

Case report

COVID-19 Patient Associated with Rare Pneumatocele Finding: CT Features and Case Report

ABSTRACT

BACKGROUND and AIM: Coronavirus disease-2019 (COVID-19) has become pandemic across the world, especially in Indonesia. One of the rare complications reported due to COVID-19 is pulmonary pneumatocele. We aim to describe the COVID-19 patient case report with pneumatocele in CT-Scan findings.

CASE REPORT: A 41-year-old man referred to our hospital with fever and a productive cough for seven days before admission. His chest X-ray and CT-Scan showed possible bilateral bronchopneumonia due to COVID-19 and confirmed with Polymerase Chain Reaction (PCR) test. In the next two weeks, the second CT-Scan showed the development of pneumothorax dextra and pneumatocele dextra with a diameter of 7,8 cm. On the third follow up, CT-Scan revealed increasing diameter into 9,5 cm and air-fluid levels in pneumatocele. He was diagnosed with infected pneumatocele, and we gave antibiotics. The patient recovered after the twenty-third-day post-admission, then discharged from hospital after twice a negative of nasopharynx swab result and resolution of symptoms.

CONCLUSION: Pneumatocele is one of the rare abnormality findings in COVID-19 patients. If the clinician suspect pneumatocele finding, the progressivity of disease should be monitored due to the possibility of complicated pneumatocele.

Keywords: COVID-19, Pneumatocele, CT-Scan Features, Case Report

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1. INTRODUCTION

Coronavirus Disease-2019 (COVID-19) has become pandemic and spreading across the world. In Indonesia, approximately 140.000 already reported positive cases (August 2020), and the numbers are still growing.[1]

There are many respiratory tract manifestations in COVID-19 infection with pneumonia as the most common.[2] Pneumatocele can occur due to acute pneumonia complications. The incidence of pneumatocele is infrequent in adults, particularly within COVID-19 infection, which still unestablished.[3] Our hospital registry data revealed only 1 from 276 COVID-19 patients showed pneumatocele in radiology findings. Here we described a rare case of COVID-19 disease with pulmonary pneumatocele.

2. CASE PRESENTATION

A 41-year-old man referred to our hospital with fever and a productive cough for seven days before admission. He attended a local area seminar ten days before a participant was then reported as positive COVID-19. Other complaints and underlying disease were denied. On examination, the patient was conscious and oriented, having malaise and fatigue. His temperature was 39.2°C and O₂ saturation 98% at room air. The chest was clear with normal vesicular breathing. Laboratory findings were leukopenia (3.600/μl), thrombocytopenia (141.000/μl), lymphocytopenia (19%), CRP increased at 9 mg/L. Possible bilateral bronchopneumonia was interpreted on a chest x-ray. Thorax CT scan was done according to the radiologist recommendation. It showed up multifocal peripheral ground-glass opacity at both upper lobes, dominant multifocal ground-glass opacity, and early consolidation at peripheral both lower lobes (Fig. 1).

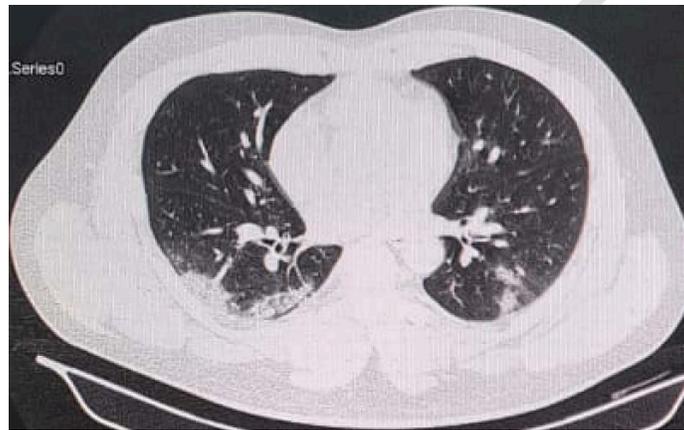


Fig. 1. Axial slice CT-scan without contrast at admission showed bilateral multifocal ground-glass opacity

The result of nasopharynx swab was confirmed with Polymerase Chain Reaction (PCR) as COVID-19 confirmed, then the patient transferred to a negative pressure isolation ward. Treatment was as follows azithromycin, oseltamivir, chloroquine, paracetamol, codeine, and Multivitamin. On the fourteenth day of inpatient treatment, cough increased with no sputum, followed by chest pain. Respiratory rate was 22/min, O₂ saturation 97% at room air, and other vital signs were unremarkable. The chest was symmetrically moving, decreased breath sound on right chest, no rhonchi or rales, hyper resonance at right-upper-posterior chest. Second Thorax CT scan interpreted moderate bilateral viral bronchopneumonia with reverse halo sign at right lower lobe and improvement of ground-glass opacity at both lower lobes, Pneumatocele dextra in superior posterior lobes, and loculated pneumothorax on the right upper posterior chest. The patient was clinically in stable condition, Water-Sealed-Drainage installation was postponed. Serial Thorax CT scan planned to evaluate the pneumatocele and pneumothorax (Fig. 2).



Fig. 2. Axial Slice computed tomography scan revealed pneumatocele and pneumothorax dextra

On the following day, foul-smelling breath and sputum streaked with blood arose—vital sign within a standard limit, with no improvement in physical examination. We then performed a third thorax CT scan, Dominant parenchyma stripe-band —absorption resolution stage is seen in the third thorax CT scan, pneumothorax on the right lung has no visible compare with previous thorax CT scan, pneumatocele on the posterior of upper right lobe with diameter 9.5 cm and the air-fluid level was increased (Fig. 3). We then diagnose patients infected pneumatocele and performed blood culture. We gave triple antibiotics, regiment cefixime, levofloxacin, and metronidazole. The twenty-third day after admission, the patient recovered then discharged from hospital after twice a negative of nasopharynx swab result and resolution of symptoms.



Fig. 3. Axial Slice Computed Tomography showed spontaneous resolution of pneumothorax and increased air-fluid level inside pneumatocele

3. DISCUSSION

A Pneumatocele is a condition characterized by thin-walled airspace filled with gas in the lung. Pulmonary pneumatocele mostly develops in young children rather than adults. In adults, pneumatocele may develop as sequelae of underlying lung pathology such as acute pneumonia due to bacterial or viral, blunt trauma, mechanical ventilator, and hydrocarbon ingestion.[3] A study from Wu et al, only two from 130 patients, showed pneumatocele findings in CT scan from COVID-19 patients.[4] The development of pneumatocele is due to obstruction caused by inflammation or injury of the bronchus, leading to a ball valve effect mechanism for air entry and making the distal dilatation of bronchial and alveoli. The air allowed to enter the space and trapped inside. Other theories explained pneumatocele formed by drainage of necrotic lung parenchyma following with enlargement of pneumatocele due to secondary ball-valve effect.[3] In COVID-19 patients, resorption of the consolidation phase may break the alveolar walls and contribute to pneumatocele.[2]

On radiographs, a chest x-ray provides low sensitivity of 24% to diagnose pneumatocele. CT scan examination was preferred because visualization size of small lesions, describe the location, and exclude the differential diagnosis. Pneumatocele can be single, but mostly multiple appeared as a round thin-walled cavitary lesion with or without air-fluid levels. [5,6] Although CT for pneumatocele was not routinely indicated, a non-contrast Chest CT was done for our patient as he had previous uncleared thorax radiology for the COVID-19 examination. Complications, when occur, include tension pneumatocele caused by rapid enlargement of the pneumatocele, pneumothorax, bronchopleural fistula formation, and secondary infection of a pneumatocele indicated by an air-fluid level. [5,6] Our patient developed pneumathorax probably due to ruptured pneumatocele located in subpleural posterior-peripheral segment inferior lobe. The last CT-scan examination showed right pneumatocele with increasing diameter and air-fluid level. Therefore, we suspected secondary infection occurs on our patient.

Almost 85% of pneumatocele are asymptomatic and disappear spontaneously within a few weeks without intervention or following treatment of the etiology causes. [6] First-line management of pneumatocele should be treated with antibiotics. Invasive therapies only considered in complicated pneumatocele patients such as guided percutaneous decompression, transcatheter aspiration, and drainage. In conditions where the patients are not suitable or previous treatment strategy fails, surgical procedures like lobectomy or pneumectomy can be performed. [3]

4. CONCLUSION

Pneumatocele is one of the rare imaging abnormality finding in COVID-19 patients. As a consequence of the low incidence finding, it is unclear why COVID-19 patients may develop pneumatocele. Follow up of the developing disease should be conducted due to the possibility of pneumatocele complications. Further study needs to be performed to understand the pathophysiology and progression of pneumatocele in COVID-19 patients.

CONSENT (WHERE EVER APPLICABLE)

Patient written consent has been collected and preserved by the authors.

ETHICAL APPROVAL (WHERE EVER APPLICABLE)

It is not applicable.

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UNDER PEER REVIEW