Volvulus of the liver with intrathoracic herniation

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ABSTRACT

INTRODUCTION We present a rare case of a liver volvulus, stomach and transverse colon herniating through the diaphragm. This scenario has not been reported previously. We discuss the presentation and management of this interesting case.

CASE HISTORY A 65-year-old woman with a history of sarcoidosis and recurrent pericardial effusions, treated previously with a subxiphoid pericardial oval window fenestration, presented with acute upper abdominal pain radiating to the chest. High contrast computed tomography showed a volvulus of the liver with consequent venous congestion, and herniation of the liver, stomach and transverse colon through an anterior diaphragmatic defect. With liver perfusion threatened, an urgent laparoscopic repair was performed. The stomach and transverse colon were reduced, and the twisted left lobe of the liver was unrotated and reduced into the abdominal cavity. A double-sided synthetic mesh was used to repair the defect. The patient made an uneventful recovery.

CONCLUSIONS This is a novel complication of a patient presenting with abdominal pain with a previous history of pericardial window fenestration. A laparoscopic reduction and repair can be performed safely with excellent postoperative results.

KEYWORDS

Volvulus – Diaphragmatic hernia – Twisted liver – Subxiphoid window fenestration complication – Laparoscopy

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Acute herniation of a liver volvulus has not been reported previously in the literature. It is extremely rare for a liver volvulus to herniate through the diaphragm. This condition presents with non-specific signs and symptoms, and makes for a difficult diagnosis. We discuss the diagnosis and laparoscopic surgical management of this rare case.

Case report

A 65-year-old woman presented with a 3-day history of left-sided intermittent epigastric pain that radiated to her chest. The pain was exacerbated by eating and was gradually worsening. Her past medical history included sarcoidosis and recurrent pericardial effusions that had been treated one year previously with an uncomplicated subxiphoid window fenestration. Her drug history included only 10mg prednisolone once daily and Adcal-D3[®] (ProStrakan, Galashiels, UK) twice daily.

On admission, the patient was haemodynamically stable and afebrile. Abdominal examination was unremarkable, and showed a soft, non-tender and non-distended abdomen with bowel sounds present. All remaining systems examinations were also normal. Blood results showed mild neutrophilia and an isolated rise in alanine transaminase. Her electrocardiography showed normal sinus rhythm. The admission chest radiography (Fig 1) showed a diminished right heart border with blunting of the right lower hemidiaphragm, which

was interpreted initially as consolidation and treated with antibiotics.

During the patient's third day of admission, she developed a sharp, excruciating, searing, epigastric pain radiating to the back that lasted for minutes. On examination, routine observations were stable but she developed mild epigastric tenderness on deep palpation. Further review of the chest radiography suggested visible bowel loops in the thoracic cavity and re-examination confirmed this.

Urgent computed tomography (CT) of the thorax and abdomen (Fig 2) showed a large central diaphragmatic defect, with the left lobe of the liver herniated through the right side of the defect, lying above the right hemidiaphragm and rotated through 180°. A degree of obstruction was demonstrated to the left portal vein and left and middle hepatic veins, with consequent congestion of the left lobe and medial right lobe of the liver. The stomach could be seen herniated through the left side of the defect.

With such results and the patient's clinical deterioration, a surgical referral was requested. After discussion with the regional hepatobiliary centre, urgent laparoscopic reduction and repair was planned.

At laparoscopy, the left lobe of the liver was confirmed to be distended, twisted and herniated through a multiloculated defect in the anterior aspect of the diaphragm. The stomach and transverse colon were similarly herniated, and after these were reduced, the triangular ligament was

Figure 1 Erect posteroanterior chest x-ray at admission showing bowel loops in the right lower zone (A). An opacity is observed above the right hemidiaphragm (B). The right heart border is diminished (C).

Figure 2 Reconstructed three-dimensional computed tomography of the thorax and abdomen showing left lobe of liver (A) twisted and herniated into thoracic cavity along with stomach and transverse colon (C) through large central diaphragmatic hernia between the two hemidiaphragms (B). Note the absence of contrast opacification of the left portal vein due to compression (E) as well as congestion of the left lobe of liver (A).

Figure 3 Intraoperative photograph of large multiloculated anterior diaphragmatic defect (A and B) with the left lobe of the liver being flipped back into the abdominal cavity (A). The heart is visible (C) beyond the diaphragm.

divided and the liver flipped back into the abdominal cavity. This is shown in the intraoperative video accompanying this case report (<http://youtu.be/RzfMJHTpZd8>). The left-sided defect (Fig 3) was narrowed with interrupted sutures. An Intramesh® W3 implant (Cousin Biotech, Wervicq-Sud, France) was used to close the defect as a bilayer; two were placed against each other to avoid exposure of the polyethylene side to either the myocardium or abdominal contents. The mesh was stapled to the undersurface of the diaphragm, leaving the lower edge free to allow the pericardial effusions to drain.

The patient recovered well postoperatively. Her pain was well controlled with regular paracetamol and codeine, with no postoperative nausea and vomiting. She was able to tolerate soft diet the following morning and was discharged home after two days.

Discussion

The first case of a liver hernia was described in 1908 by Elder and Postlethwaite; it was mistakenly thought to be an intrathoracic tumour and only confirmed to be the liver after autopsy.¹ Herniation of the liver requires a defect in the diaphragm, which can be either congenital or acquired. Congenital diaphragmatic hernias occur secondary to embryological defects in the diaphragm and mostly present in early life although cases are noted occasionally to present in adult life. Acquired diaphragmatic hernias are almost always traumatic, with only 1% of diaphragmatic ruptures being spontaneous.²

An acquired herniated liver is a rare but well published phenomenon. In our case, the patient had an iatrogenic defect in the diaphragm that resulted in the herniation and, uniquely, twisting of the left lobe of the liver through this defect. This occurrence has not been reported previously in the literature and represents a novel complication

of subxiphoid pericardial window fenestration. A case review of the pericardial window procedure notes that serious complications include recurrent effusions, pneumothorax and cardiac arrests.⁵

With regard to other published liver herniation, the range of presentation found in these patients is broad. Agha presented three liver hernias that ranged from incidental findings on radiography to acute presentations with dyspnoea and periodic abdominal pain.¹

Initial investigations may show deranged liver function tests secondary to vascular compromise to the liver, as with our case. Chest x-ray is usually the initial radiological modality but has a low sensitivity and specificity of just 17–40%.² High resolution CT should be the next immediate imaging modality on suspicion of a diaphragmatic defect because of the far superior specificity and sensitivity.^{4,5}

An immediate surgical opinion should be sought after radiological diagnosis to assess the risk of complications, incarceration and eventual strangulation, as demonstrated here. The technique used allows for the original pericardial window fenestration procedure to continue its purpose but prevents further herniation of abdominal content into the thoracic cavity by leaving the posterior flap free from stapling. It is important to maintain the intended purpose of the pericardial window procedure by leaving a posterior flap free from staples when securing the mesh.

This case also demonstrates a novel approach in using two Intramesh[®] W3 implants, each with a smooth dimethyl siloxane side and an unwoven polyethylene terephthalate side, stitched together. The polyethylene layers face each other, preventing exposure to the abdominal and myocardial viscera to reduce risk of adherence and fistulation (with the viscera). This bilayer Intramesh[®] W3 arrangement provides

a sturdy and cheap permanent resolution of the hernia compared with other commonly used permanent meshes.

Conclusions

This case highlights a novel complication of a subxiphoid pericardial window through the diaphragm: a herniated liver volvulus. We describe the difficulty in diagnosis owing to the broad underwhelming initial presentation and the urgency for treatment, including its management. It is important to include surgical intervention as early as possible and this can be managed laparoscopically with excellent postoperative results.

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