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CASE REPORT / ПРИКАЗ БОЛЕСНИКА

A rare case of traumatic chylothorax after blunt thoracic trauma

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SUMMARY
Introduction Chylothorax is an accumulation of chyle in the pleural cavity due to a disruption of the thoracic duct. Traumatic chylothoraces are usually a result of a penetrating trauma and disruption of the thoracic duct, but blunt traumatic chylothorax is a rare condition. The aim of this paper is to present a rare case of traumatic chylothorax after blunt thoracic trauma.
Case Outline We present a case of traumatic chylothorax after blunt thoracic trauma in a patient injured in a motor vehicle accident. The patient had a right-sided fracture of rib XI, hydropneumothorax, lung contusion, and signs of pneumomediastinum. We performed thoracic drainage, but a few days later, according to the increase of amount of the fluid daily drained, and the confirmation of laboratory findings of the analyzed fluid, we made a diagnosis of chylothorax and the patient underwent a thoracotomy, where we sutured the thoracic duct.
Conclusion Chylothorax should be considered in patients after chest trauma if they develop a milky pleural effusion. Analysis of pleural fluid and level of triglycerides is important for the diagnosis and treatment of chylothorax.
Keywords: chylothorax; surgery; thoracic trauma; thoracotomy

INTRODUCTION

Chylothorax is defined as the accumulation of chyle in the pleural cavity that occurs most commonly as a result of disruption of the thoracic duct. In 1875, Quincke reported the first case of chylothorax [1]. Fats taken through food are transported by lymph into the venous blood via the thoracic duct. During the state of starvation the lymph is usually clear due to the low level of fats [2]. Traumatic chylothoraces usually occur as a result of a penetrating trauma and consequent disruption of the thoracic duct, but blunt traumatic chylothorax is a very rare condition, and to date it has been described mainly through case reports in literature [3]. The aim of this paper is to present a rare case of traumatic chylothorax after blunt thoracic trauma.

CASE REPORT

A 55-year-old female patient was brought to our institution because of the injuries sustained in a motor vehicle accident as a pedestrian. She was conscious, communicative, spontaneously breathing, hemodynamically stable. Urgent CT scan showed the right sided fracture of rib XI, hydropneumothorax and lung contusion, fracture of thoracic vertebra XI, signs of pneumomediastinum, and signs of the right tibia fracture were discovered (Figure 1). Injuries of the head, neck and abdomen were excluded. Urgent chest tube drainage of the right hemithorax was performed, and 600 ml of hemorrhagic fluid and air were evacuated. The operation was then continued by a team of orthopedic surgeons performing external fixation of the right tibia. Stabilization of thoracic vertebra XI was delayed until the patient was no longer vitally threatened. Chest X-rays showed complete re-expansion of the lungs with regression of parenchymal contusion (Figure 2). Within the initial five days of hospital stay, serous/serohemorrhagic fluid was evacuated through thoracic drainage, with a tendency of decreasing daily drained amount (800 ml, 700 ml, 50 ml). During this period, the patient took no food perorally. After peroral nutrition was started, sudden increase of the

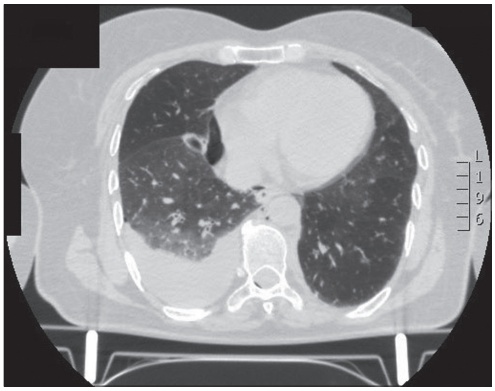

Figure 1. Chest CT on admission; right-sided hydropneumothorax, lung contusion, and pneumomediastinum can be seen

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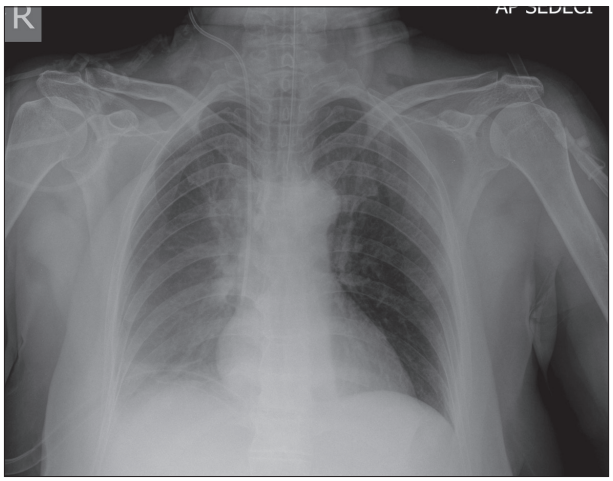

Figure 2. Chest X-ray after chest tube drainage; complete lung reexpansion, absence of pleural effusion, and right-sided lung contusion can be seen

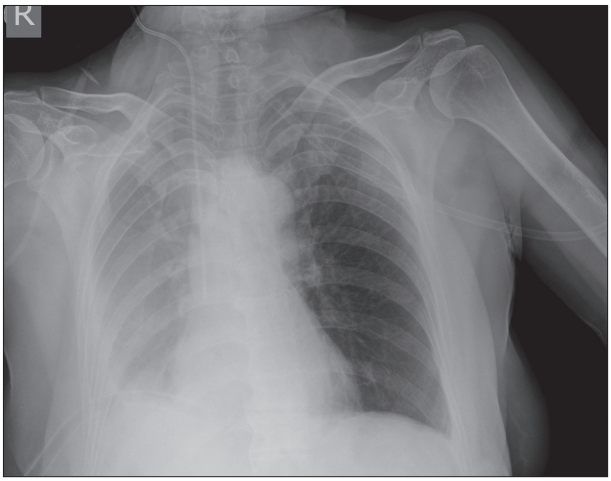

Figure 3. Chest X-ray on the 10th day of hospital stay; ahomogenous decrease of transparency of the right hemithorax can be seen

daily amount of the drained fluid was noted (2,000 ml, 1,500 ml, 2,600 ml); the fluid was cloudy and yellowish. Biochemical analyses of the pleural fluid were conducted (Table 1), and the diagnosis of chylothorax was stated. We started with a conservative treatment that consisted of thoracic tube drainage with continuous suction and total parenteral nutrition. During the conservative treatment there was no decrease of amount of daily drained fluid

Table 1. Biochemical analysis of the pleural fluid

Analyses	Result	Reference range
Cholesterol (mg/dl)	33.26	< 200
Triglycerides (mg/dl)	297.59	< 110
HDL (mg/dl)	7.35	> 60
LDL (mg/dl)	25.9	< 100
LDH (U/l)	1,420	< 200 transudate > 200 exudate
Total proteins (g/l)	17	< 30 transudate > 30 exudate

(3,600 ml, 1,000 ml, 1,400 ml), and chest X-rays showed signs of impairment as homogenous decrease of transparency of the right hemithorax (Figure 3). In the light of these findings, we made a decision to operate. On the 15th day of hospital stay, a team of thoracic surgeons performed a right thoracotomy. A cyst with thin walls, 10 × 10 cm in size, filled with yellowish fluid, was found, along with supradiaphragmal chylous leakage. The cyst was extirpated completely (Figures 4a and 4b), and thoracic duct was sutured en bloc. A traumatic communication between spinal canal and pleural space was identified and local flap from parietal pleura was mobilized to close this defect. Orthopedic surgeons performed external stabilization of thoracic vertebra XI. With the aid of X-rays, four 6 × 45 mm transpedicular screws were placed at the thoracic vertebrae X and XII level, where accompanying titanium rods were placed as well. Alongside X-ray control, the distraction and repositioning of the fractured thoracic vertebra XI was done. Histopathological examination of the cyst identified it as lymphangioma cysticum. Postoperatively, the daily amount of the drained fluid progressively decreased, and it was serous. Postoperative chest X-rays showed complete re-expansion of the lungs with forming of pleural adhesions in the right hemithorax. We removed the chest tubes successively on the 10th postoperative day, thus ending thoracic surgical treatment.

DISCUSSION

Chylothorax occurs as a result of trauma, rarely occurs due to neoplasm or other diseases, or it can be congenital [4]. It usually develops after iatrogenic injury in diagnostic or

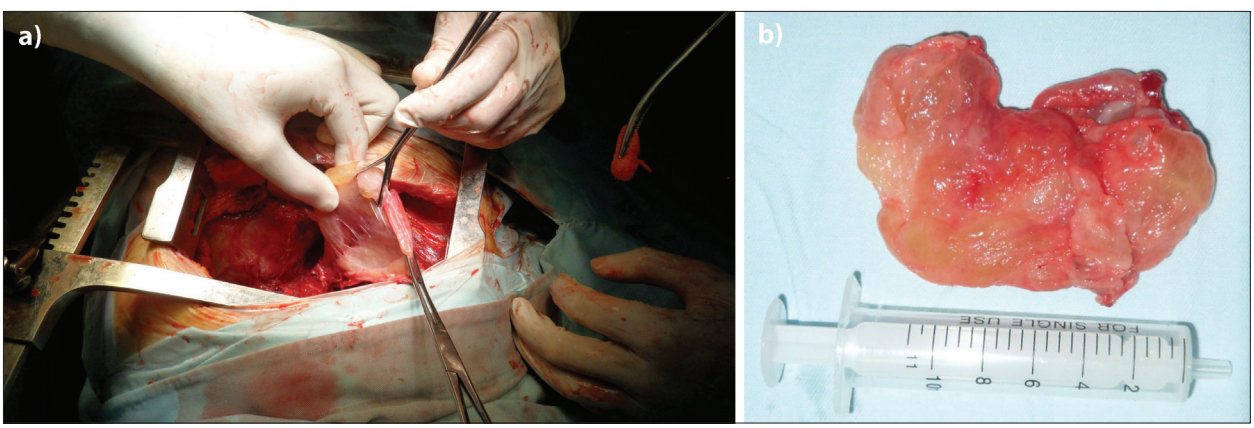

Figure 4. a) Chylous cyst in situ (intraoperative findings); b) chylous cyst – extirpated

therapeutic procedures, but it may also occur after non-iatrogenic trauma of the neck or chest [5, 6]. Injury of the thoracic duct may occur during blunt trauma of vertebrae, as well as at penetrative injuries. Due to sudden hyperextension of the spinal column at blunt trauma of the thorax, joined with the injury of thoracic vertebrae, a rupture of the duct at a characteristic spot above the diaphragm in the right hemithorax occurs [7–10]. This was the case with our patient, who was involved in a car accident as a pedestrian and had a blunt thoracic trauma and fracture of thoracic vertebra XI. Chylothoraces are usually right-sided, in about 50% of the cases, left-sided in about 30%, while others are two-sided [11]. Our patient had right-sided chylothorax. A characteristic of chylothorax symptomatology is its slow development. Usually between two and seven days pass from the moment of injury to the occurrence of the first signs of chylothorax [9]. In our patient, chylothorax was diagnosed on the seventh day of her hospital stay. The daily amount of chyle and lymph varies and ranges 10–100 ml / kg of body mass, depending on many factors [12]. If the patient is in a state of starvation or the pleural fluid is mixed with blood, the color of the pleural fluid does not necessarily have to be chylous and is not always a reliable sign of chylothorax. In about half of patients with chylothorax, the pleural fluid is hemorrhagic, opaque yellowish or greenish, serous or sero-hemorrhagic [13]. In our case, the pleural fluid on the seventh day of the hospitalization was milky with traces of blood. The diagnosis of chylothorax was established by measuring triglyceride levels in the pleural fluid. Triglyceride value greater than 110 mg/dl indicates that it is probably chylothorax [14]. In our patient, the triglyceride level was 297.59 mg/dl, which is why we suspected that it was chylothorax occurring as a result of blunt thoracic trauma. Conservative treatment of chylothorax is successful in roughly 88% of cases [15]. Conservative treatment of chylothorax should be initially started; the conservative treatment, according to some authors, implies the following: tube thoracostomy, termination of oral intake, as well as total parenteral nutrition, and the patient's state and the quantity of the drained pleural fluid must be closely observed on a daily basis. Length of duration of the conservative treatment of chylothorax differs depending on the author and it is mostly from the seventh day up to three to four weeks, but many authors recommend the conservative treatment for no longer than two weeks [16]. In the case of our patient we initially decided for the conservative treatment during the first eight days from the day of chylothorax diagnosis, but due to the unsuccessful treatment, led by the available references we opted for the operation treatment. Indications for the operation treatment of chylothorax are as follows: when the daily chyle leak exceeds 1 l/day for a period more than five days [16], or 1.5 l/day [17], a leak persists for more than two weeks (100 ml/day > 2 weeks), and the drain output remains unchanged over one to two weeks [18]. When we were considering surgical treatment, which was necessary with this patient due to the failure of non-surgical treatment, we took into account that the best option is ligation of the thoracic duct, and the same technique is confirmed by other recent papers [18, 19]. Intraoperatively, we identified the thoracic duct and ligated it at the level above the right diaphragm, which is in accordance with similar cases. This technique is successful in about 90% of cases [14]. Simultaneously and after the operation in the thorax was done, the last stabilization of the fracture of thoracic vertebra XI was performed, similar to a case recently reported in references [20, 21].

In conclusion, although it is very rare complication, chylothorax should be considered in patients who had sustained thoracic trauma and who exhibit pleural leakage of milky content. Value of triglycerides in the pleural fluid is important for reaching the diagnosis. By conservative treatment a successful result can be achieved, but by surgical treatment the healing is definitely achieved.

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Редак случај трауматског хилоторакса након тупе трауме грудног коша

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САЖЕТАК

Увод Хилоторакс представља накупљање лимфе у плеуралној шупљини које настаје као последица дисрупције дуктус торацикуса. Трауматски хилоторакс обично настаје као последица пенетрантне трауме, а након тупе трауме грудног коша је изузетно ретка појава.

Циљ овог рада је да прикаже редак случај настанка хилоторакса након тупе торакалне трауме.

Приказ болесника Приказујемо случај трауматског хилоторакса након тупе торакалне трауме код жене повређене у саобраћајној несрећи. Повређена је имала прелом 11. ребра са десне стране, хидропнеумоторакс, контузију плућа и пнеумомедијастинум. Урађена је плеурална дренажа, али неколико дана касније, због повећања количине дренираног садржаја и лабораторијске потврде присуства триглицерида у анализираном садржају, постављена је дијагноза хилоторакса. Урађена је торакотомија и подвезан је дуктус торацикус.

Закључак О хилотораксу треба мислити након повреде грудног коша са плеуралним изливом млечног садржаја. Анализа плеуралног садржаја и вредност триглицерида у њему је битан метод у постављању дијагнозе и одлуке о даљем лечењу.

Кључне речи: хилоторакс; грудна траума; торакотомија; грудна дренажа