

A Condition Mimicking Lung Mass Appearance in Childhood: Round Pneumonia

Çocukta Akciğerde Kitle Görünümünü Taklit Eden Bir Durum: Yuvarlak Pnömoni

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ABSTRACT

In childhood, pneumonia is one of the major infectious diseases responsible for significant morbidity and mortality. Clinical and radiographic features of round pneumonia simulate pulmonary masses. *Streptococcus pneumoniae*, *Mycobacterium tuberculosis*, and *Klebsiella pneumoniae* are the most frequent etiologic agents of Round pneumonia in children. A two-year-old boy presented with fever, cough, respiratory distress, tachypnea, suprasternal-intercostal retractions, rales and expiratory wheezes. In the laboratory findings white blood cell count was 17300/mm³, neutrophils 56%, erythrocyte sedimentation rate 54 mm/hour, C-reactive protein 68.84 mg/L, and chest radiogram showed right perihilar 2.5 cm density. In the chest computed tomography scan a 24 mm size irregular contoured consolidation-atelectasis complex in the superior segment of the lower lobe of right lung, demineralization at the right side of T5 vertebra and enlargement at the neural foramina was present. Thorax-abdomen magnetic resonance imaging was performed to exclude neuroblastoma. The spinal cord and neural foramina were normal. The case was discussed at the Aegean University Medicine Faculty Pediatric Respiratory-Allergy Council and the round consolidation with air bronchogram was consistent with round pneumonia. Clinical and radiographic recovery was performed after third generation cephalosporin treatment. In this case we aim to mention the round pneumonia which mimics lung masses. (*Tur Toraks Der* 2012; 13: 42-4)

Key words: Round pneumonia, lung mass, children

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INTRODUCTION

In childhood, pneumonia is one of the major infectious diseases responsible for significant morbidity and mortality [1]. Round pneumonia is a type of acute infective pneumonia with a round shaped consolidation area radiologically [2,3]. It was first reported in the radiology literature in 1954 [3]. The outcome of round pneumonia is usually good and primarily depends on the virulence of the infective organism and host immunity [4]. We report

ÖZET

Çocukluk çağı pnömonileri önemli morbidite ve mortaliteye neden olan enfeksiyon hastalıklarındandır. Yuvarlak pnömoninin klinik ve radyolojik özellikleri akciğer kitlelerini taklit etmektedir. Çocukluk çağıında en sık yuvarlak pnömoni etkenleri olarak *Streptococcus pneumoniae*, *Mycobacterium tuberculosis* ve *Klebsiella pneumoniae* bildirilmektedir. İki yaşında erkek olgu ateş yüksekliği, öksürük, solunum sıkıntısı bulguları (taşıpne, suprasternal-interkostal çekilmeler) ve kreptan rallerle başvurdu. Laboratuvar bulgularında beyaz kan hücresi 17300/mm³, periferik yaymasında %56 nötrofil hakimiyeti vardı. Eritrosit sedimentasyon hızı 54 mm/st ve C-reaktif proteini 68.84 mg/L saptandı. Akciğer grafisinde sağ perihiler bölgede 2.5 cm boyutta dansite artışı izlendi. Toraks tomografisinde sağ akciğer alt lob üst segmentte 24 mm boyutta düzensiz sınırlı konsolidasyon-atelektazi görünümü ve torakal 5. vertebra sağında demineralizasyon ve nöral foraminalarda genişleme olduğu belirtildi. Nöroblastom dışlanması amacıyla çekilen toraks-abdomen manyetik rezonans görüntüleme spinal kord ve nöral foraminalar normal olarak değerlendirildi. Olgu Ege Üniversitesi Tıp Fakültesi Çocuk Solunum Allerji Konseyi'nde tartışıldı. Hava bronkogramı içeren yuvarlak konsolidasyon alanı "Yuvarlak Pnömoni" olarak değerlendirildi. Üçüncü kuşak sefalosporin tedavisi ile klinik ve radyolojik düzelleme izlendi. Bu olgu ile akciğer kitleleri ile ayırıcı tanıya gidebilen yuvarlak pnömoniyi hatırlatmak istedik.

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the case of a two-year-old boy with round pneumonia who was successfully treated with antibiotic therapy.

CASE

A previously healthy two-year-old boy was admitted to hospital with symptoms of fever, cough and wheezy breathing. All his vaccines had been administered appropriately. BCG scar was positive. There was no other significant history. His past history did not reveal anybody

This case was partly presented at the 29th UMEMPS Congress Union of Middle Eastern and Mediterranean Pediatric Societies, 14- 17 September 2005, Istanbul, Turkey.

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with tuberculosis in his environment. He had a family history of atopic dermatitis and allergic conditions in his mother's history.

On admission, his body temperature was 38.3°C, the heart rate was 112/min, respiratory rate was 56/min. The blood pressure was 100/70 mm Hg, weight was 12 kg (25-50 centile), length was 83 cm (75 percentile). Physical examination showed respiratory distress, tachypnea, suprasternal-intercostal retractions, rales and expiratory wheezes. Laboratory data showed an elevated white blood cell count of 17300/mm³, on the peripheral blood smear neutrophils 56% and toxic granulation was positive. Erythrocyte sedimentation rate 54 mm/hour, C-reactive protein 68.84 mg/L and chest radiogram showed right perihilar 2.5 cm density (Figure 1). The purified protein derivative (PPD) test and *Mycobacterium tuberculosis* cultures were negative. A blood culture performed before administration of antibiotic treatment was also negative.

The chest computed tomography (CT) scan showed a 24 mm irregular contoured consolidation-atelectasis complex in the superior segment of the lower lobe of right lung, demineralization at the right side of T5 vertebra and enlargement at the neural foramina (Figure 2

and 3). A thorax-abdomen magnetic resonance imaging (MRI) was performed to exclude neuroblastoma. The spinal cord and neural foramina were normal.

The case was discussed at the Aegean University Medical Faculty Pediatric Respiratory-Allergy Council and the round consolidation with air bronchogram was thought to be Round Pneumonia. The patient was treated with 75 mg/kg/day cefuroxime axetil. On the 3th day of treatment clinical recovery was observed. Two weeks after treatment resolution of radiographic findings was seen (Figure 4).

DISCUSSION

Round pneumonia is a benign cause of coin lesions seen on chest radiography. This entity is more common in children. Patients are usually under 8 years of age [5]. It has been reported more rarely in adults. It accounts for less than 1% of "coin lesions" of the lung and the typical location is the posterior and lower lobe (especially in the superior segment of the lower lobe) [2,5,6]. Patients usually present with community acquired pneumonia symptoms (fever, malaise and cough). They can also be asymptomatic or can present with nonspecific symptoms [1,5].



Figure 1. The initial Chest X Ray and appearance of the round opacity



Figure 3. Computed tomography image of chest, consolidation-atelectasis complex

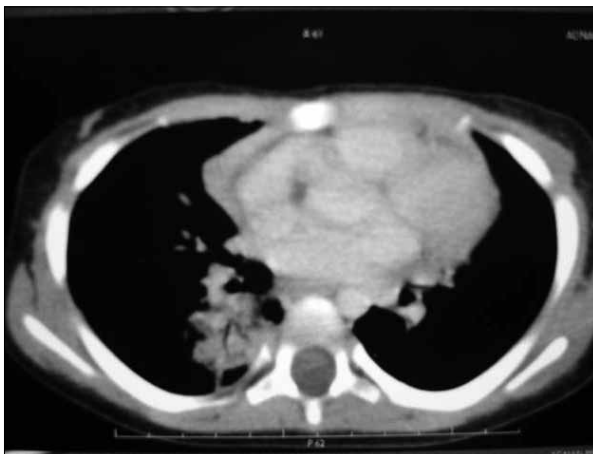


Figure 2. Computed tomography image of chest



Figure 4. Chest X ray (After therapy)

Streptococcus pneumoniae, *Mycobacterium tuberculosis*, and *Klebsiella pneumoniae* are the most frequent etiologic agents of round pneumonia in children [1,6-8]. There are also reports of *Mycoplasma pneumoniae*, *Legionella pneumoniae*, *Coxiella burnetii* (Q fever), *Aspergillus* spp. and *Coronavirus* presenting with round pneumonia [4,7-10].

Round pneumonia is hypothesized to be an early manifestation of the disease resulting from an infectious focus in alveolar tissue. High affinity of pneumococci with the type 2 alveolar cell explains the mechanism of round pneumonia. The inflammation and exudation has spread, traveling through the intra-alveolar channels (pores of Kohn and Lambert canals). This can produce a well-circumscribed, smoothly marginated "mass" appearance because no segmental boundaries exist in the alveolar tissue [2,5,7,8].

Clinical and radiographic features of round pneumonia simulate pulmonary masses, and distinguishing this entity from solitary pulmonary nodules in children and bronchogenic carcinoma in adults can often be difficult [2,6]. Chest radiography is the primary imaging study and CT is sometimes used in patients to exclude other diagnoses. Radiologically normal recent chest films and chest CT scan showing a heterogeneous soft-tissue mass with spicules, air bronchograms, pleural thickening and satellite lesions can support the diagnosis of pneumonia [1,2,5].

The majority of reported cases of round pneumonia have resolved clinically and radiographically with appropriate antibiotic therapy [5]. Follow-up chest films are important to document resolution of the lesion, and to rule out a malignant process. In a young patient who presents with a pulmonary mass, respiratory infection symptoms and no other findings of malignancy, it is important to suspect round pneumonia. Considering this entity in the differential diagnosis of pulmonary masses might prevent unnecessary diagnostic tests such as a biopsy [2,5,6,8].

Our patient presented with symptoms and physical findings that were consistent with acute pneumonia. His chest radiograph and CT scan revealed a round pulmo-

nary mass but he had no signs or symptoms of malignancy. His PPD test, blood and *Mycobacterium tuberculosis* cultures were negative so we did not consider tuberculosis disease. We excluded neuroblastoma radiologically.

He was treated with cefuroxime axetil, because this treatment was effective for *Streptococcus pneumoniae*. Clinical symptoms recovered after 3 days of treatment. Two weeks after therapy, resolution of radiographic findings was seen. The pulmonary mass appearance that decreased in size and resolution after antibiotic treatment supported the diagnosis of round pneumonia.

In this case we have discussed round pneumonia which mimics lung masses. Recognition of this diagnosis and management with appropriate antimicrobial therapy can prevent unnecessary diagnostic tests and the associated complications

REFERENCES

1. Franquet T. Imaging of pneumonia trends and algorithms. *Eur Respir J* 2001;18:196-208. [\[CrossRef\]](#)
2. Wagner AL, Szabunio M, Hazlett KS, et al. Radiologic manifestations of round pneumonia in adults. *AJR Am J Roentgenol* 1999;172:549-50.
3. Rose RW, Ward BH. Spherical pneumonias in children simulating pulmonary and mediastinal masses. *Radiology* 1973;106:179-82.
4. Wan YL, Kuo HP, Tsai YH, et al. Eight cases of severe acute respiratory syndrome presenting as round pneumonia. *AJR Am J Roentgenol* 2004;182:1567-70.
5. Kim YW, Donnelly LF. Round pneumonia: imaging findings in a large series of children. *Pediatr Radiol* 2007;37:1235-40. [\[CrossRef\]](#)
6. Durning SJ, Sweet JM, Chambers SL. Pulmonary mass in tachypneic, febrile adult. *Chest* 2003;124:372-5. [\[CrossRef\]](#)
7. Katsumura Y, Shirakami K, Satoh S. Pneumococcal spherical pneumonia multiply distributed in one lung. *Eur Respir J* 1997;10:2423-4. [\[CrossRef\]](#)
8. Soubani AO, Epstein SK. Life-threatening "round pneumonia". *Am J Emerg Med* 1996;14:189-91. [\[CrossRef\]](#)
9. Antón E. A frequent error in etiology of round pneumonia. *Chest* 2004;125:1592-3. [\[CrossRef\]](#)
10. Kosut JS, Kamani NR, Jantusch BA. One-month-old infant with multilobar round pneumonias. *Pediatr Infect Dis J* 2006;25:95-7. [\[CrossRef\]](#)