

A Mild Chest Trauma in an Infant who Developed Severe Pulmonary Hemorrhage

Bir Infantta Hafif Bir Göğüs Travması Sonrası Gelişen Ağır Pulmoner Hemoraji

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Abstract

Chest trauma, an important cause of morbidity and mortality, is the second most common cause of death in children under four years of age. Due to the different anatomy and physiology of the respiratory system in childhood, the injuries and consequences of chest trauma are also dissimilar. A seven-month-old male infant presented to the emergency clinic with cyanosis and respiratory distress. His medical history revealed that he had been found trapped behind his bed in a cyanotic state two hours earlier. Although physical examination revealed no signs of trauma, respiratory distress and hemorrhagic secretions indicated pulmonary hemorrhage or contusion. This preliminary diagnosis was confirmed by thoracic tomography. There was complete recovery following 48-hour oxygen and medical treatment. Even after mild injuries, the fact that severe pulmonary hemorrhages and contusions may develop without a trace of trauma should be kept in mind.

Key Words: Chest trauma, Childhood, Morbidity, Mortality

Özet

Önemli bir morbidite ve mortalite neden olan göğüs travması dört yaşından küçük çocuklarda en sık ikinci ölüm nedenidir. Çocukların solunum sistemi, anatomik ve fizyolojik olarak erişkinlerden farklı olduğundan dolayı yaralanmalar ve sonuçları da farklıdır. Yedi aylık erkek hasta, morarma ve solunum sıkıntısı ile acile getirildi. Anamnezinden 2 saat önce yatakla duvar arasında morarmış olarak bulunduğu öğrenildi. Yapılan fizik muayenede dıştan bir travma izi olmamasına rağmen, solunum sıkıntısı ve hemorajik sekresyon pulmoner hemoraji ve/veya kontüzyonu düşündürdüğünden acil toraks tomografisi yapılan hastada tanı kesinleştirilerek tedaviye alındı. 48 saatlik oksijen ve medikal tedavi ile tamamen iyileşti. Hafif travmalardan sonra bile, travma izi olmaksızın ağır pulmoner hemoraji ve kontüzyon gelişebileceği akılda tutulmalıdır.

Anahtar Kelimeler: Göğüs travması, Morbidite, Mortalite

Introduction

Trauma is the leading cause of death in children 1-14 years of age in developed countries, and thoracic trauma is the second most common cause of mortality following head trauma [1]. The elasticity of the chest structure in childhood is due to the incomplete ossification of the costal cartilage and the suppleness of the connective tissue. The mobility of the mediastinal organs is also greater than in adults [2]. These features result in different consequences of trauma in the absence of fractures of the ribcage and the direct transmission of energy to the pulmonary parenchyma [3]. Therefore, children are more prone to developing pulmonary contusions in cases of high-energy trauma. With this case

report, we want to emphasize that this type of chest trauma may cause pulmonary contusions and hemorrhages in the absence of any external signs of trauma.

Case Report

This 7-month-old male patient presented to our clinic with complaints of facial cyanosis and respiratory distress. He had been found trapped between his bed and the wall, cyanotic and whining, two hours earlier. His personal and familial medical history showed no distinctions.

A physical examination revealed a poor general appearance, with foaming at the mouth, perioral cyanosis, dyspneic and tachypneic (68 beats/min) breathing, pulse of 200 beats/min, and intercostal and subcostal retractions. Diffuse,

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crepitant rales in all areas of the right lung were heard upon auscultation. A chest x-ray showed a diffuse, centrally located opacity in the right lung. Thoracic tomography revealed infiltrative areas in the right lung, indicating a diffuse alveolar hemorrhage (Figure 1). Laboratory analysis demonstrated a hemoglobin of 10.2 gr/dl, hematocrit of 30.8%, white blood cell count of $8200/\text{mm}^3$, platelet count of $292,000/\text{mm}^3$, and ketonuria +++, while PT, aPTT, CRP and other biochemical values were within normal limits. Arterial blood gas measurements were pH 7.28, HCO 18 mmol/L, PaCO_2 48 mmHg, and PaO_2 89 mmHg. The history of trauma (entrapment), the radiological finding of a diffuse pulmonary hemorrhage in the right lung, and the mild hypoxia in the arterial blood gas measurements led to a diagnosis of a pulmonary hemorrhage following blunt trauma, and emergency treatment was commenced. Intravenous access was obtained, and nasal oxygen (3-4 L/min) was administered. The vital signs were stable after approximately 6 hours. Furthermore, auscultation sounds in the right lung disappeared approximately 48 hours later. The thoracic tomography at hour 72 was normal (Figure 2), and the patient was discharged the same day.

Discussion

Thoracic trauma may be blunt or penetrating and sometimes both blunt and penetrating. The majority of patients present with blunt trauma affecting multiple organs, while penetrating trauma is less prevalent and usually concerns a single system [4]. In children, chest trauma accounts for around 20-30% of all blunt trauma cases [5, 6]. Following

head trauma, thoracic trauma is the second most common cause of mortality in children [1, 7]. General mortality rates associated with trauma are around 2-3%, but they escalate to roughly 20% in children with chest trauma [8, 9]. According to the type of trauma, ecchymosis on the chest wall, costal fractures and pulmonary contusion may develop. Owing to the more flexible bone structure in childhood, contusions may develop in the absence of costal fractures. Costal fractures have been reported in only 50% of children with major chest trauma [6, 10]. Post-contusion leakage of fluids and blood from capillaries to the alveoli and interstitium causes acute respiratory distress and hypoxia [11]. Our patient had hypoxia caused by a pulmonary hemorrhage in the absence of ecchymosis or a costal fracture. Upon pulmonary auscultation in this type of patient, breath sounds were diminished in the area of the contusion, and rales and rhonchi are detected. However, diagnosis is difficult by physical examination alone. In our patient, breath sounds were diminished, and there were diffuse crepitant rales in the right lung area. Contusions appeared on x-ray as peripheral opacities with indistinct borders. The chest x-ray of our patient showed mainly centrally located opacities. Computerized tomography is much more sensitive in the demonstration of contusions [12, 13]. Radiological findings develop swiftly within the first six hours and regress within a few days post-treatment. The treatment of pulmonary contusions consists of general trauma therapy and respiratory support. Patients will be in need of oxygen support if hypoxemia exists [4, 14]. Limitation of fluid intake is recommended. With administration of oxygen at 2-3 L/min and continuous minimal intravenous fluids, our patient stabi-



Figure 1. Coronal MIP image revealing infiltrative areas in the right lung, indicating a diffuse alveolar hemorrhage.

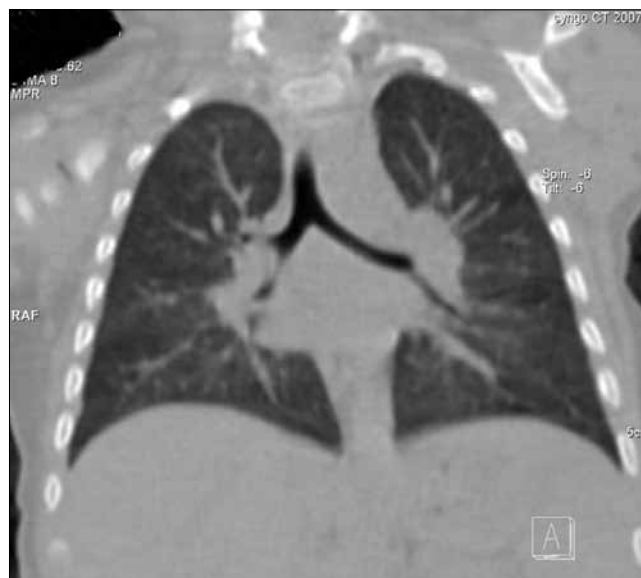


Figure 2. Three days after treatment. Lung tomography revealed recovery of infiltrative areas in the right lung.

lized within six hours, and auscultation findings normalized within 48 hours. In cases in which findings are not normalized, ARDS, pulmonary edema, fat embolisms, infection and aspiration should be considered [15].

In conclusion even after mild injuries, severe pulmonary hemorrhages and contusions may develop without a trace of trauma and should be kept in mind.

Conflict of interest statement: The authors declare that they have no conflict of interest to the publication of this article.

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