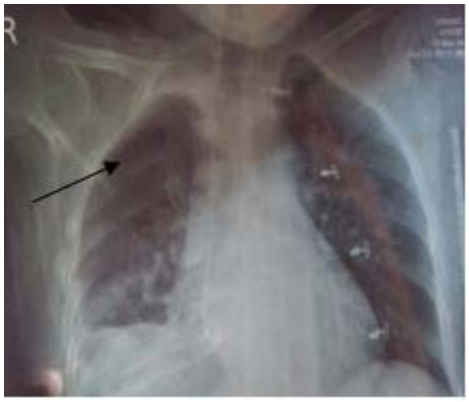


Figure 7: Chest X-ray 5 days after surgery showing Expansion (arrows) of right lung

3. Discussion

Injuries of the diaphragm were first described in 1541 by Sennertus and the initial repair was performed by Riolfi in 1886.[2] Diaphragmatic hernia is often initially overlooked in the acute setting and is only correctly diagnosed in 30 to 40 percent of cases.[3-5] In our case, diaphragmatic injury was diagnosed after 10 after the injury. It would have been missed had there not been a high index of suspicion regarding the abnormal shadow in chest X-Rays. A rupture of the right side of the diaphragm is uncommon. Approximately 69 percent of hernias are left-sided, 24 percent are right-sided, and 15 percent are bilateral.[6] Although autopsy studies have revealed equal incidence of right- and left-sided diaphragmatic ruptures, ante mortem study reports suggest 88 to 95 percent of them occur to the left side.[7-9] Right-sided tears are significantly less likely than left-sided tears because of the protective effect of the liver. They are associated with high mortality and morbidity.[10,11]

Prolapse of the liver with gallbladder is rare. There are just a few articles that report the presence of the liver and gallbladder in posttraumatic diaphragmatic hernia.[12-17] In our case, an impeded presentation of the ruptured diaphragm and the presence of the liver and gallbladder can be explained by the hypothesis of delayed detection. The 'delayed detection' hypothesis assumes that a diaphragmatic defect created at the time of the injury becomes clinically evident only when herniation occurs or when problems arise from the hernia contents.[2,18].In our case although there were no respiratory symptoms, patient would have presented late with respiratory complications had we not done a CT scan of thorax and abdomen.

The operative treatment for diaphragmatic rupture consists of hernia reduction, pleural drainage and repair of the defect.[19] The surgical approach could be either trans abdominal or trans thoracic, or both. However, laparoscopic surgery, thoracoscopy, or artificial patches have become very popular in recent years. Our patient underwent a trans abdominal approach, primary diaphragmatic repair with prolene sutures and prolene mesh repair. The mesh decreases the risk of a recurrence of the hernias, which is caused by the shearing of a stretched membrane and avulsion of the diaphragm from its points of attachments due to a sudden increase in intra-abdominal pressure, transmitted through the viscera.[20]

4. Conclusions

Right side post traumatic diaphragmatic hernia with prolapse of liver and gallbladder is a rare entity. Diaphragmatic hernia should be considered as a possible diagnosis in patients of blunt chest and abdominal trauma. As patients with this injury may remain without symptoms for a long period, a high index of suspicion should be kept for diagnosis of diaphragmatic hernia at the time of presentation. It should be suspected in symptomatic patients and/or with unusual shadows in the thoracic region after recently sustained injury or with a history of injury. Abdominal thoracic computed tomography should be advised in all suspected cases as the investigation of choice and the treatment of choice being surgical repair with meshplasty.

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