A case of round pneumonia in an adult

Published on 15.09.2010

DOI: 10.1594/EURORAD/CASE.8653
ISSN: 1563-4086
Section: Chest imaging
Case Type: Clinical Cases
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Patient: 74 years, male

Clinical History:

We present the case of a 74 year old man complaining of cough and low grade fever during the last month and a right lung mass on chest X-ray.

Imaging Findings:

A 74 year old man was complaining of cough and low grade fever during the last month. CXR revealed a mass adjacent to the mediastinum on the right mid lung zone (Fig. 1a,b). Chest radiography findings were suspicious for malignancy, as the patient had a smoking history. Further evaluation with CT and probably also CT-guided percutaneous biopsy were deemed necessary, by the referring clinician. Lung CT depicted an oval-shaped 4cm mass in the posterior segment of the RUL. The mass was abutting the major fissure, causing some degree of bulge, but there was no evidence of infiltration towards the lower lobe. On the anterior part its margins were somewhat ill defined with evidence of tiny air-bronchograms. There were no satellite lesions, around the mass. There was also no evidence of enlarged lymph nodes in the mediastinum (Fig. 2a-d, 3a-c). Imaging findings were not typical of malignancy(broad-based configuration with pleura, no associated lymphadenopathy). Laboratory findings included an elevated ESR, white blood cell count within normal range and were otherwise unremarkable. Bronchoscopy was negative. CT-guided biopsy was considered unnecessary. The patient received antibiotic treatment and was advised to have a follow-up CT in a month. The 1-month follow-up CT showed resolution of the mass. There was only some residual scar tissue left in the region previously occupied by the mass, with mild pleural thickening in the major fissure (Fig. 4a-c). The patient was asymptomatic at that time. The mass was attributed to a round pneumonia. No specific causative microorganism was identified.

Discussion:

Round pneumonia (RP) is a non-segmental, oval or round-shaped form of acute pneumonia, well recognized in children but uncommonly reported in adults. It is under-reported in adults, as successfully treated pneumonias, are usually never imaged. Its discovery depends on how frequently patients are imaged. During SARS epidemic, with frequent CXR imaging, RP had a high incidence (29%). Adult RP affects patients with a mean age of 40.9 (range 21-68) years. Most RPs are caused by Streptococcus pneumoniae. Other typical and atypical bacterial and viral agents are implicated. Sometimes no organism is isolated. Most RPs are found in the lower lobes, making upper lobe lesions more suspicious for malignancy. RP presents as acute febrile illness, with coughing, dyspnoea and chest pain. Sometimes symptoms may be mild (mimicking a viral syndrome), or absent. A history of cough and fever may be absent, making diagnosis difficult. Leukocytosis may exist, although sometimes is absent. Frequently these patients undergo unnecessary biopsy. The clinical course of RP is usually benign. The outcome depends on pathogen virulence and host immunity. Complicated courses have been described in patients with comorbidities,
leading to respiratory failure. Fatalities have also been described. The pathogenesis of RP is unknown. One presumption is that in children <8 years, the collateral pulmonary pathways of circulation (pores of Kohn, canals of Lambert) are underdeveloped. This limits the infection, resulting in a focal, round mass. This may also explain why RP is uncommon in adults with fully developed canals of Lambert. Another assumption is that RP in children is due to the closely apposed connective tissue septa and smaller alveoli, helping form more compact and confluent consolidations. In adults, RP may represent an early manifestation of pneumonia, with the infectious focus spreading centrifugally, either through the collateral pathways, or by destroying the neighbouring acini. This dissemination of exudative fluid through interalveolar communications is responsible for the non-segmental, centrifugal distribution. In SARS patients though, the round opacities did not grow centrifugally suggesting that this growth pattern may simply reflect host immune response. RP mimics lung cancer. On CXRs its margins range from smooth, to irregular and ill-defined. The presence of air-bronchograms, does not differentiate malignancy from RP, as they can appear in both. Recent (within the last 1-2 months) normal radiographs may help the diagnosis. CT may depict RP as a soft tissue-density mass. The lesion margins may be spiculated. Satellite lesions may be more conspicuous at CT. The pleura may be thickened when RP is peripheral. Satellite lesions and broad-based lesion configuration relative to the pleura are distinctive CT features of RP. Even PET/CT cannot differentiate RP from tumours. The differential includes septic emboli, granulomatous infections, vascular malformations, round atelectasis, focal organizing pneumonia, rheumatoid nodules and Wegener’s. RP is an uncommon cause of coin lesions in adults and may be difficult to distinguish from carcinoma, sometimes leading to unnecessary biopsy. Radiologists must be aware of this entity and be prudent to treat with antibiotics first before attempting image-guided biopsy. Follow-up is recommended as only mass resolution can rule out a neoplasm.

**Differential Diagnosis List:** Round pneumonia

**Final Diagnosis:** Round pneumonia

**References:**


Figure 1

Description: PA CXR: There is a fairly well-defined opacity projecting adjacent the mediastinum on the right mid lung zone, (white arrows). Origin:
**Description:** Left lateral CXR: The opacity is located in the posterior segment of the RUL (black arrows). **Origin:**
Description: There is an oval-shaped, mass (arrow) in the posterior segment of the right upper lobe. Its margins bordering the lung are somewhat ill-defined. Some tiny air-bronchograms can be appreciated.

Origin:
**Description:** The oval-shaped mass (arrow) measures 4 cm in its longest diameter. It has a broad-based contact with the right major fissure, causing some degree of bulge. There is no evidence of infiltration towards the lower lobe, though. Air-bronchograms are also present in this slice. **Origin:**

**Description:** The caudal part of the mass has somewhat irregular margins with the adjacent lung. There is no evidence of satellite lesions. **Origin:**
Description: Close-up view of figure 2b, with the black arrowhead pointing to an air-bronchogram.
Origin:
Figure 3

a
Description: Contrast-enhanced CT at the level of the left main pulmonary artery (same level as 2a), depicting the upper part of the soft tissue density mass (arrow). Origin:

b
Description: Image just below figure 3a showing the oval mass at its greatest dimensions (same level as figure 2b). Origin:
**Description:** Image at the lower part of the mass (same level as figure 2c). There is no evidence of pathologically enlarged lymph nodes. **Origin:**
Figure 4

Description: Follow-up CT at the level of the carina, lung windows. There is resolution of the mass with some residual scar tissue remaining in the right upper lobe, in the region previously occupied by the mass (arrow). Origin:
Description: Follow-up CT (non contrast enhanced) at the same level with figure 4a, mediastinal windows. There is definitely no evidence of the mass seen on figures 3a-c. Origin:
Description: High resolution CT image at same level with 4a. There is some residual pleural thickening at the level of the right major fissure (white arrowheads). Compare with normal major fissure on the left.

Origin: