



Round Pneumonia Management in COVID-19 Patient

COVID-19 Hastasında Round Pnömoni Yönetimi

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ABSTRACT

Round pneumonia is an infrequent entity in the adult population. Its clinical presentation and radiological features resemble to malignant tumoral lesions very much; therefore, it is often misdiagnosed as being malignant in nature. In patients with solitary pulmonary nodules, especially when clinical findings of pneumonia are present, plain radiography or computed tomography of the chest should be repeated after the treatment and follow-up time should be extended. Although radiological findings of Coronavirus disease-2019 (COVID-19) pneumonia have been described, it should be kept in mind that other respiratory tract infections may be observed in these patients as a co-infection to COVID-19.

Keywords: Pneumonia, viral pneumonia, COVID-19, neoplasms, computed tomography

ÖZ

Round pnömoni, yetişkin popülasyonda seyrek görülen bir durumdur. Klinik görünümü ve radyolojik özellikleri malign tümöral lezyonlarla oldukça benzerdir; bu nedenle, doğası gereği genellikle kötü huylu olarak yanlış teşhis edilir. Soliter pulmoner nodülü olan hastalarda, özellikle klinik pnömoni bulguları mevcutsa, tedaviden sonra direkt radyografi veya göğüs bilgisayarlı tomografisi tekrarlanmalı ve takip süresi uzatılmalıdır. Koronavirüs hastalığı-2019 (COVID-19) pnömonisinin radyolojik bulguları tanımlanmış olmakla birlikte, bu hastalarda COVID-19 koenfeksiyon olarak başka solunum yolu enfeksiyonlarının da görülebileceği akılda tutulmalıdır.

Anahtar Kelimeler: Pnömoni, viral pnömoni, COVID-19, neoplazmalar, bilgisayarlı tomografi

INTRODUCTION

Round pneumonia is a subtype of pneumonia that is frequently observed in the pediatric age group and very rarely in adults¹. The pathology is normally attributable to the presence of immature Kohn pores and canals of Lambert in children, causing inflammatory consolidation to be limited to a round morphology². In adults, on the other hand, inflammatory processes normally spread laterally to cause what is known as lobar pneumonia. However, developmental arrest, or faulty development of Kohn pores and the canals of Lambert duct, may frequently limit the consolidation in adults as well². In such cases, *Streptococcus* is the most common cause of etiology, although *Coxiella burnetii* and coronaviruses may also present as round pneumonia³. Lately, we have encountered such an appearance in a patient with computed tomography (CT)

findings and reverse transcription-polymerase chain reaction (RT-PCR) evidence of Coronavirus disease-2019 (COVID-19). Although many studies have been conducted to describe the typical, indeterminate, and atypical CT features of the disease, as of yet, round pneumonia has not been reported as a primary or accompanying finding of the disease⁴.

CASE REPORT

A 42-year-old male hospital worker was admitted to the emergency department with the complaints of cough, sputum, shortness of breath, and pleuritic pain in the left side for the last two days. He was a heavy smoker (20 packs/year). Upon admission, his vital signs were as follows: body temperature: 36 °C, blood pressure: 125/81 mmHg, pulse: 102 bpm, and O₂ saturation: 96%. Laboratory findings were as follows:

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white blood cell count: $7 \times 10^3/\mu\text{L}$ (4-10), C-reactive protein: 1.21 mg/dL (0-0.5), lymphocyte count $3.3 \times 10^3/\mu\text{L}$ (0.80-4.00), D-dimer: 0.23 ug/mL (0-0.5), and ferritin: 92.96 ng/mL (22-275). Chest CT and naso-oropharyngeal swab were performed due to the patient's potential risk of exposure to COVID-19 patients in the hospital. Chest CT findings were normal except for a pleural-based 6.6×6.2 mm rounded mass with regular margins in the left upper lobe, which was interpreted as solitary pulmonary nodule (SPN) (Figure 1A). Due to the size of the nodule, short-term follow-up was planned. However, the patient was readmitted to the emergency department four days after his initial presentation. At that time, he had increased back pain and shortness of breath. His vital signs and oxygen saturation were normal. CT scan was repeated and it revealed a significant progression of the mass to 16.2×12.5 mm (Figure 1B) and structural findings (i.e., bilateral peripheral, posterior, ground-glass opacities) of COVID-19, although RT-PCR test was still negative (Figure 1B). However, in the light of typical CT findings and according to national management guidelines, the patient was diagnosed as mild COVID-19⁵. The SPN, on the other hand, was interpreted as an atypical finding of COVID-19 pneumonia, due to the rapid progression of the lesion and its temporal relationship with the latter. The patient received favipiravir regimen (2×1600 mg/day) on the first day as a loading dose, followed by a total of 1200 mg/

day (2×600 mg/day) for 14 days. Although the parenchymal findings of COVID-19 disappeared on the fourteenth day (Figure 1C), the solitary lesion had significantly progressed in size and reached 27.5×26 mm in size and had irregular margins (Figure 1C). The lesion was thought to have a bacterial origin and a broad-spectrum antibiotic was empirically initiated. Fourteen days after the start of antibiotic treatment, the lesion had significantly regressed to 14×13 mm in size, with air bronchogram with pleural thickening (Figure 1D). Although the clinical findings of the patient had resolved, positron emission tomography (PET)/CT was requested by the clinician and the lesion was evaluated as benign in nature with low fluorodeoxyglucose uptake (Figure 2). Informed consent was obtained from the patient.

DISCUSSION

Round pneumonia is a type of pneumonia almost always seen in the pediatric age group. It is uncommon after eight years of age but it can also be encountered in adulthood. It may be an early stage of lobar pneumonia or related to developmental defect of inter-alveolar communications and collateral airways^{1,2}. While they mostly occur in inferior lobes in children, in adult patients, superior lobes are dominant and air bronchograms are very rare (17%)². The typical radiological feature of round

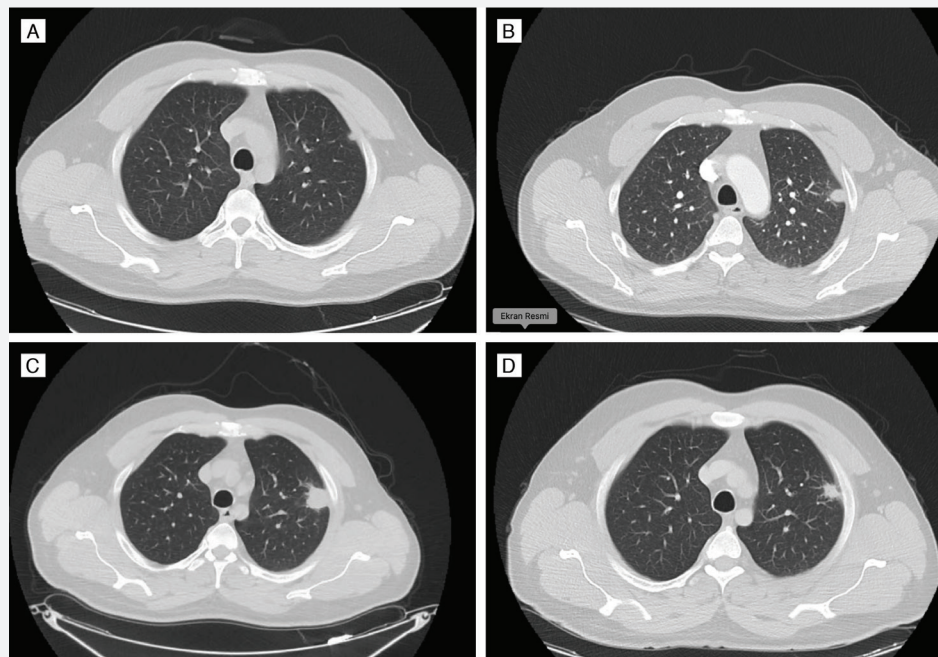


Figure 1. A) Chest computed tomography (CT) shows the round, 6.6×6.2 mm, pleural-based mass-like lesion in left upper lobe at initial presentation. There were no other findings. B) A repeat CT scan shows a significant progression of the mass to 16.2×12.5 mm in size and bilateral peripheral, posterior, ground-glass opacities after four days. C) The parenchymal findings of COVID-19 had disappeared fourteen days after favipiravir treatment was initiated but the solitary lesion had progressed to 27.5×26 mm in size and it had spiculated pattern. D) Fourteen days after the initialization of the broad-spectrum antibiotic, the lesion had regressed to 14×13 mm in size and it had air bronchogram with pleural thickening and spicules



Figure 2. No significant FDG uptake was observed in the lesion in PET/CT, which was conducted ten days after the patient's last admission

pneumonia is a round, well circumscribed consolidation area with irregular margins¹. They may have spicules, pleural thickness, and satellite nodules⁶. The differential diagnosis of round pneumonia from bronchogenic carcinoma can be difficult and is generally based on the lesion's response to antibiotics. However, there are cases where malignant obstructions may cause secondary infection and antibiotic treatment may result in temporary but not permanent regression in lesion size. In such cases, FDG-PET may attempt to provide clues, though seldomly as both lesions may show increased metabolism^{7,8}. The definitive diagnosis is either by complete resolution of the lesion in due course or by tissue biopsy.

The histopathological features of COVID-19 pneumonia are parenchymal and pulmonary interstitial damage. This damage manifests as so-called "typical" findings that include but not limited to ground-glass opacities and consolidation⁹. Rarely, focal GGO or opacities may be encountered in round morphology in COVID-19 pneumonia¹⁰. It must be noted that other respiratory infections can also be observed in COVID-19 pneumonia patients as demonstrated in this report. There are no obvious guidelines for bacterial co-infection in COVID-19 but empiric antibiotics should be given if radiological atypical findings such as round pneumonia are present¹¹.

CONCLUSION

In conclusion, round pneumonia should be considered in the differential diagnosis of patients with nodular consolidation and should be evaluated in terms of malignancy after appropriate medical treatment.

Ethics

Informed Consent: Consent form was filled out by all participants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: G.Y., Concept: G.Y., H.M.K., Design: G.Y., H.M.K., Data Collection or Processing: G.Y., Analysis or Interpretation: G.Y., Literature Search: G.Y., Writing: G.Y., H.M.K.

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