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Case Report

COVID-19 and active primary tuberculosis in a low-resource setting: A case report

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ABSTRACT

Introduction and importance: Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness. But there are few studies that explain the clinical features of COVID-19 patients with active primary tuberculosis. In a low-resource setting, it is difficult to distinguish the clinical characteristics of COVID-19 from other respiratory diseases. Here, we briefly report the first case of COVID-19 with active primary tuberculosis in our low-resource institution.

Case presentation: A fourty two year old diabetic Indonesian male was admitted to emergency department in November 2020 due to vertigo-like dizzines for one week, tension type headache, shivering, cough with sputum, abdominal pain, and night sweats. Xpert MTB-RIF Assay G4 detect Mycobacterium Tuberculosis Bacteria (MTB) without rifampicin resistance, but the Tubex test for antibody IgM anti-O9 was negative. Patient admitted to isolation ward for suspected COVID-19 with separate rooms due to tuberculosis, until 24 hours evaluation of nasopharyng and oropharyng swab test performed. On the second day, the evaluation swab test was positive for COVID-19.

Clinical discussion: Limited or no protection against COVID-19 is one of the problems that leads to co-infection. Now, there is no recommendation treatment for COVID-19 sufferer with tuberculosis co-infection or vice versa. Ventilation support and intensive care for infectious patient must be accessible, yet still unavailable in our institution.

Conclusion: A low resource setting has its own challenges in handling COVID-19. Further studies are needed to address the clinical characteristics, diagnosis and management in COVID-19 patients with active tuberculosis.

1. Introduction

Severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) was reported in Wuhan, Hubei Province, China by the World Health Organization (WHO) on December 31, 2019. Currently this virus is called COVID-19 and pose major public health and governance challenges [1]. As of 11 November, the Government of Indonesia announced 502,110 confirmed cases and 16,002 deaths, accompanied by issue of limited laboratory resources in some areas [2]. Due to resource limitations and challenges accessing adequate care, the low-resource setting pose the highest of morbidity and mortality in COVID-19 with tuberculosis infection [18].

Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness. The difficulty in distinguishing clinical characteristics of COVID-19 from other respiratory diseases was reported in a low-resource setting study [3]. A study of active tuberculosis in COVID-19 revealed unknown patient outcomes and the clinical features are not fully elucidated [4]. Previous studies have demonstrated that the presence of any comorbidity has been associated with a risk of developing acute respiratory distress syndrome [5]. Diabetes, hypertension, respiratory diseases, cardiac diseases, pregnancy, renal diseases and malignancy were the most common comorbidities that associated with poorer prognosis [6]. It has been hypothesized that infectious disease such as tuberculosis, caused by *Mycobacterium tuberculosis* could predispose to the development of COVID-19, but it not clearly understood [7]. Here, we briefly report the first case of COVID-19 with active

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primary tuberculosis in our low-resource institution, Indonesia. This case was reported in line with the SCARE criteria [19].

1.1. Case presentation

A fourty two year old diabetic Indonesian male was admitted to emergency department in November 2020 due to vertigo-like dizzines for one week, tension type headache, shivering, cough with sputum, abdominal pain, and night sweats. Patient is on treatment for diabetic at current hospital. He denied having any contact with any confirmed COVID-19 patient or tuberculosis sufferer, but he works as a intercity courier. On physical examination, there was no trouble during breathing with his saturation of peripheral oxygen (SpO 2) was 95% on room air and normal vital sign. Also, auscultation sound on thorax was normal. Laboratory finding shown increasing random blood glucose (311 mg/dL, normal: 70–140 mg/dL), slightly neutrophilia (7.97 $\times$ 10^3/μL, normal: 2–7 $\times$ 10^3/μL), and the neutrophil-lymphocyte ration (NLR) was 5.87. Patient was tested non-reactive with Anti-SARS-CoV-2-IgG/IgM. Electrocardiogram was normal, cardiac enzymes were not performed due to limited resource. Expertise from chest x-ray was oedema pulmonum and bilateral consolidation (viral atypical) (Fig. 1.). Chest computed tomography (CT) scans was not performed since the setting do not have any CT scans for suspected infectious patient. Nasopharyng and oropharyng swab test was negative. Interistingly, Xpert MTB-RIF Assay G4 detect Mycobacterium Tuberculosis Bacteria (MTB) without rifampicin resistance, but the Tubex test for antibody IgM anti-O9 was negative. Patient admitted to isolation ward for suspected COVID-19 with separate rooms due to tuberculosis, until 24 hours evaluation of nasopharyng and oropharyng swab test performed. On the second day, the evaluation swab test was positive for COVID-19. For treating tuberculosis, patient receive 4 tablets of Fixed Dose Combination (FDC) consist of 75 mg of Isoniasid (INH), 150 mg Rifampisin, 400 mg Pirazinamid and 275 mg of Ethambutol. The patient must consumpt the 4 FDC tablet once a day for 56 days and will continue with 2 FDC tablet for 16 weeks. Other than that, the patient also receiving another antibiotics; azihtromycin and ceftriaxon. During day-5 of treatment ceftriaxon was changed to ceftazidime until day-10 due to occasionally fever and increasing leucocyte (13.12 $\times$ 10^3/μL, normal: 3.8–10.60 $\times$ 10^3/μL) at day-4 and azithromycin was stop administered at day-7. Antiviral therapy that given to patient from day-1 until day-7 was Oseltamivir, then given Hydroxchloroquien until remaining days of treatment. Prophylactic anti coagulant drugs was administered too since start of treatment, though coagulation factor test was performed on day-5 with normal result. The nasopharyng and oropharyng swab test were negative on day-10. Two chest x-ray evaluation were performed on day-6 with expertise pneumonia with vascular increasing and day-11 with expertise pneumonia dextra, less lession compared to previous chest x-ray (Fig. 1.). The patient was discharged to home isolation after 13 days of treatment.

2. Discussion

We report the first case of COVID-19 with active primary tuberculosis from Indonesian patients in our low-resource setting. About 38.8% of the patients with COVID-19 appeared during tuberculosis infection. Limited or no protection against COVID-19 is one of the problems that leads to coinfection [4].

Our patient was treated on Prambanan General Hospital. This government instution appointed as one of referral hospital for COVID-19 in the area for patient without any severe symptoms or need for adequate respiratory and haemodinamically support. He was never utter any problem of breathing, except coughing with sputum. Due to suspected as tuberculosis, patient must be on separated room from another COVID-19 non-coinfection patients. The exhaust system in COVID-19 isolation ward was not yet established. Exhaust system will remove great quantity of air to maintain negative pressure, which is necessary for patient with airborne transmission [12]. Instead, we put high-efficiency particulate air (HEPA) filters and use it as often as possible. We believed the HEPA filter could help decreasing transmission, event though there is no recommendation yet for COVID-19. HEPA filter is suggested due to its ability to reduce or eliminate infectious contaminant from (Severe Acure Respiratory Syndrome-Corona Virus) SARS-CoV 1 and tuberculosis, as well as needed for positive pressure room especially patient with immunocompromise [12–14]. Another dilemma, CT scans thorax can not be performed for any infectious patients. Though, it can be used to diagnose asymptomatic COVID-19 by the existence of ground-glass opacity which consider there is a mean delay Real-Time Polymerase Chain Reaction (RT-PCR) assays to turn from initial negative to positive result and also help to identify tuberculosis whether the lesion is pre-existing or active primary [4,15].

Our patient did not have any problem during breathing. The clinical features of COVID-19 patients with active tuberculosis were not fully elucidated [4]. Interestingly, decreased breath sounds at the lung bases was found in physical examination of COVID-19 with tuberculosis patients [7]. Cough lasting for longer than 2 weeks, hemoptysis, weight loss, fever, and night sweats were the typical of clinical manifestation in patients with pulmonary tuberculosis [9]. Our patient also experienced night sweat which was classical for tuberculosis patients.

Due to lack of laboratory equipment, our institution did not examine any swab sample for COVID-19 and Xpert MTB-RIF Assay G4. The hospital can actually do the Xpert MTB-RIF, but for COVID-19 patient the Xpert MTB-RIF test was incapable because there were no reagents

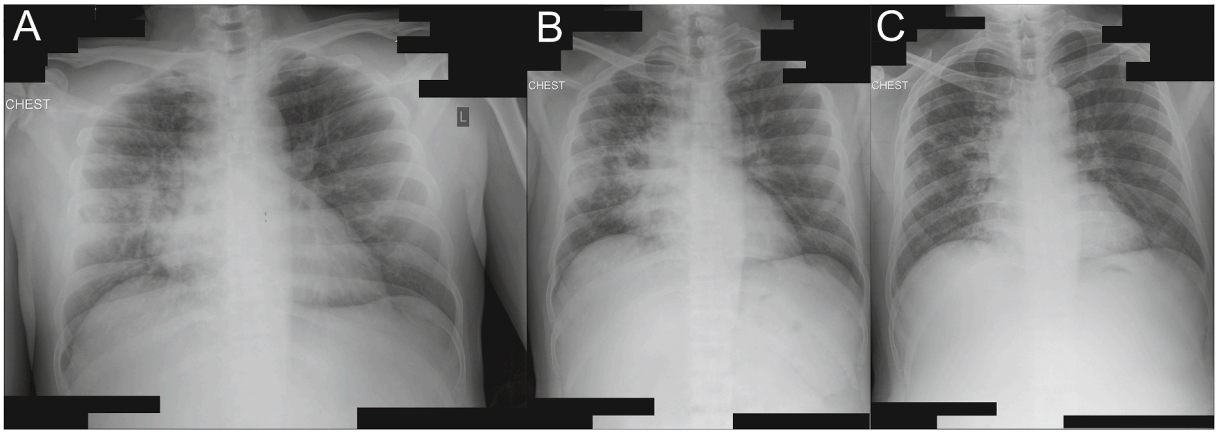

Fig. 1. (A) Chest X-ray on day 1, oedema pulmonum and bilateral consolidation (atypical virus), (B) Chest X-ray on day 6, pneumonia with increasing vesicular, and (C) Chest X-ray on day 11, less lession compared to previous chest x-ray.

and supporting conditions. Patient's swab sample was reffered to laboratory of Dr. Sardjito Hospital, Yogyakarta and for Xpert MTB-RIF Assay G4 sample will be taken by private clinical laboratory courier that already made an appointement. Nasophayrng and oropaharyng swab test sample were put in Viral Transport Medium (VTM) and secure on sample transportation [11,12]. The sample will be delivered from our institution on the same day when the sample taken. They will test using RT-PCR assays and it take one day for the test. The result of swab test will be send by them through email as soon as they are finish. So, the estimated time for confirming swab test in our setting takes 2 days and the private clinical laboratory will deliver the Xpert MTB-RIF Assay G4 result also within 2 days. Quick and accurate diagnostic tool is desirable, because delaying diagnosis will cause improper treatment for the patient.

Chest X-ray was performed and showed oedema pulmonum and bilateral consolidation. Previous study showed bilateral interstitial infiltrates in portable chest X-ray result. While, in chest computed tomography scan (CT-Scan) revealed bilateral diffuse ground-glass opacities [7]. Bilateral peripheral/basal ground glass haze/consolidation was a common patterns on chest X-ray in patients with COVID-19 [8]. NLR was identified as an early risk factor for severe COVID-19 illness [10]. Fortunately, our patient did not experience any progression and fully recover.

He was receiving antibiotic and antiviral during his stay in hospital in accordance with the treatment protocol for COVID-19 and tuberculosis in Indonesia. Until now, there is no recommendation treatment for COVID-19 sufferer with tuberculosis co-infection or vice versa. From recent study, rifampicin and isoniazid that included in FDC have potent inhibitor against COVID-19 virus which interfere with its life cycle by interacting with the proteatse [16,17]. Rifampicin is the most suggested repurposing drug for treatment COVID-19 [17]. Nevertheless, patient with comorbidity for respiratory problem could be on threatening condition. Ventilation support and intensive care for infectious patient must be accessible, yet still unavailable in our institution [6].

3. Conclusion

A low resource setting has its own challenges in handling COVID-19. Further studies are needed to address the clinical characteristics, diagnosis and management in COVID-19 patients with active tuberculosis.

Ethical approval

The informed consent form was declared that patient data or samples will be used for educational or research purposes. Our institutional review board also do not provide an ethical approval in the form of case report.

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Author contribution

Muhammad Anis Baskara and Firdian Makrufardi, and Ardiana Dinisari conceived the study and approved the final draft. Muhammad Anis Baskara, Firdian Makruafrdi drafted the manuscript, and Ardiana Dinisari critically revised the manuscript for important intellectual content. Muhammad Anis Baskara, Firdian Makrufardi, and Ardiana Dinisari facilitated all project-related tasks.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Registration of Research Studies

This is not a 'first in humans' report, so it is not in need of registration.

Guarantor

Muhammad Anis Baskara.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of competing interest

No potential conflict of interest relevant to this article was reported.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2020.12.052.

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