Round Pneumonia

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Case Report

Round Pneumonia constitutes an atypical radiological presentation of pulmonary infections which occurs in less than 1% of cases of pneumonia. It is most commonly seen in children less than eight years of age and may simulate a pulmonary or mediastinal mass and is very rare in adults. The recognition of this entity is important, 1st in that the pneumonia may be confidently diagnosed as bacterial in etiology, usually pneumococcal; therefore appropriate antibiotic therapy may be instituted. 2nd ly, that in children it shouldn’t to be confused with mass which may have an alarming appearance on chest radiograph. So undue anxiety and unnecessary imaging may be avoided by properly diagnosing and treating the pneumonia. Here, are two cases of round pneumonia documented with their chest radiographs, which show radiological progression from round to lobar pneumonia followed by resolution after treatment with appropriate antibiotics.

Keywords: Round Pneumonia, Case Report, and chest radiographs

Introduction

Chest radiograph confirm the diagnosis of pneumonia[1]. Bacterial pneumonia characteristically shows lobar consolidation or round pneumonia , with pleural effusion in 10-30 % of cases[2]. Round pneumonia constitutes an atypical radiological presentation of pulmonary infections and is very rare in adults [3]. It is a benign cause of coin lesions seen on chest x-rays, that can lead to confusion. Although usually turning up in children, round pneumonia can develop in patients of any age and may be clinically silent. Since it's easily treated with antibiotics, consider this diagnosis in anyone with a coin lesion, keeping in mind that, in adults, bronchogenic carcinoma is much more common [4]. While in children it shouldn’t to be confused with mass [5].

Case number (1)

M. M. is a 4 yr old male child, was admitted to hospital with symptoms of high fever and dry cough. Fever developed one week prior to admission, when he also experienced difficulty in breathing. The condition associated with poor appetite, poor activity, and sleep disturbance. There was no other significant past history. On physical examination, the patient was well built, with a temperature of 38.9°C; respiratory rate was 46 breaths per minute. The oropharynx was injected, and chest auscultation revealed diminished breath sounds, with bronchial breathing at the right middle zone of the lung. The remainder of the physical examination was unremarkable. Laboratory data showed an elevated white blood cell count (20.1x109 cells/L with neutrophil predominance) and C reactive protein (87 ng/dL). First chest radiographs {figure 1A} revealed a spherical mass in the right middle lung area and the 2nd chest radiograph (taken after one day) the lesion evolved to consolidation of the right middle lung area {figure 1B}. The 3rd chest radiograph (after 7 days of admission) showed radiographic resolution {figure 1C}. In the hospital he received treatment (third generation cephalosporin) and on the third day of admission, fever subsided and dyspnea resolved.

Case number (2)

A. A. is a 7 years old female child, was admitted to hospital for evaluation of right-sided chest pain and a concerning chest radiographic finding. She initially developed a cough several days prior to admission with associated URI symptoms. The following day, he developed a fever to 39 C0. The following day he developed right-sided chest pain, was described as sharp/stabbing, localized to right mid/upper chest, exacerbated by coughing, taking deep breaths. Physical examination is normal apart
from crackles in RUL, moving air well, breath sounds symmetric. Laboratory data showed an elevated white blood cell count (30.1x109 cells/L with neutrophil predominance) and 1st chest radiographs (figure 2A) revealed a round mass in the right middle lung area and the 2nd chest radiograph (taken after two days) showed consolidation of the right middle lung area (figure 2B). The 3rd chest radiograph (after two weeks of admission) showed radiographic resolution (figure 2C). In the hospital he received treatment (third generation cephalosporin) and on the 2nd day of admission, fever subsided and dyspnea resolved.

**Discussion**

This phenomenon is most commonly seen in children less than 8 years of age and may simulate a pulmonary or mediastinal mass [6], but is not infrequent in adults [7] and this is what is happen in our two patients. Although a case with bilateral spherical shadows of the chest has been reported, in most reported cases, the radiographic manifestation of spherical pneumonia is a solitary round nodule with or without hilar lymphadenopathy as in figure 1A, 2A. This lesion is predominantly located in the posterior portions of the lung [8]. Streptococcus pneumoniae is the most prevalent bacterial pathogen in all ages. [9] Also the most popular pathogen of spherical pneumonia both adults and children is, S. pneumoniae. Other pathogens, including Klebsiella pneumoniae, Haemophilus influenzae, and Mycobacterium tuberculosis [10] C burnetii, S pneumoniae, L pneumophila, S aureus [11] have also been reported. Fungal infections, hydatid cysts, and lung abscesses may have a similar appearance on chest radiographs [12]. Although malignant lesions are the most common cause of pulmonary round lesions in adults, one should consider infectious processes, malformations, and round atelectasis, as well as benign tumors, in any differential diagnosis of pulmonary mass lesions [13]. One of the differentiating points is that round pneumonia appears as well circumscribed, rounded mass lesion in a peripheral location with air bronchograms while the intrathoracic mass lesions will not have air bronchograms [14].

Because a round lesion is an early manifestation of the disease, a history of cough or fever may be absent at the time of presentation [15]. Early in the course of infection, the inflammatory process is predominantly confined to the alveolar space. It spreads by direct extension through the interalveolar channels (the pores of Kohn and the channels of Lambert). This results in a lesion with a nonsegmental distribution and smooth borders. Later, with centrifugal and peribronchial spread, the pneumonia lesion becomes segmental or lobar, and the typical appearance is seen on a radiograph [16, 17]. 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 adults [18]. 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.

The recognition of this entity is important in that the pneumonia may be confidently diagnosed as bacterial in etiology, usually pneumococcal; therefore appropriate antibiotic therapy may be instituted. Secondly, because the "mass" may have an alarming appearance on chest radiograph which was occur with our patient's family and led them to consult many doctors and radiologists, undue anxiety and unnecessary imaging may be avoided by properly diagnosing and treating the pneumonia. This was typically what happens in both patients' family. If any further evaluation is warranted, it should be a follow up radiograph which will demonstrate dissipation of the mass into a more typical consolidation within a day or two, or complete resolution of the process if a repeat chest radiograph is obtained following treatment [6]. British Thoracic Society guidelines recommend follow-up chest X-ray and clinical review for children with round pneumonia to ensure that tumor masses are not missed [19], and to document complete clearing in a patient with consolidation [20].
References

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Figure 1A: PA chest radiograph (on admission) demonstrate a round opacity with air bronchograms in the superior segment of the right lower lobe. The lungs are otherwise clear, and the costophrenic sulci are sharp. (Early stage of bacterial pneumonia)

Figure 1B: Later, with centrifugal and peribronchial spread, the pneumonia lesion becomes segmental or lobar, and the typical appearance is seen on a radiograph

Figure 1C: Follow-up chest radiographs obtained one week later (following antibiotic treatment) demonstrate partial resolution of the round mass

Figure- 2A: Posteroanterior chest radiograph (on admission) demonstrate a round opacity with air bronchograms in the superior segment of the right lower lobe. The lungs are otherwise clear, and the costophrenic sulci are sharp.
**Figure- 2B:** Figure 1B: Later, with centrifugal and peribronchial spread, the pneumonia lesion becomes segmental or lobar, and the typical appearance is seen on a radiograph (obtained 24 h after admission showed near classic lobar pneumonia.

**Figure- 2C:** Follow-up chest radiographs obtained two weeks later (following antibiotic treatment) demonstrate nearly complete resolution of the round mass.