A chest wall defect caused by empyema necessitatis due to profound malnutrition

Göğüs duvarı defekti oluşturmuş ağır malnütrisyona bağlı ampiyema necessitatis

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Empyema necessitatis is defined as the extension of an empyema through the parietal pleura, into surrounding tissue. It is most commonly seen in adults. In this article, we report a five-year-old malnourished boy who presented with a chest wall defect due to empyema necessitatis. The mentally retarded patient was diagnosed with empyema necessitatis, hyponatremia, anemia and protein-energy malnutrition. The patient was placed in intensive care and treated for infection after establishing fluid balance and correcting deficiencies. Daily open wound dressing and debridement were performed. The chest cavity and intercostal spaces were closed with granulation tissue within two weeks. Empyema necessitates is quite rare in children. A delay in diagnosis may result in significant morbidity and mortality.

Key words: Chest wall defect; empyema necessitatis; malnutrition.

Ampiyema necessitatis, ampiyemin pariyetal plevrayı aşarak çevre dokulara ilerlemesi şeklinde tanımlanır. Genellikle erişkinlerde görülür. Bu çalışmada ampiyema necessitatis'e bağlı göğüs duvarı defekti olan beş yaşındaki malnütrisyonlu bir olgu sunuldu. Zihinsel engelli hastaya ampiyema necessitatis, hiponatremi, anemi ve protein-enerji malnütrisyonu tanısı konuldu. Yoğun bakıma alınan hastaya, sıvı dengesi sağlandıktan ve eksiklikleri tamamlandıktan sonra enfeksiyona yönelik tedavi uygulandı. Günlük açık yara pansumanları ve debridman yapıldı. Göğüs duvarındaki defekt ve interkostal boşluklar granülasyon dokusu ile iki hafta içerisinde kapandı. Ampiyema necessitatis çocuklarda oldukça nadirdir. Tanının gecikmesi önemli düzeyde morbidite ve mortaliteye yol açabilir.

Anahtar sözcükler: Göğüs duvarı defekti; ampiyema necessitatis; malnütrisyon.

Empyema necessitatis (EN) is a rare complication of pleural space infections and occurs when the infected fluid dissects spontaneously into the chest wall from the pleural space. This complication usually occurs after a chronic empyema related to an infection. The most common infections are tuberculosis and actinomycosis.[1,2] With the development of antituberculous therapy, tuberculous empyema and EN have become uncommon diseases. This rare complication of empyema is more commonly reported in adults. Recent pediatric cases of EN appear to be exceedingly rare.[3,4]

We describe a five-year-old malnourished boy who presented with a chest wall defect due to empyema necessitatis.

CASE REPORT

A five-year-old boy presented with a 10-day history of upper-lower respiratory symptoms and an increasing mass on the right side of his back. About three days prior to the consultation, his parents had noticed serous drainage from a sore on the right lateral wall of his chest. Physical examination revealed he was physically and mentally retarded as well as undernourished. A 4x5 cm chest wall defect with thinned-out skin, subcutaneous tissues, intercostal muscles, and endothoracic fascia was present, and extended into the thoracic space (Figure 1a). His weight was equal to a three-month-old child's weight (5 kg), his height was equal to a one-and-a-half-year-old child's height (80 cm), and his head

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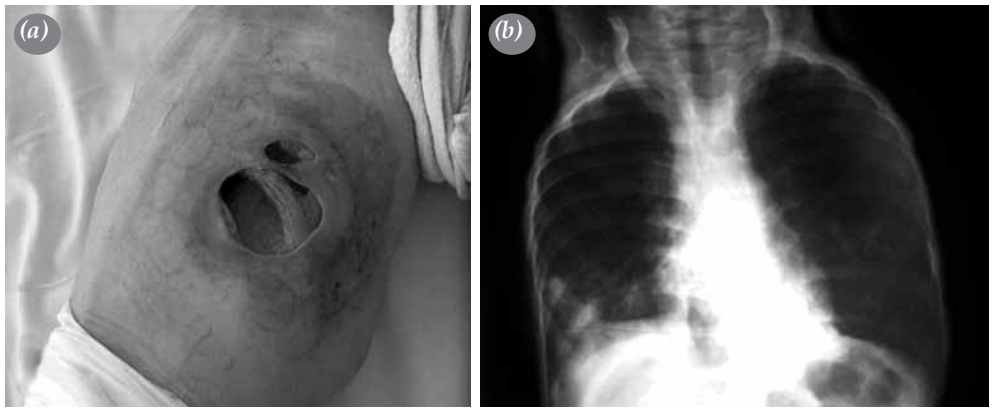

Figure 1. (a) At admission, the wound on the chest wall was 4x5 cm in size and was in participation with the thoracic space. **(b)** A chest radiograph revealed a consolidation in the right lower lobe.

circumference was equal to that of a four-month-old child (42 cm). Breath sounds were decreased on the right side. A chest radiograph obtained at admission revealed right-sided pleural effusion with consolidation in the right lower lobe (Figure 1b). His vital signs revealed normothermia (36.7 °C), tachycardia (144/min), tachypnea (46/min), decreased blood pressure (90/50 mmHg), and hypoxia on room air (oxygen saturation of 84%).

Laboratory values revealed a hemoglobin count of 6.7 g/dL, a hematocrit of 22.1%, a white blood cell count of 22700/mm^3 (with neutrophils 80%), and an increased erythrocyte sedimentation rate of 113 mm/h. His blood glucose level was 57 mg/dL, his sodium level was 119 mmol/L, his total protein level was 6.9 g/dL, and his albumin level was 1.7 g/dL. Cultures of pleural-fluid, blood, and urine were sterile. A pleural fluid Gram stain revealed gram-positive cocci and gram-negative bacilli. Proteus mirabilis developed in the wound site smear culture. No tuberculosis bacillus was observed on the sputum when acid-fast bacilli (AFB) staining was performed.

The mentally retarded patient was diagnosed with empyema necessitatis, hyponatremia, anemia, and protein-energy malnutrition. Since his general status was poor and his body weight was too low, chest computed tomography was not taken. The patient was placed in intensive care and treated for infection by completing his deficiencies. He was treated with ceftriaxone (100 mg/kg/day, intravenously, twice a day) and ampicillin/sulbactam (150 mg/kg/day, intravenously, three times a day). The patient was resuscitated with crystalloids and transfused with red blood cells. Daily dressing and debridement were also performed. A diet rich in calories and protein was initiated as soon as he was able to take nourishment orally. The patient presented good clinical recovery, and his respiratory signs and symptoms as well as his blood parameters improved. The chest cavity and intercostal spaces were almost filled with granulation tissue within two weeks. The skin defect was closed with a skin graft by plastic surgery (Figure 2a, b). He was discharged on the 30th day in good condition.

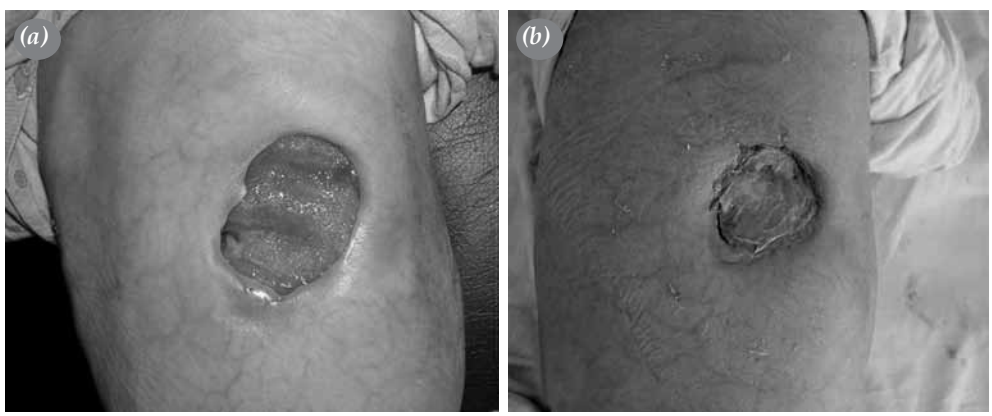

Figure 2. (a) On the 12th day, the intercostal spaces were filled with granulation tissue. **(b)** On the 24th day, the defect on the chest wall was closed with a skin graft.

DISCUSSION

Empyema that occur in children is usually a complication of upper or lower respiratory tract infections. Factors such as malnutrition and poor hygiene complicate the clinical progress and management of children with pneumonia.[2] The most common presenting symptom of an empyema in children is fever. Fever, cough, and dyspnea are present in 75% of children on admission. Other signs and symptoms include decreased breath sounds, tachypnea, tachycardia, intercostal retractions, and lethargy.[1-4] The physical examination of our mentally retarded and severely undernourished patient showed that all the symptoms mentioned in the literature were present except for high temperature. We attribute the absence of the temperature to the poor general status of the patient.

In 5 to 10% of patients, a parapneumonic effusion becomes more complicated and leads to empyema, which could later lead to EN.[2] In the literature, the age range of patients with EN was three months to 81 years, with a mean age of 40 years. Patients may present with chronic or subacute courses, with symptoms preceding the diagnosis from one and a half weeks to six years.[1] A painful anterior chest wall mass, typically between the second and sixth intercostal space, is the most common presenting symptom.[2,4] Although our patient was five-year-old, he had the weight and height of a one-and-a-half-year-old child and had had a history of disease for the 10 days. The infection may have developed rapidly due to poor general status and inadequate treatment. Since he was mentally retarded and confined to bed, pleural fluid had deposited at the back of the hemithorax so that the defect on the chest wall was posterior.

Empyema necessitatis in children is a rarely reported disease which requires a high index of suspicion. A delay in diagnosis may result in significant morbidity and mortality.[5,6] In our case, the defect on the chest wall was considerably large and extended into the thorax. Rapid recovery was achieved with proper treatment, good nourishment, and daily debridement and dressing. Finally, the defect was closed with a skin graft.

What makes our patient unusual is his age and body status. He presented with symptoms for a shorter time than has been reported in the literature. He responded well to medical therapy combined with daily dressing and debridement, and his recovery period was short. This case shows the incredible healing capacity of infants and children.

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