

Case Report

An isolated left diaphragmatic injury due to blunt trauma abdomen: a rare case entity

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ABSTRACT

Isolated diaphragmatic injury in blunt trauma occurs acutely and can be associated with other life-threatening organ injuries. A sudden increase in abdominal pressure causes injury in the membranous or muscular part of the diaphragm. Isolated left diaphragmatic injury after blunt trauma is rarely seen, its diagnosis can be overlooked frequently. Early diagnosis is the most important step in the treatment thereby reducing morbidity and mortality. The most critical point during the diagnosis is the suspicion for clinical diaphragm injury like respiratory distress. Single or serial plain chest radiographs with a high index of suspicion are diagnostic in most cases. Computed tomography of the abdomen and thorax can be a guide for identifying the size of diaphragmatic injury and the contents. In this case report, we presented an isolated left side diaphragmatic rupture after blunt abdominal trauma and treated with an urgent surgical operation.

Keywords: Isolated left diaphragmatic injury, Blunt trauma, Emergency surgery, Diaphragm repair

INTRODUCTION

Blunt and penetrating trauma are the most common causes of diaphragmatic injuries. A sudden increase in abdominal pressure due to blunt trauma may cause injury in the membranous or muscular part of the diaphragm. Traumatic rupture of the diaphragm is a rare injury and occurs in 0.8% to 5.8% of all thoracoabdominal blunt trauma.¹ Left-sided rupture of the diaphragm is three times more common than on the right side due to the relative weakness of the diaphragm on the left side and the protective effect of the liver on the right side. Traumatic diaphragmatic injury is accompanied at 94-100% of the cases with visceral organ injuries.²

Although liver and spleen injuries coexist with diaphragmatic injury depending on the localization rupture develops, major vascular injuries and small intestine perforation can also be seen. In this case report, we presented an isolated left side diaphragmatic rupture after

blunt trauma of abdomen and treated with an urgent surgical operation.

CASE REPORT

A previously healthy 52 years old male patient presented to emergency with acute abdominal pain and respiratory distress following a road traffic accident. He had no history of loss of consciousness, seizures, or vomiting. On examination patient's vitals were stable.

Physical examination revealed grazed abrasions present all over the abdomen tracking from right iliac fossa to left costal region with reduced chest expansion present over left side. There was decreased respiratory sounds on the left side and tenderness on the left hemithorax and in the whole abdomen. Chest X-ray showed bowel loops in the left lower chest (Figure 1). Contrast-enhanced computed tomography of thorax, abdomen, and pelvis revealed a left diaphragmatic rupture with herniation of stomach, bowel,

and omentum with resultant left lung collapse, multiple ribs, spine, and pelvic fracture present (Figure 2).

The patient underwent an urgent exploratory laparotomy. Exploration revealed a defect of size 7×4 cm in the muscular portion of the left diaphragm (Figure 3). The stomach, transverse colon, and omentum were herniated into the left hemithorax. Other organs in the abdomen were normal.

The stomach, transverse colon, and omentum were placed in the abdomen and a chest drain was placed towards the apex in the left side of the thorax. The defect in the diaphragm was repaired with a prolene suture. Post-op stay was eventful. On the 5th post-operative day, the chest tube was removed. The patient was discharged with complete recovery on the 8th post-operative day.

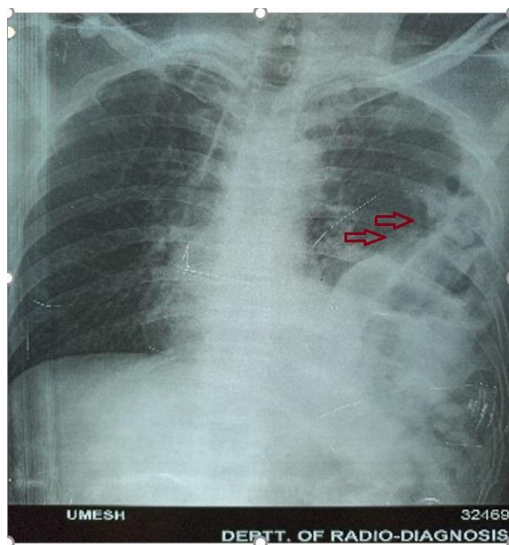


Figure 1: Chest X-ray showing presence of bowel loops in left hemithorax.

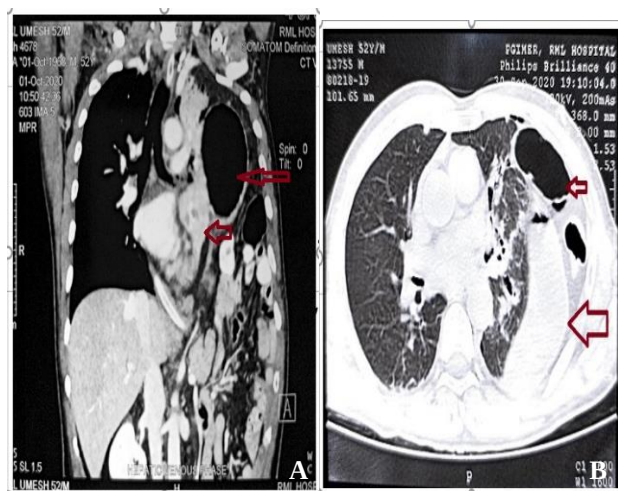


Figure 2: CT thorax and abdomen showing herniation of stomach, bowel and omentum in the left hemithorax (A) coronal section; and (B) axial section.

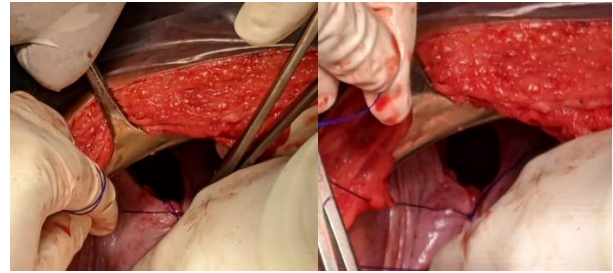


Figure 3: Intra-operative visualization of the diaphragmatic rent in left side and primary repair it with prolene sutures.

DISCUSSION

The diaphragmatic injury occurs when there is a sudden increase in abdominal pressure which results in rupture of the membranous or muscular part of the diaphragm. Because of the low incidence of blunt isolated diaphragmatic injury (0.8-5.8% of all blunt trauma) and the presence of masking associated multiple injuries in 94-100% of patients, early diagnosis is difficult and often delayed.^{1,2} More frequent presence of diaphragmatic injury on the left side is correlated to various anatomical and clinical factors. These can be explained with the fact that diaphragm is congenitally weaker in the left medial posterolateral tendeno-muscular area, the protective effect of liver on the right side, higher mortality rates concerning major trauma related to right side injuries.³ Cases with the delayed diagnosis can result in a diaphragmatic hernia with high mortality and morbidity rates due to complications such as strangulation and incarceration.⁴

The most critical point during the diagnosis is the suspicion for clinical diaphragm injury symptoms like respiratory distress. Diagnosis can be more difficult sometimes due to the smaller size of the defect after penetrating injuries. The bigger size of the defect (5-10 cm) and easier herniation of intraabdominal organs after blunt trauma make the clinical and radiological diagnosis easier.⁵ Single or serial plain chest radiographs with a high index of suspicion are diagnostic in most cases. Computed tomography of the abdomen and thorax can be a guide for identifying the size of diaphragmatic injury and the contents.⁶ Progressive respiratory distress should be treated by intubation.

An intercostal chest tube insertion may not improve the situation and is associated with high risk of iatrogenic injuries. Surgical repair is mandatory and laparotomy should be the preferred approach in unstable patients. Thoracoscopic and laparoscopic repair is feasible in selected patients.⁷ To avoid missed injury, a thorough inspection of both hemidiaphragm should be done routinely in every trauma patient undergoing laparotomy. For diaphragmatic repair, it is widely recommended to use nonabsorbable sutures like prolene. Both interrupted and continuous techniques are equally effective. Mesh repair is rarely needed in acute diaphragmatic injury but may be

used to achieve tension-free repair in patients with late presentation.⁸

CONCLUSION

Traumatic rupture of the diaphragm is a rare injury and usually masked by multiple associated injuries. Given the lack of data, this remains a diagnostic and therapeutic challenge. Although Computed Tomography of the thorax and abdomen provides the most sensitive and specific examination at present, many cases are not diagnosed and remain undetected until they become symptomatic. Timely diagnosis helps in early management thereby reducing morbidity and mortality.

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