

Round Pneumonia in Children

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ABSTRACT

We evaluated four children with rounded densities on their chest radiographs in whom the final diagnosis was presumed to be lower respiratory tract infection. The differential diagnose between round pneumonia and a neoplastic process is difficult to make. In this report, all of cases of round pneumonia have resolved clinically and radiographically with antibiotic therapy. [*Indian J Pediatr* 2008; 75 (5) : 523-525] E-mail: solmaz@uludag.edu.tr

Key words: Children; Pneumonia; Round

Pneumonia may appear as round or oval features on the radiograph, simulating a carcinoma. These features have often led clinicians to consider mass lesions^{1,2}. Truly round pneumonias seem to be well known in children³, however few cases having been reported in the literature^{4,5}. We have recently seen four children with round densities, simulating mass lesions, on their chest radiographs, which were subsequently shown to be caused by lower respiratory tract infection.

CASES REPORTS

Case 1

A 4-month-old boy was hospitalized with cough and fever. On physical examination, he was tachypneic, tachycardic and febrile. Inspiratory crackles were heard over the right lung zone. Laboratory analysis showed white blood cell (WBC) count of 23700 /mm³, erythrocyte sedimentation rate (ESR) 25 mm/h, C-reactive protein (CRP) 14 mg/dl. Chest radiograph revealed a round homogenous lesion in the right upper lobe. It was initially agreed that the patient had a lower respiratory tract infection. Cefuroxime (100 mg/Kg, daily 3 divided doses) plus clindamycin (40 mg/kg, daily 3 divided doses) therapies were started and his symptoms improved rapidly. Blood cultures did not reveal the cause of the infection. The round lesion and infiltrate cleared radiographically within seven days.

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Case 2

A 6-year-old boy presented with fever and left upper abdominal pain for several days. He has had history of varicella-zoster infection two weeks before admission. Results of physical examination were remarkable for fever, diffuse rales on the left lung zone and hyperpigmented skin lesions on the body. Laboratory analysis showed WBC count of 26000 /mm³, ESR 35 mm/h, CRP 18 mg/dl. Chest radiograph revealed a 3-cm round lesion in the left upper lobe. No organism was isolated from blood cultures. He was treated with a 14-day course of cefuroxime (100 mg/Kg, daily 3 divided doses) with a rapid resolution of clinical and radiographic findings.

Case 3

A 2-year-old girl was hospitalized with a diagnosis of pneumonia. She noted the onset of acute upper respiratory tract symptoms two days before admission, which had progressed to a febrile illness with respiratory distress. On physical examination, she was tachypneic, tachycardic and febrile. Inspiratory crackles were heard over the right side of the chest. Laboratory analysis showed WBC count of 11800 /mm³, ESR 58 mm/h, CRP 29 mg/dl. Chest radiograph revealed a 3-cm round homogenous lesion in the right upper lobe. Our patient presented with symptoms and physical findings that were consistent with pneumonia. Cefuroxime (100 mg/Kg, daily 3 divided doses) plus clindamycin (40 mg/Kg, daily 3 divided doses) were given and her symptoms improved rapidly. Blood cultures did not yield the cause of the infection.

Case 4

A 7-year-old boy was hospitalized with a diagnosis of a

possible mass lesion. He presented with fever and vomiting for two days before admission. Results of physical examination were remarkable for fever and rales in the right side of the chest. Laboratory analysis showed WBC count of 25300 /mm³, ESR 30 mm/h, CRP 15 mg/dl. Posteroanterior chest radiograph obtained at presentation showed a round mass in the right upper lobe (Fig. 1). Lateral chest radiograph revealed a homogenous, smoothly marginated, 3-cm round lesion in the right upper lobe (Fig. 2). Computed tomography demonstrated a focal area of homogenous consolidation in the right upper lobe and air-bronchogram within the consolidation (Fig. 3). The lesion contain an air bronchogram compatible with pneumonia. He was treated with ampicillin-sulbactam (200 mg/Kg, daily 4 divided doses) for pneumonia. The patient's clinical condition was improved with

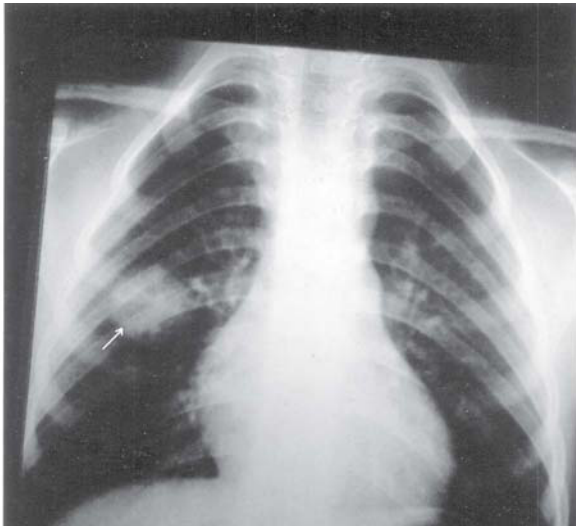


Fig. 1. Posteroanterior chest radiograph shows a round mass (arrow) in the right middle zone.

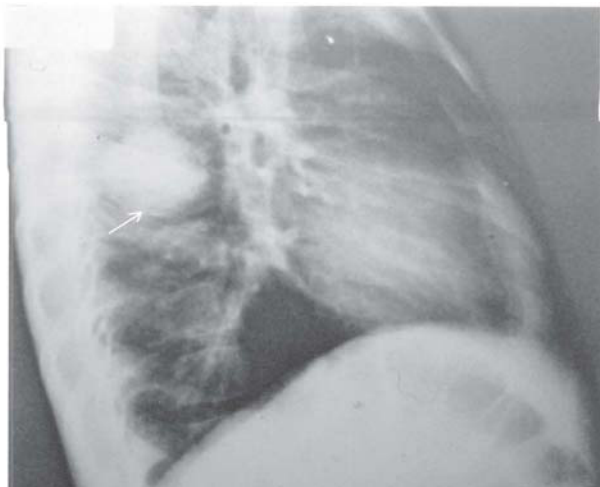


Fig. 2. Lateral chest radiograph reveals a homogenous, smoothly marginated, 3-cm round lesion (arrow) in the right middle zone

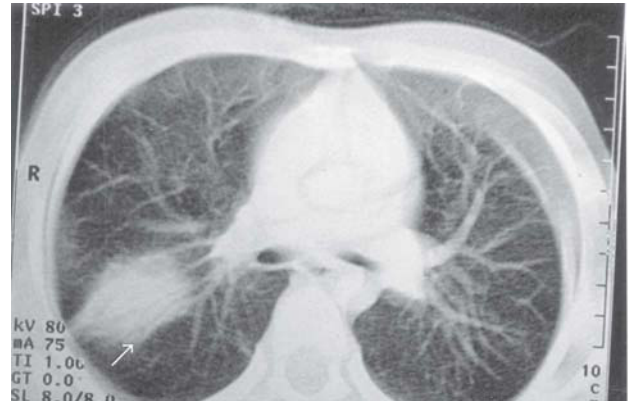


Fig. 3. Computed tomography demonstrates a focal area of homogenous consolidation (arrow) in the right upper lobe. Note the presence of air-bronchogram within the consolidation.

therapy. The lesion had cleared almost totally following ampicillin-sulbactam therapy.

DISCUSSION

Three patients were admitted to the emergency department because of respiratory symptoms and were found to have round densities on chest radiographs. The fourth patient initially referred for evaluation for neoplasm with no respiratory symptoms. CT obtained within 48 hours confirmed the round consolidation containing an air bronchogram in the right upper lobe, the final diagnosis was round pneumonia. Patients with round pneumonia generally present with acute to subacute symptoms of community-acquired pneumonia. Patients also can present nonspecific symptoms⁶. Fewer than 1% of cases of pneumonia manifest as pulmonary round lesions⁷. The process begins in a segmental bronchus and spreads through the lymphatic channels and the pores of Kohn (interalveolar communications) producing a round appearance⁸. The pathways of collateral ventilation (the pores of Kohn) are poorly developed in children. Children also have more closely apposed connective tissue septae and smaller alveoli than adults do. These factors work together to produce more-compact confluent areas of pulmonary consolidation, without the softer margins that are evident in the typical infiltrates seen in adults⁹. They also result in a slower progression of disease and increase the chance of detecting round pneumonia. Therefore round pneumonia is more often seen in children than in adults. A "round lesion" prompts evaluation for malignancy, because of the high incidence of cancer in the lesions and the potential for surgical cure in adults^{1,2}. However, one should consider infectious processes, malformations, and round atelectasis, as

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well as benign tumors, in any differential diagnosis of pulmonary mass lesions in adults. In children, a round lesion on a radiograph, with the clinical picture of a lower respiratory tract infection, should be followed up clinically.

Round pneumonia is seen in the early stages of pneumococcal pneumonia^{10,11}. The organisms that most frequently cause round pneumonia have been found to be *Streptococcus pneumoniae*, followed, in descending order of frequency, *Klebsiella pneumoniae*, *Haemophilus influenzae*, and *Mycobacterium tuberculosis*. Fungal infections, hydatid cysts, and lung abscesses may have a similar appearance on chest radiographs.¹² Recent study reported that eight cases with severe acute respiratory syndrome presented as round pneumonia.¹³ In our patients, no organism was isolated from blood cultures.

The treatment of cases with round pneumonia is similar to that of individuals with lobar pneumonia. Our patients with round pneumonia were treated with cefuroxime plus clindamycin or ampicillin-sulbactam or cefuroxime. Further diagnostic studies may not be indicated unless the patient fails to demonstrate rapid clinical and radiographic improvement within 2 weeks. In this study, all of cases of round pneumonia have resolved clinically and radiographically with antibiotic therapy.

One should consider the diagnosis of round pneumonia in a child who presents with a pulmonary mass, especially if patient has respiratory tract infection symptoms.

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