

CASE REPORTS

Complicated Primary Spontaneous Pneumothorax - Challenges to Overcome: Case Report and Literature Review

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Abstract

Regarding the pediatric population, the cause of spontaneous pneumothorax is well known to be the presence of apical pleural blebs, however this pathology is rare in children under 18 years of age and more common in the second decade of life^{1,2}. The case report is about a sixteen year old female patient who was brought to the emergency unit accusing chest pain in the right hemithorax which started 7 days before, but which increased in intensity in the last 24 hours. The chest x-ray showed right pneumothorax (Figure 1) which complicated with the onset of thoracic bleeding (Figure 2). An intercostal drainage was performed and it drained 1500 ml of blood so it was opted for wet suction pleural drainage in order to facilitate hemostasis, with temporary results, consequently, the patient underwent diagnostic thoracoscopy, which revealed pleural adhesions, suggesting previously undiagnosed pneumothorax. A month later, the pneumothorax reappeared so parietal pleurectomy was performed, with no recurrence in the next six months. Analyzing the presentation, evolution and outcome of the case we concluded that CT (Computed Tomography) is the most suitable diagnostic approach and thoracoscopy is the best therapeutic method in the acute phase of a complicated pneumothorax as well as in case of recurrence.

Keywords: spontaneous pneumothorax, hemothorax, pleurectomy

Rezumat

În populația pediatrică, cauza bine cunoscută a pneumotoraxului spontan o reprezintă bulele pleurale apicale, iar această patologie este mai rară la copiii sub 18 ani, aceasta fiind des întâlnită în a doua decadă a vieții^{1,2}. Prezentarea de caz este despre o pacientă în vârstă de 16 ani adusă în urgență pentru durere în hemitoracele drepte, debutată de 7 zile, care a crescut în intensitate în ultimele 24 de ore. Radiografia toracică a arătat pneumotorax drept (Figure 1) complicat ulterior cu hemotorax (Figure 2). S-a montat drenaj pleural care a evacuat 1500 ml de sânge, motiv pentru care s-a optat pentru drenaj aspirativ în scopul facilitării hemostazei, cu rezultate temporare, motiv pentru care s-a efectuat toracoscopie exploratorie care a relevat aderențe pleurale, sugerând că pacienta a prezentat pneumotorax spontan nedignosticat în antecedente. O lună mai târziu, pneumotoraxul a recidivat și s-a apelat la pleurectomie parietală, fără acuze și recidivă a pneumotoraxului în următoarele 6 luni. Analizând prezentarea, evoluția și rezultatele tratamentului aplicat, putem concluziona că examinarea CT este cea mai potrivită metodă de diagnostic, iar toracosopia este cea mai eficientă procedură terapeutică în faza acută a pneumotoraxului complicat, cât și în situația recidivelor.

Cuvinte cheie: pneumotorax spontan, hemotorax, pleurectomie

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INTRODUCTION

The studies concerning spontaneous pneumothorax in children offer a limited amount of information about the best approach with regard to the patients who require surgical treatment of this condition. The less severe forms respond to conservative treatment which consists of oxygen therapy and pain medication. If medical treatment does not alleviate the symptoms or if the pneumothorax persists, the patient requires chest tube drainage^{4,5,6}. Surgical treatment is indicated when the pneumothorax reoccurs or if effective pleural drainage does not improve the condition of the patient^{5,7}. However, there is limited data about the advantages of pleural adhesiolysis by video-assisted thoracoscopy with or without different types of pleurodesis, and about which type of pleurodesis has the lowest rates of recurrence. Although chemical pleurodesis was widely used in adults most research suggests it should be avoided in children^{11,16}. Pleurodesis can be achieved by pleural abrasion or parietal pleurectomy with or without wedge resection^{10,13}.

MATERIALS AND METHODS

The case report is about a sixteen year old patient who was brought to the emergency unit for pain in the right hemithorax which occurred 7 days before presentation, but it increased in intensity in the last 24 hours. The child was directed to the hospital by her sports teacher. The chest x-ray showed right pneumothorax (Figure 1) and the blood gases were normal. The medical history of the patient revealed prematurity associated with neonatal respiratory distress syndrome. The anamnesis discovered that the patient presented in the past years several episodes of chest pain, which lasted for a week, without dyspnea, so they did not seek medical attention, which can be considered as recurrent spontaneous pneumothorax, and this fact can explain the formation of the pleural apical adhesions. The patient's Marfanoid appearance was investigated during the school years, but it was not confirmed by genetic testing. Since the respiratory status of the patient was stable, she was administered oxygen therapy and pain medication, but her condition did not improve, and, after 6 hours of conservative treatment, another x-ray examination was performed and it revealed right hydropneumothorax (Figure 2). In this situation thoracic CT scan was obtained and it emphasized right hemopneumothorax (Figure 3), atelectasis of the right lower lobe with bronchiectasis (Figure 4), as well as apical pleural blebs in both lungs (Figure 5). The therapeutic approach was pleural drainage in the 4th intercostal space on the



Figure 1.

middle axillary line with an 18 Ch chest tube that drained 1500 ml of blood. In these circumstances an emergency thoracotomy was considered, but considering the unclear history of the patient with possible pulmonary dysplasia from childhood, it was opted for wet suction pleural drainage using a pressure of -20 mmHg in order to facilitate pulmonary expansion and hemostasis. The symptoms were alleviated but, despite maintaining proper hemostasis and administering 2 units of 400 ml of red blood cells transfusion. The bleeding persisted, the pleural effusion quantifying around 100 ml per day. The cardiovascular balance was obtained by administering plasma transfusion and macromolecular solutions. The progress of the patient was monitored using a series of x-ray examinations after 24 and 48 hours of pleural drainage which showed persistent hemothorax. Taking these findings into consideration, a diagnostic thoracoscopy was performed which revealed apical pleural emphysema and pleural adhesions which caused the pneumothorax after their rupture. We concluded that the apparition of this adhesion was triggered by previously undiagnosed primary pneumothorax which explains the recurrent thoracic pain that the patient accused in the past. In this episode a larger collapse



Figure 2.



Figure 4.

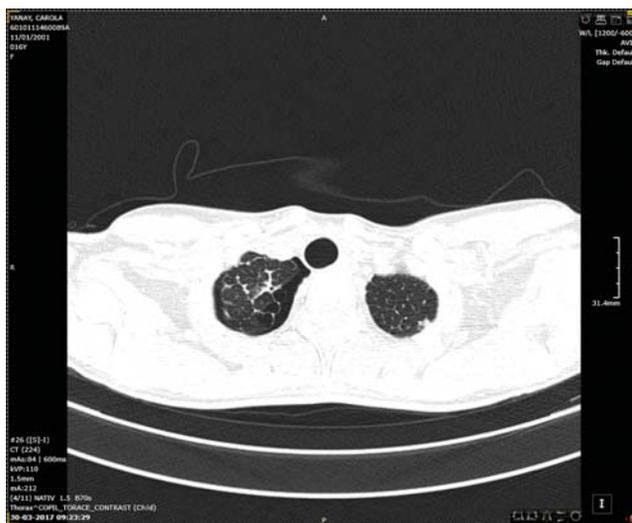


Figure 5.

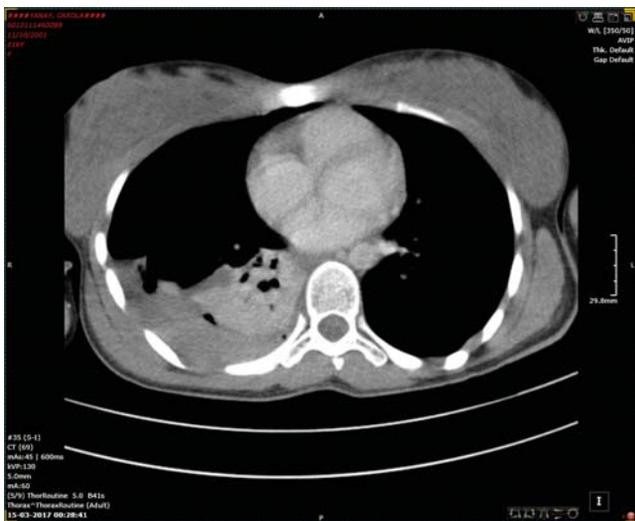


Figure 3.

of the lung put tension on these adhesions resulting in their rupture and thoracic bleeding. After pleural adhesiolysis and bipolar coagulation, autologous blood pleurodesis was performed.

Following the thoracoscopic procedure, the patient's condition improved. The wet suction pleural drainage

was kept 10 days postoperatively and the resorption of the pneumothorax was confirmed at the CT scan performed 7 days later. The immediate progress of the patient is favorable, with a normal check-up at one month after the procedure, but a week later, the patient presents a recurrence of the right pneumothorax. We took into consideration catamenial pneumothorax and endometriosis so thoracoscopic parietal pleurectomy is performed, the general state of health of the patient presenting significant improvement after the intervention. The next 6 months of follow-up did not reveal any abnormal clinical or radiological findings and histology revealed only inflammatory modifications of pleura.

RESULTS AND DISCUSSION

Spontaneous pneumothorax is a condition which can progress silently and it can lead to the patient being brought to the doctor for the first time when complications, such as hemothorax, occur^{1,2}. When a higher volume of pneumothorax is formed, the pleural adhesions extend and the increased pressure leads to their rupture which causes bleeding^{4,5,6}. In these circumstances, it is preferable to perform a diagnostic thoracoscopy at the time of the insertion of the chest tube in order to perform proper hemostasis, since, in its absence, the bleeding continues despite pulmonary reexpansion^{7,14,15}. Regarding different types of pleurodesis, research shows lower recurrence rates in apical parietal pleurectomy (9.1%) compared to pleural abrasion (12.8%)^{8,9}. Surgical chemical pleurodesis is rarely performed since it is known to cause severe adhesions, postoperative pain and it may be related to carcinogenesis¹². Most

of the findings in the medical research support parietal pleurectomy versus pleural abrasion^{9,13}. Chemical pleurodesis must be combined with pleural abrasion or wedge resection¹². The lowest reoccurrence rates were found in patients who underwent parietal pleurectomy or wedge resection.

CONCLUSIONS

In complicated primary pneumothorax, although lung reexpansion by wet drainage can result in primary hemostasis, exploratory thoracoscopy is the best approach for evaluation and hemostasis. Simple blood adhesion and coagulation of apical blebs is not enough to avoid further complications or new episodes of pneumothorax in the future. We prefer thoracoscopic parietal pleurectomy to accomplish pleurodesis and prevent any recurrences.

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