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POST-TRAUMATIC DIAPHRAGMATIC HERNIA IN A CHILD (CASE REPORT)

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Abstract

We describe the clinical case of a 9-year-old girl operated for diaphragmatic hernia. The probable cause of the diaphragm defect in the girl is a blunt abdominal injury with the subsequent formation of a false diaphragmatic hernia with clinic of acute respiratory failure, making it difficult for early diagnosis. A complex of instrumental methods of investigation was used to visualize a traumatic diaphragmatic hernia, the most effective of which was contrast computed tomography. The discussed clinical case is interesting for its rarity. The peculiarity of the disease is marked in a specific case, and the problem of early diagnosis of traumatic diaphragmatic hernias due to the lack of early pathognomonic symptoms of this pathology is considered. We conclude that managing children who had severe injuries requires being cautious in terms of the possibility of traumatic diaphragmatic hernia formation.

Keywords: *post-traumatic diaphragmatic hernia, acute respiratory failure, surgical treatment, children*

Introduction

Diaphragmatic hernia is the displacement of abdominal organs into the thoracic cavity through natural or pathological openings in the diaphragm, as well as by protrusion of its thinned section. Diaphragmatic hernias in children are most often congenital. Acquired hernias are extremely rare and are usually the result of trauma, injury. In closed trauma to the torso, the rupture of the diaphragm is caused by a strong shock, occurs in its thinnest place.

Depending on the type of trauma or injury, a number of other points, the surgeon can meet with acute and chronic diaphragmatic hernia. It is usually false (Struchkov, V.I.,

Pugachev, A. G., 1975; Adler, D. H., 2002; De Nadai, T. R., Lopes J. C., Inaco Cirino C. C., Godinho M., Rodrigues A. J., 2015).

Abdominal organs (stomach, intestines, spleen, etc.) move into the pleural cavity through the formed wound defect, compressing the lung, shifting the mediastinum to the opposite side. This condition is commonly referred to as acute traumatic diaphragmatic hernia. Rupture of the diaphragm is usually one of the components of a combined abdominal trauma. It is less common for an isolated injury to the diaphragm to occur. In such cases, the rupture may be unrecognised. Subsequently, the abdominal organs are periodically displaced into the thoracic cavity through the diaphragm defect. There is a "chronic" post-traumatic diaphragmatic hernia. In this disease, the need for urgent surgical intervention arises only in cases of complications, which are similar in nature to those observed in false congenital diaphragmatic hernia (Bairov G. A., 1997; Falidas E., Gourgiotis S., Vlachos K., Villias C., 2015; Hajong R., Baruah A., 2012). In the diagnosis of chronic posttraumatic diaphragmatic hernia, anamnesis (indication of trauma or injury) is of great importance.

Case study

Patient E., 9 years old, was admitted to the Department of Critical Care Medicine of the M. Iashvili Central Mother and Child Hospital of Batumi at 02:16 with the diagnosis of acute respiratory failure. Complaints of dyspnoea, breathing difficulties, abdominal pain in the epigastric region and left subcostal area. From anamnesis it is known that abdominal pain appeared in the afternoon, in the evening she vomited. Later she had difficulty breathing, vomiting became more frequent, and dyspnoea appeared. The girl's general condition is severe. The severity of the condition is due to respiratory failure. Her skin was pale, her face was covered with sweat, cyanosis of the nasolabial triangle, marked tachycardia, tachypnoea, respiratory rate – 42 per minute, SPO_2–92%, HR – 130 per minute, BP – 80/55 mmHg. Chest is cylindrical, symmetrical, auscultatory – no breath sounds on the left, percussion – boxy sound. Heart tones are muffled, the boundaries of absolute and relative cardiac bluntness are shifted to the right. The abdomen is not distended, participates in the act of breathing, palpatorily soft, painful in the epigastric region, left subcostal area, symptoms of peritoneal irritation are negative.

The child underwent emergency examinations – general blood and urine analysis, biochemical blood analysis, blood electrolytes, ECG, echocardioscopy, ultrasound of abdominal cavity and chest organs. A review radiograph of the chest organs revealed mediastinal displacement to the right, horizontal fluid levels were visualised in the left side of the chest (Fig. 1).

Contrast computed tomography of the abdominal cavity and chest organs was performed. The obtained slices show a collapsed left lung, the stomach is sharply dilated, displaced into the thoracic cavity, and fluid with horizontal levels in the lumen (Fig. 2).

Additional history with the parents revealed blunt abdominal trauma five months ago. She was examined and observed by a surgeon, no damage to the abdominal cavity organs was detected.

The girl was diagnosed with diaphragmatic hernia. A laparotomy was performed as an emergency. A defect of 5.0 × 3.5 cm was found in the left dome of the diaphragm, through which the inflated stomach, omentum, part of the transverse colon and spleen prolapsed into the pleural cavity. Abdominal organs are evacuated from the pleural cavity with difficulty, especially the stomach. The diaphragm defect was sutured with separate nodular sutures. Complete haemostasis, drainage of the abdominal cavity, pleural cavity, layer-by-layer sutures on the wound.

The postoperative period was satisfactory, without complications. Drains from the abdominal and pleural cavities were removed. On the control X-ray of the chest on the left side, the lung was flattened, the heart was within normal limits.

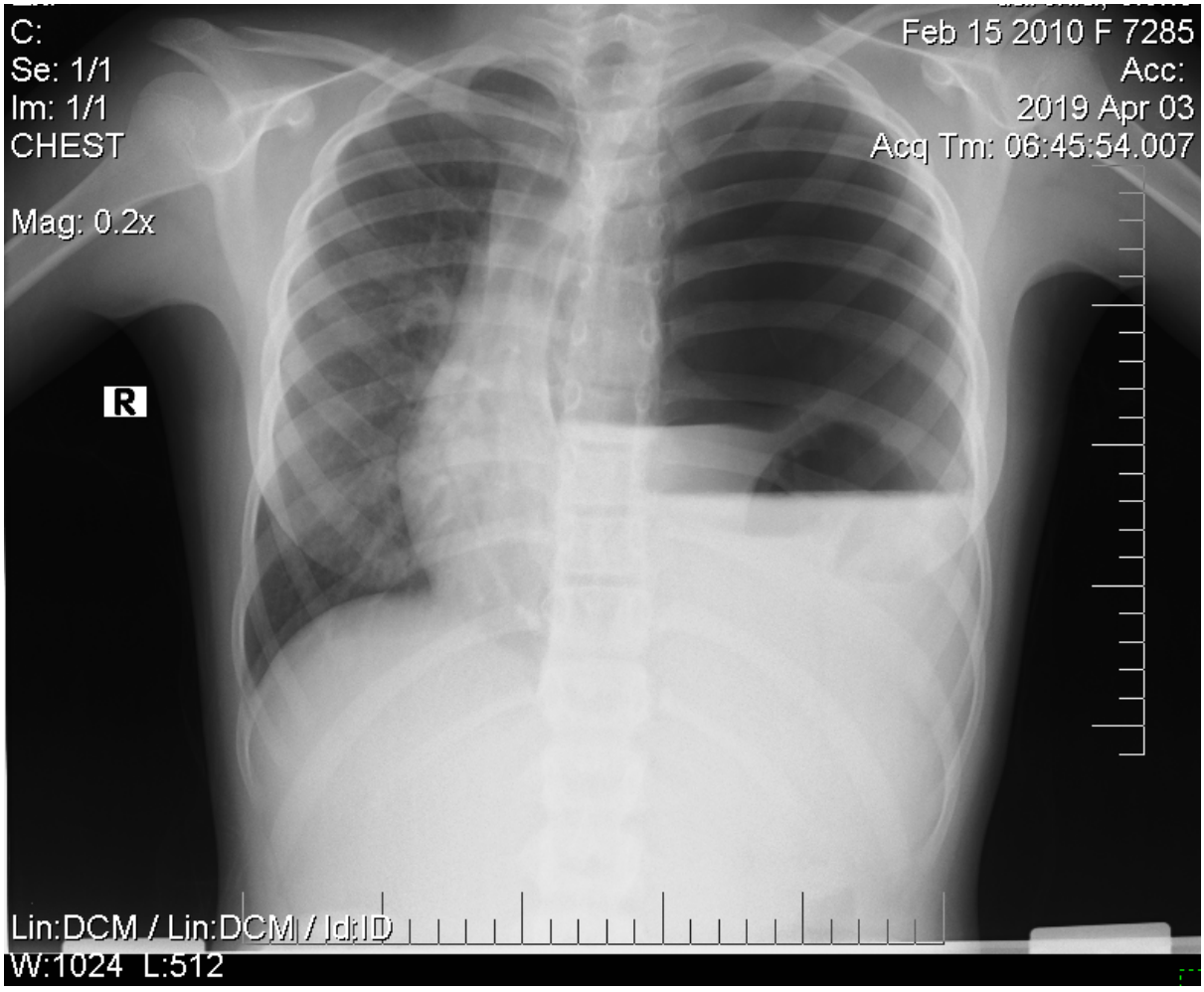
The girl was discharged from the clinic in satisfactory condition.

Discussion

The case presented here was a rather rare pathology for this age. The probable cause of the diaphragm defect in the girl was blunt abdominal trauma five months ago. After examination, the child's satisfactory general con-

dition and absence of distinct symptoms of abdominal cavity organ damage removed the suspicion of a possible diaphragm injury. Subsequently, a false diaphragmatic hernia was formed. Clinical manifestations and complications developed five months after the injury in the form of acute respiratory failure clinic, which made early diagnosis difficult. Because of the process under the guise of acute respiratory failure, the patient was admitted to the Department of Critical Care Medicine, where an examination was performed and a diaphragmatic hernia was diagnosed.

Figure 1. *Overview radiograph of the chest organs. The mediastinum is displaced to the right, horizontal fluid levels are visualised in the left side of the chest*



Standard chest radiological examination is the first diagnostic method in childhood. The main signs of diaphragm injury on review radiographs are detection of abdominal internal organs (gas bladder with horizontal fluid level is detected), elevation of the diaphragm dome on the affected side and contralateral displacement of the mediastinum, as in our 9-year-old patient.

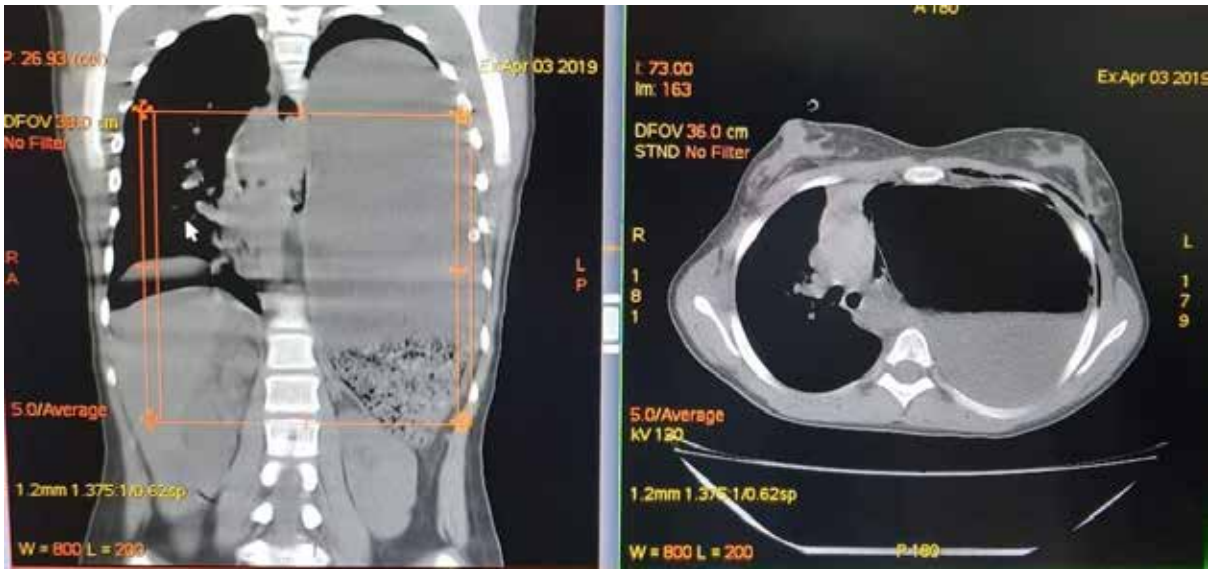
For visualisation of traumatic diaphragmatic hernia, ultrasound of abdominal and thoracic organs is also an available diagnostic method. However, it is not the main, but only an auxiliary method, which allows in the absence of computed tomography to tentatively differentiate the drained effusion in the pleural cavity from the stomach and intestinal loops.

The method of choice in the diagnosis of the disease is computed tomography of the chest and abdomen, which allows to convincingly diagnose diaphragmatic hernia, identify associated damage to the organs of the thoracic and abdominal cavity, differential diagnosis, as well as the correct choice of surgical access. Our girl, having previously conducted radiological and ultrasound studies, the final diagnosis was made after contrast

computed tomography of the chest and abdominal cavity.

The only possible method of treatment of diaphragm injuries and defects, as well as diaphragmatic hernia is surgery. The aim of surgery is to eliminate the compression syndrome (return the abdominal organs to their natural anatomical conditions) and eliminate the diaphragm defect.

Figure 2. *Contrast CT scan of the chest and abdominal cavity. Collapsed left lung is visualised, stomach is sharply dilated, displaced into the thoracic cavity, fluid with horizontal level in the lumen*



Conclusion

Patients with severe abdominal trauma in satisfactory general condition and absence of distinct symptoms from the thoracic and abdominal cavities should not dismiss the suspicion of possible diaphragm injury. Clinical manifestations and complications may develop several months after the injury, making early diagnosis difficult. Children who have suffered severe trauma should be alert to the possibility of traumatic diaphragmatic hernia formation.

Therefore, the problem of early diagnosis of traumatic diaphragmatic hernia is not completely solved, as there are no early pathognomonic symptoms of this pathology. Diagnosis requires the use of a set of instrumental methods of investigation, the most effective of which is contrast computed tomography.

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