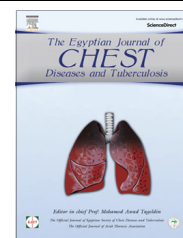




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CASE REPORT

Right sided traumatic diaphragmatic hernia repair with intrathoracic herniation of liver, stomach and transverse colon



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KEYWORDS

Blunt trauma chest;
 Blunt trauma abdomen;
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Abstract Traumatic rupture of the right dome of the diaphragm is an uncommon clinical entity. The diagnosis is difficult due to lack of specificity in clinical signs and chest film findings. Clinical incidence of rupture of the right dome of the diaphragm due to blunt trauma is much less common (10%) compared to the left (90%) and usually associated with more grievous injuries with very high pre hospital mortality thus accounting for rare clinical diagnosis. We report a case of 26 year old male who had the blunt trauma chest referred to us after 7 days of injury with complaints of shortness of breath and vomiting. On investigations the patient was diagnosed as a case of the ruptured right dome of the diaphragm with intrathoracic herniation of the stomach. The patient also had fracture pelvis. Surgical exploration was done through right 6th intercostal space which revealed intrathoracic herniation of the stomach, liver and transverse colon, which were healthy. Contents reduced into the abdomen and diaphragm was repaired. Post operative chest X-ray suggested complete expansion of the right lung with no residual herniation of abdominal contents. Post operative recovery was uneventful with the patient discharged on 14th post operative day.

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Case report

A 26 year old male patient had the blunt trauma chest, abdomen and fracture pelvis while working under tractor trolley. Initially the patient was treated at peripheral health central and referred to us on 7th day when the patient had complaints of shortness of breath and repeated episodes of vomiting. On

examination the patient was dehydrated. HR-120/min., BP – 110/66, RR. 40/min and SPO₂ 85% on O₂ mask. On chest auscultation air entry was decreased on right side. The patient was resuscitated with IV fluids and Ryle's tube inserted. On investigations chest X-ray showed the obliterated right dome of the diaphragm with suspected bowel loop in the right chest (Fig. 3). CECT of the chest done to confirm diagnosis revealed the ruptured right dome of the diaphragm with herniation of the stomach into the right chest cavity with collapse of the right lung. After confirmation of diagnosis the patient was taken for surgical repair. Right thoracotomy was done through 6th intercostal space and intrathoracic herniation of

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the whole stomach along with greater omentum (Fig. 1), the right lobe of the liver (Fig. 2) and transverse colon was present. Herniated intraabdominal organs were healthy and reduced into peritoneal cavity. The right dome of the diaphragm was

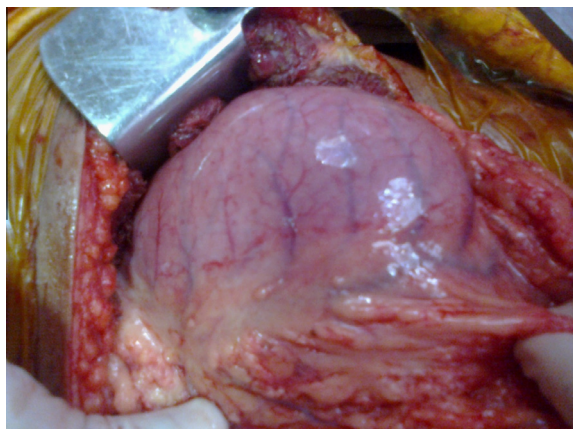


Figure 1 The herniated stomach in the right chest.

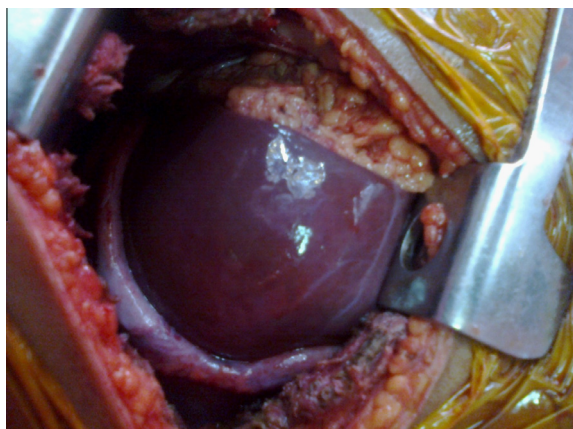


Figure 2 The herniated liver in the right chest through the ruptured right dome of the diaphragm.



Figure 3 Pre operative chest X-ray showing the obliterated right dome of the diaphragm.

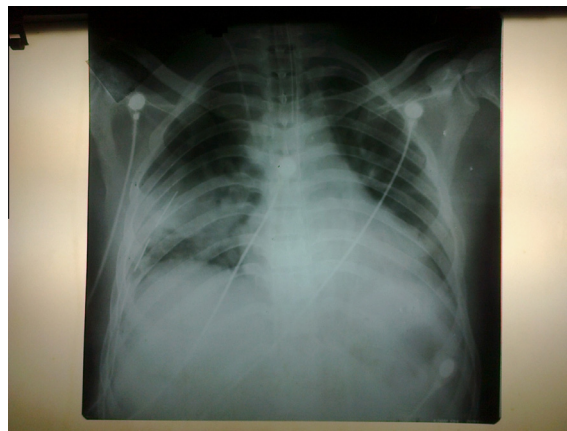


Figure 4 Post operative chest X-ray showing contour of the right dome of the diaphragm maintained with the expanded right lung.

disrupted from its costal attachment in its entire length. The diaphragm was repaired with interrupted sutures using the Ethibond no. 2. Chest drain was put and thoracotomy closure was done in layers. The patient was post operatively ventilated for 4 h and post operative chest X-ray showed the right dome of the diaphragm contour was maintained with the expanded right lung (Fig. 4). Post operative recovery was uneventful. Ryle's tube was kept for 10 days. On 10th post operative day the patient started taking orally and was discharged on 14th postoperative day.

Discussion

The diagnosis and management of Traumatic Diaphragmatic Hernias (TDH) still remains a problem. This is due to the lack of specificity in clinical signs and chest film findings. Clinical incidence of rupture of the right dome of the diaphragm due to blunt trauma is much less common (10%) compared to the left (90%) [1] as it is usually associated with more grievous injuries with a very high pre hospital mortality [2] thus accounting for a relatively low clinical diagnosis of right TDH. Diaphragmatic hernia was first described in 1541 by Sennertus in an autopsy finding, who in a letter to Hildani described herniation of the stomach through a rent in the diaphragmatic dome which had occurred 7 years ago by self inflicted stab wound [5]. Ambroise Pare in 1579 described TDH again as an autopsy finding after a gunshot wound sustained 8 months back in a French artillery captain [6]. Most injuries reported involve the left dome of the diaphragm. There are a few reported cases involving the right diaphragmatic dome [3,7–12]. The rarity of right TDH caused by blunt injuries is due to the cushioning effect of the liver. The blunt injuries causing the right dome tear are usually fatal because the force required to rupture the right dome is massive and cause extensive collateral damage to the other intra abdominal organs, spine, pelvis and great vessels with high pre hospital mortality [2,10]. Generally right sided TDH due to injury by speeding vehicles may be due to primary high energy impact over the thoraco abdominal region with resultant momentary development of high intra abdominal pressure. Sometimes there is additional secondary impact caused by speeding wheels running over the abdominal region resulting in very high IAP

and resultant TDH and direct crush injuries to several intra abdominal organs with high mortality. Our patient had a high energy primary impact by fall of tractor trolley over the chest, abdomen and pelvis, due to slipping of jack resulting in raised intraabdominal pressure and rupture of the right dome of the diaphragm.

Diagnosis of TDH is often delayed because intra abdominal organs take some time from hours to days to reach through the rent in the diaphragm of the intra thoracic cavity with negative intra pleural pressure as reported by Meyers and McCabe [4] from Harvard Medical School and Massachusetts General Hospital in 1993. The same authors stated that pre operative diagnosis of TDH was only possible in 31%. It was diagnosed during surgery in only 45%, after surgery in 4.5% and 1.5% during autopsy.

Those diagnosed late obviously have major injuries excluded and are subjected to investigations only when the chronic symptoms of a slowly growing diaphragmatic hernia develops over days and weeks before being confirmed. Our patient falls in an intermediate category where diagnosis was made on the 7th day after injury when the patient develops shortness of breath and repeated episodes of vomiting. However chest X-ray is often not diagnostic initially due to a slow passage of abdominal contents through the diaphragm. Serial X-rays are often helpful [3]. In our patient chest X-ray showed the obliterated right dome of the diaphragm with suspected bowel loop in the right chest (Fig. 3). For confirmation we got CECT of the chest which revealed the ruptured right dome of the diaphragm with herniation of the stomach into the right chest cavity with collapse of the right lung. We used Ethibond sutures for suturing the diaphragm. The whole right lobe of the liver was in the right chest cavity (Fig. 2) but having no injury to the biliary tree, hepatic artery, IVC hepatic vein junction. Ushijima et al. (2007) [13] had reported the use of CPB with total circulatory arrest and Taga et al. [14] reported veno-venous bypass for repairing the hepatic vein and caval trauma. Although there was no such vascular injury, we believe any such injury with TDH involving high migration of the liver need to be dealt in units which has provision of CPB.

Conclusion

Traumatic rupture of the right dome of the diaphragm is rarely encountered clinical entity due to less incidence and very high pre hospital mortality. Diagnosis is difficult initially due to the

lack of specific clinical signs and associated grievous injuries. We can manage effectively such cases by meticulous evaluation and early surgical repair and management of associated injuries.

Conflict of interest

These authors declare no conflict of interest.

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