Rare disease

Delayed presentation of post-traumatic diaphragm rupture repaired by laparoscopy

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Summary

Diaphragmatic rupture is a serious but frequently missed condition that is potentially curable. While surgical management has classically been performed through open thoracotomy, a laparoscopic approach has been suggested as a preferable alternative. A man in his mid-50s presented with non-specific abdominal symptoms, 8 months after falling down some stairs. Diaphragmatic rupture was suspected after old rib fractures were noticed on an admitting chest radiograph. Further signs and symptoms presented following deterioration due to the unstable pathology. Prompt surgical treatment using laparoscopy was attempted with success and resulted in rapid and lasting improvement in symptoms.

BACKGROUND

Diaphragmatic rupture is a rare but life-threatening condition. It is often associated with severe blunt trauma¹ with the most common precipitant being car collisions.²

The main reason behind diaphragmatic rupture posing a risk to life is that abdominal organs can move through the new opening into the thoracic cavity. Complications include respiratory compromise as well as ischaemia to the affected abdominal organs.

Diaphragmatic rupture may occur in the presence of other injuries sustained in a polytrauma case. There may be associated haemo/pneumothorax, splenic injuries or liver lesions or occasionally other injuries such as associated oesophageal and stomach rupture.³ CT scanning as often performed in such trauma cases may make the diagnosis more readily available,⁴ especially when compared with the lower sensitivities of plain film.⁵

Without a high index of suspicion or obvious radiological findings, the condition may frequently be missed. Such occurrences make delayed presentation of ruptured diaphragm an important differential in patients presenting with signs indicative of the aforementioned complications, especially those with a history of trauma.

CASE PRESENTATION

A man in his mid-50s was referred urgently with epigastric pain and bilious vomiting to an upper gastrointestinal (GI) unit from a sister hospital with a provisional diagnosis of worsening hiatus hernia. He mentioned that he had been having worsening indigestion for the last 5 months although had not sought medical advice about this. He had no blood or melaena per rectum or associated weight loss.

This man was a non-smoker and had never been admitted to hospital prior to this admission.

On examination he had mild epigastric tenderness. Auscultation of his chest revealed reduced air entry on the left base. The rest of the examination was unremarkable.

Soon after the gentleman was admitted he became tachypnoeic. Careful auscultation of the chest revealed the presence of bowel sounds in the left lower zone of the thorax.

INVESTIGATIONS

His chest x-ray (figure 1) showed a raised left hemidiaphragm and an old rib fracture that became apparent after closer inspection. Questioned about this, he mentioned he had fallen down some stairs onto his ribs 8 months previously. He had gone to A&E at the time and was discharged that day. The chest x-ray taken at the time was subsequently obtained (figure 2).

Figure 1 Chest x-ray on admission.

Figure 2 Chest x-ray following original fall.

Chest x-rays repeated when he deteriorated clinically showed extension of his stomach into his mediastinum, with collapse of his left lung (figure 3).

A CT scan of the patient's chest and abdomen (figures 4 and 5) showed left lower zone collapse, a small left pleural effusion and elevation of the hemidiaphragm. There was no hiatus hernia but left diaphragmatic eventration/hernia with stomach herniation.

DIFFERENTIAL DIAGNOSIS

Gastritis, GI ulcer, GI perforation, pancreatitis, hiatus hernia and gastric volvulus.

TREATMENT

The patient underwent laparoscopy and a 10 cm left diaphragmatic defect was found with stomach herniation (figure 6). The hernia was reduced after adhesiolysis and the defect was repaired with endoscopically inserted sutures.

Figure 3 Chest x-ray following deterioration.

Figure 4 CT scan slices showing diaphragm rupture.

OUTCOME AND FOLLOW-UP

Postoperative recovery was unremarkable. The patient felt an immediate improvement in his breathing with associated reduction in pain. He was discharged from hospital the day following surgery.

DISCUSSION

This case study adds to the literature a case of delayed presentation post-traumatic rupture of the diaphragm that was successfully repaired using laparoscopy. While delayed-onset diaphragmatic rupture is not unheard of, it is highly unusual for it to present acutely in such a manner.

Delayed presentation of diaphragm rupture has been documented in the literature. Similar to acute presentations it is most common after severe trauma.¹⁻⁶ The condition may manifest itself co-incidentally on plain film¹ or as a sequelae of the underlying pathology.⁷

Figure 5 CT scan slices showing diaphragm rupture.

Figure 6 Image of diaphragm rupture taken during laparoscopic surgery.

Surgical treatment has classically been attempted using an open approach with thoracotomy.⁸ Recently, laparoscopic repair has been suggested in the literature for both acute and delayed presentation.^{1 9 10}

Similar to other abdominal procedures, laparoscopic surgery provides several advantages over open repair. This can include a shorter postoperative recovery period, a smaller incision, reduced pain and reduced blood loss. In this case study the laparoscopic surgery was performed without complication and left minimal scarring. Minimally invasive surgery potentially offers a safer and equally effective means of treatment for diaphragm rupture compared to a traditional open thoracotomy approach.

Learning points

- ▶ Diaphragmatic rupture is an unstable life-threatening condition and can present subacutely months after the original event.
- ▶ Symptoms may present as a result of the underlying pathology; these can include epigastric pain, vomiting, constipation and shortness of breath.
- ▶ Old rib fractures on plain film with a history of trauma should increase clinical suspicion of the condition.
- ▶ Admitting surgeons should be aware of the importance of an adequate history to include previous thoracic trauma, even if it may now appear inconsequential to the patient.
- ▶ Laparoscopic repair should be recommended for non-complicated delayed presentation of traumatic diaphragmatic hernia.

Competing interests None.

Patient consent Obtained.

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