

Late presentation of a shrapnel wound-induced traumatic intra-thoracic abdominal evisceration, as colon perforation with left faecopneumothorax

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Rezumat

Eviscerație intra-toracică tardivă după rana prin srăpnel, prezentată ca și perforație colonică și feco-pneumotorax

Hernia diafragmatică reprezintă o complicație bine recunoscută și comună a traumatismelor toracoabdominale, penetrante sau nepenetrante. Debutul clinic apare fie în faza acută, fie mai târziu, când sunt întâlnite ca și manifestări clinice simptomele complicațiilor, cel mai des de natură obstructivă. Scopul studiului de față este să prezinte un caz de complicație tardivă a unui traumatism prin explozie, soldat cu hernie diafragmatică, complicată de hernierea și perforarea unghiului splenic al colonului în cavitatea pleurală. Sunt evidențiate multiplele complicații ale episodului clinic inițial, și rezolvarea stadializată a acestora.

Cuvinte cheie: eviscerație intra-toracică, complicații, feco-pneumotorax

Abstract

The diaphragmatic hernia is a well recognized and common complication of both the penetrating and blunt thoraco-abdominal trauma. The clinical presentation is either in the

acute phase, or later, when it features the symptoms of obstructive complications. The aim of the study is to report a case of delayed presentation of a blast wound with diaphragmatic hernia, complicated by herniation and perforation of the left colonic angle in the pleural cavity. The report highlights the multiple complications following the initial event and the staged management of the case.

Key words: intra-thoracic evisceration, complication, faeco-pneumothorax

Introduction

The diaphragm is often injured in the penetrating thoraco-abdominal trauma. Usually, a blunt trauma is followed by a extensive injury, produced by a laceration mechanism, as opposed with penetrating wounds, that produce smaller defects, more susceptible to be missed on the initial evaluation and treatment of the patient.

The herniation of the abdominal organs occurs in up to 95% of the cases on the left side, because on the right side the liver acts as a protective structure. The negative pressure in the pleural cavity during the inspiration creates a vacuum, drawing the abdominal contents into the chest. The perforation of the colon, with his hyper-septic content, is a very serious complication, hard to recognize and treat due to the uncommon features.

Case report

We present the case of a 23 years old male, with a history of

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penetrating chest trauma, managed by a left chest tube drainage in 2005, when he was exposed to a explosion, that resulted in blast wounds of the forearm and chest. The clinical records of the previous surgeries were not available.

The patient was brought in the ER, 4 years after the initial event, accusing diffuse abdominal pain, pain in the left hemi-thorax, shortness of breath, nausea, vomiting, fever. The symptoms started 3 days prior the presentation, with growing pain, and vomiting in the last 24 hours. On exam: 3 small scars on the left hemi-thorax, about 1,5 cm in length, in the 5th and 7th intercostals spaces (anterior axillary line), and 5th space on posterior axillary line. Respiratory sounds absent on the left side, diffuse tenderness in the abdomen. WBC – 6300/ mm., Ht – 31%, HGB – 10 mg/dl, HR – 110 BPM, BP 90-55 mmHg., Temp.- 103 F. The CT scan demonstrated the perforation of the left angle of the colon in the left pleural cavity (Fig. 1, 2). The patient was taken to the OR, where a left chest tube was placed, evacuating 2000 ml of faeco-purulent liquid. Exploratory midline laparotomy was performed, that revealed a left diaphragmatic defect, of about 3 cm diameter, with herniated colon. Through the enlarged defect the colon was reduced into the abdomen, and omentectomy and segmental colonic resection (left angle of the colon), with LUQ end-colostomy were carried out. A second left pleural drain tube was placed, after copious irrigation of the pleural and abdominal cavities and manual debridement of the pleural cavity through the diaphragmatic defect. The diaphragmatic hernia repair was performed by using non-absorbable interrupted sutures (Fig 3, 4).

4 days after the initial surgery a TPN lavage was performed through the chest tube, after the scan demonstrated retention of fluid, and the patient accused fever and shortness of breath. On the 11th and 14th days post-op, the presence of residual apical pneumothorax and a pleural collection required percutaneous, CT guided drainage. The patient was discharged 21 days after the surgery.

40 days after the initial event, the patient was re-admitted, accusing fever, anemia. A new CT scan demonstrated a left pleural abscess and abdominal abscess, that were drained using the same per-cutaneous, CT-guided approach. After 14 days of broad-spectrum antibiotic therapy and after the removal of the drains in the 10th day, the patient was discharged.

On the 82th day after the initial surgery, the patient was admitted, the CT triple-contrast CT scan demonstrated no residual collections in the pleural space or abdomen. The colostomy take-down and colo-colonic anastomosis was performed. Normal recovery followed, and the patient was discharged.

Discussion

Though Sennortus described the laceration of the diaphragm in a post-mortem case as early as 1541, it was Bonditch who published the ante-mortem diagnosis of the traumatic diaphragmatic hernia in 1855 (1). Though there is a good ammount of literature on this subject, it is mainly confined to



Figure 1. Plain thoraco-abdominal X-ray at presentation



Figure 2. Chest CT-scan, perforated colon in the left pleural space, at presentation

the acute cases, when the lesion is diagnosed immediately after the initial traumatic event.

Funatu et al have described three types of diaphragmatic hernia - acute, chronic, and obstructive. In acute type, chances of flail chest, pulmonary injury and multiple organ failure are high. Chronic type is usually associated with sub-acute gastrointestinal symptoms due to herniation of the intra-abdominal organs, without perforation. Obstructive type of diaphragmatic hernia appears after strangulation and/or perforation of cavitory viscerae and is usually complicated by thoracic abscess and sepsis (2).

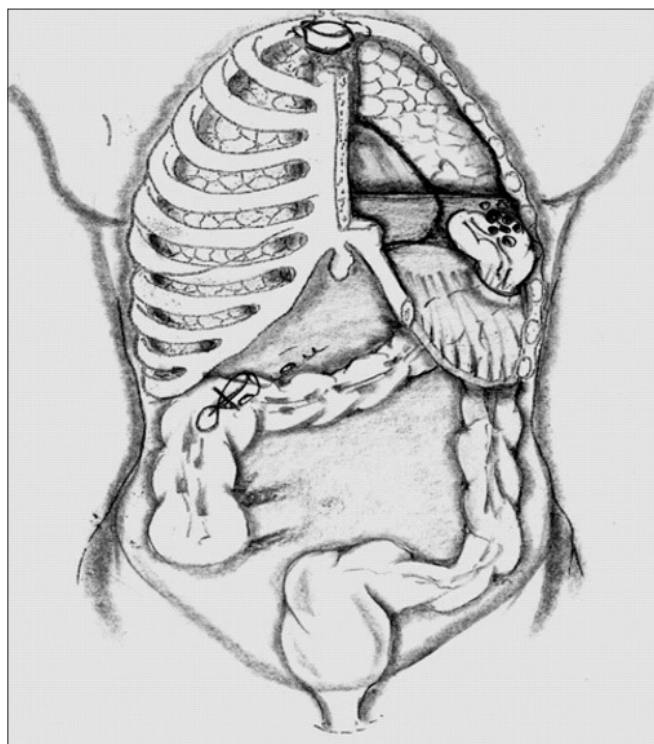


Figure 3. Initial image (© Sabau Dan)

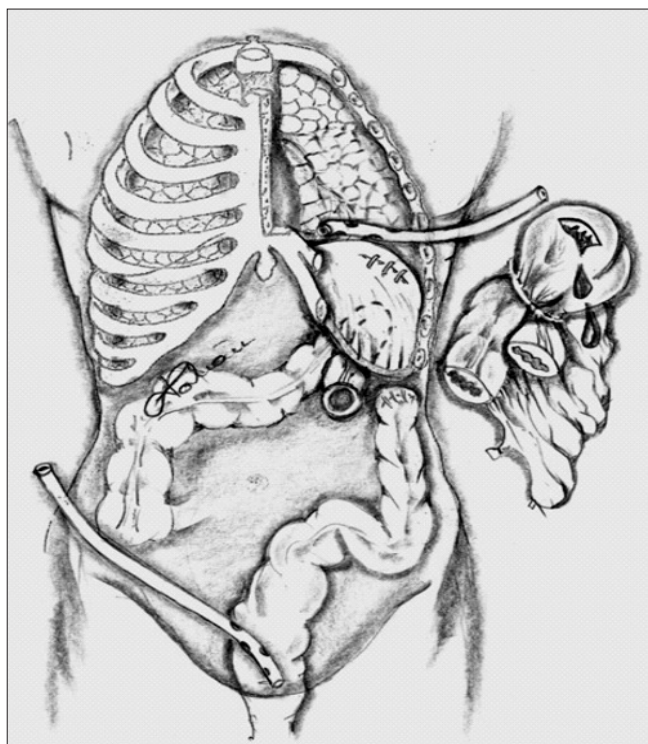


Figure 4. The therapeutic solution (© Sabau Dan)

The diaphragmatic hernia has a different clinical presentation in the acute phase which is most common, as compared to the latent or obstructive late phases, which are rather uncommon (3). According to recent literature, indirect penetrating trauma is responsible in a ratio of 4:1 to direct trauma in producing strangulated posttraumatic diaphragmatic hernias (4). The herniation of the colon, most frequently on the left pleural cavity, might be followed by the perforation, through a strangulation mechanism, especially in the case of small diaphragmatic defects.

The rate of initially undiagnosed traumatic diaphragmatic hernia oscillates between 12 and 60%. They remain asymptomatic in nearly half of the patients. Hence, delayed presentation, days or even years after the onset of the initial trauma, is not uncommon, when they are revealed by a complication (5,6).

Degiannis et al reported, in their retrospective series of 45 patients with diaphragmatic hernia post penetrating trauma, that 16/45 patients had a delayed diagnosis (median of 27 months). The mortality rate in this group was 25% compared to 3% in the group who presented early (7).

Standard chest x-ray is considered the first-line diagnostic imaging tool. The literature indicates that plain chest X-ray is diagnostic in 73% of patients with diaphragmatic hernia. The signs of diaphragmatic injury on plain radiographs are intra-thoracic herniation of abdominal viscera, marked elevation of the hemi-diaphragm, distortion of the diaphragmatic margin and contralateral mediastinal shift (8,9).

CT is a very appropriate and maybe the best test for assess-

ment of delayed TDH. Besides suspected diaphragmatic injury, thoraco-abdominal scanning can identify other concomitant abdominal and thoracic injuries and complications. Conventional CT has a sensitivity of 82% and specificity of 87% (10). Helical CT shows improved sensitivity of 100% and specificity of 100%.

Conclusion

The initial absence of symptoms at the time of injury may be due to absence of associated herniation or prolapse of intra-abdominal viscera into the chest cavity when the diaphragmatic rupture occurred. Some of the patients only become symptomatic when there is complication to herniated organs, such as obstruction, strangulation or perforation. This events increase the risk of complications. The presented case was treated by means of staged interventions, due to the delayed presentation and multiple complications (the sepsis at the initial presentation, intra-pleural and parietal abscesses). The presence of a helical CT-scan device helped tot the management of the case, including the minimally invasive approach of some complications (draining, TPN instilations).

Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Competing interests

The authors declare that they have no competing interests.

Author's contributions

AIP, CWL and CN conceived of the study, carried out a detailed literature review, collected and presented the pertinent data. DSK and DS participated in the study design and coordination and helped to draft the final manuscript. All authors read and approved the final manuscript.

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