

Case Report of Coronavirus Disease 2019 (COVID-19) in Patients with Pulmonary Tuberculosis and Sequelae Tuberculosis Accompanied by Malnutrition

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Abstract: Tuberculosis (TB) is an infectious chronic infectious disease caused by rod-shaped bacteria or bacillus, and is acid-resistant to *Mycobacterium tuberculosis*. Coronavirus disease (COVID-19) is a disease caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) infection. Clinical manifestations of COVID-19 and tuberculosis include fever, cough, tightness, weight loss, weakness, and expectoration. Patients with tuberculosis have two times the risk of dying or experiencing severe symptoms. The case report reported one case of a 20-year-old man suffering from TB who had undergone 2nd line tuberculosis treatment who also suffered from a COVID-19 infection and malnutrition.

Keywords: COVID-19, tuberculosis, malnutrition

INTRODUCTION

Tuberculosis is an infectious chronic infectious disease caused by rod-shaped bacteria or bacillus, and is acid-resistant to *Mycobacterium tuberculosis*. *Mycobacterium tuberculosis* infection mostly affects the pulmonary organs (pulmonary tuberculosis), but this bacterium also has the ability to infect organs other than the lungs (extra-pulmonary tuberculosis).¹ Indonesia is the second-ranked country in

the world with the highest number of tuberculosis cases after India. Based on data from the World Health Organization (WHO) in the Global Tuberculosis Report 2021, the prevalence of newly diagnosed tuberculosis cases during the Coronavirus Disease 2019 (COVID-19) pandemic has decreased from 7.1 million people in 2019 to 5.8 million people in 2020.² Meanwhile, the estimated number of tuberculosis cases based on data from the Ministry of Health of the Republic of Indonesia (Kemenkes RI) in 2021 was

obtained as high as 842,000 from the entire Indonesian population.³

Corona virus disease (COVID-19) is a disease caused by a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. The disease was first discovered in late December 2019 at Huanan Traditional Market, Wuhan City, Hubei Province, China. Human-to-human transmission occurs via respiratory droplets that arise when talking, coughing, or sneezing. The World Health Organization (WHO) officially designated COVID-19 as a pandemic on March 11, 2020.^{2,3}

Clinical manifestations of COVID-19 and tuberculosis include fever, cough, tightness, weight loss, weakness, and expectoration. Patients with tuberculosis have two times the risk of dying or experiencing severe symptoms.⁴

CASE

Mr. Irwan, a 25-year-old man, came with his biological mother and puskesmas officers to the pulmonary polyclinic of Drs. H. Amri Tambunan Hospital with complaints of shortness of breath felt in both chests and continuously. The perceived tightness is reduced by drinking warm and burdensome water if the patient walks far enough. Patients admit to feeling tight, especially in the morning. In addition to tightness, the patient also complains of weakness and a cough accompanied by yellow sputum. The patient also complains of a fever and has night sweats.

The patient's previous history of disease was diagnosed with pulmonary tuberculosis in 2017 and underwent treatment with category 1 anti-tuberculosis drugs for 6 months. In 2019, the patient was then diagnosed with *relapse tuberculosis* and received treatment with category 2-line 1 anti-tuberculosis drugs for 8 months. The TCM test, conducted in November 2020, obtained a positive result for *Mycobacterium tuberculosis*.

In the patient's family environment, the patient's mother experienced the same symptoms and was diagnosed with pulmonary tuberculosis with a complete treatment status. The patient's nutritional history admitted that his appetite decreased so that he experienced weight loss and had a history of allergies to shrimp. The patient also has an allergy to cold weather.

The patient's family environment is an endemic area for tuberculosis. In addition, patients also have a habit of using drugs.

On physical examination, it was found that the general condition appeared tight, the patient's consciousness was compos mentis, blood pressure was 118/87 mmHg, pulse frequency was 79x/minute, breathing frequency was 30x/min, and temperature was 36.5°C. The nutritional status of the patient was determined to be that the patient's weight and height were 45 kg and 170 cm. The Body Mass Index (BMI) was found at 15.57 kg/m².

A thoracic examination found that the shape and movement of the right and left chest were asymmetrical, as well as retraction in the right posterior basal pulmonary field. The stem fremitus of the right lung is weakened and when percussed, hypersonor is found in the right lung field, the apex and medial part, and dim in the basal part. Additional breathing sounds are found wheezing in the right lung field in the medial and basal parts, as well as in the basal part of the left lung field.

A thoracic photo examination was carried out and infiltrating spots were found in both pulmonary fields; bullae on the supra hilus of the right lung, and avascular in the upper field of the right lung. The PCR test was found to be positive for COVID-19, and the sputum culture results were found to be positive for *Mycobacterium tuberculosis*. The patient's occupational diagnosis is COVID-19 with pulmonary tuberculosis and tuberculosis sequelae accompanied by poor nutrition.

Management patients were given a 0.9% NaCl infusion intermittently with CL inimix 20 gtt/min. Moxifloxacin infusion 400mg/day, cefoperazone 1 gr/8 hours, avigan 2x600 mg, FDC 0-0-3 anti-tuberculosis drug, gabaxa per day, N acetyl cysteine infusion 200 mg/8 hours, VIP albumin sachet 3x1, curcuma 3x1, zegavit 1x1, dalfarol 1x1, Isoprinosine 4x1, aile The prognosis of this patient is dubia ad bonam. The diet of patients is high-calorie and high-protein soft foods.

DISCUSSION

The *World Health Organization* (WHO) states that viral diseases continue to emerge and are a serious problem for public health. In the last 20 years, there have been several virus epidemics recorded, including the *Severe Acute Respiratory Syndrome Coronavirus* (SARS-CoV), which began in China in 2002-2003 and involved several countries with a sequential number of cases and deaths of 8000, and 800 (a death rate of 9.6%). In addition to SARS-CoV, the next epidemics were H1N1 influenza in 2009 and *Middle East Respiratory Syndrome Coronavirus* (MERS-CoV) in Saudi Arabia in 2012, with the number of cases reaching 2500 and 800 deaths (35% mortality rate). The next epidemic that has occurred is *Coronavirus Disease 2019* (COVID-19), which is a lower respiratory tract infection that was first discovered in Wuhan City, Hubei Province, China in late December 2019. At first, this case was identified as "pneumonia of unknown cause". The *Chinese Center for Disease Control and Prevention* (CDC) has conducted an intensive investigation into the outbreak, and it is known that the etiology of this disease is related to Coronavirus (CoV).

The virus is highly contagious and spreads rapidly to various countries, so it was declared a *Public Health Emergency of International Concern* (PHEIC) by WHO on January 30, 2020. Next, the *International Committee on Taxonomy of Viruses* (ICTV) announced that the name of the virus that

causes COVID-19 is *Severe Acute Respiratory Syndrome Coronavirus 2* (SARS-CoV-2).

Coronavirus (CoV) is the main pathogen that causes respiratory disease outbreaks. This virus is a virus with genetic material in the form of single-chain RNA (+ ssRNA) that can be isolated in several different animal species.

For reasons that are not yet fully known, the virus lives in different species and can cause several diseases in humans, ranging from the common cold to more severe diseases such as MERS and SARS. The coronavirus that causes this epidemic is thought to have originated in bats and then moved to ferrets for SARS-CoV, and dromedary camels for MERS-CoV before being transmitted to humans. As for SARS-CoV-2 until now it is not known, but there is speculation that SARS-CoV-2 is also of animal origin. On March 11, 2020, the number of COVID-19 cases outside China increased more than 13 times and there were 114 countries that reported COVID-19 cases with a total of 118,000 cases, so WHO declared COVID-19 a global pandemic.

The diagnosis of tuberculosis is determined based on complaints, anamnesis results, clinical examinations, laboratory examinations, and other supporting examinations.

1. Complaints and results of anamnesis include:

complaints submitted by patients, as well as detailed interviews based on patient

complaints. Clinical examination based on the symptoms and signs of tuberculosis includes:

1. The main symptom of a pulmonary tuberculosis patient is coughing up phlegm for 2 weeks or more. Coughing can be followed by additional symptoms, namely phlegm mixed with blood, coughing up blood, shortness of breath, weakness, decreased appetite, decreased weight, malaise, night sweats without physical activity, fever for more than one month. In hiv-positive patients, coughing is often not a characteristic symptom of tuberculosis, so cough symptoms should not always be for 2 weeks or more.
2. The symptoms mentioned above can also be found in lung diseases other than tuberculosis, such as bronchiectasis, chronic bronchitis, asthma, lung cancer, and others. Considering that the prevalence of tuberculosis in Indonesia is currently still high, everyone who comes to the health facility with the aforementioned symptoms, is considered a suspected tuberculosis patient, and it is necessary to do a microscopic sputum examination directly.
3. In addition to these symptoms, it is necessary to take into account the examination of people with risk

factors, such as: close contact with tuberculosis patients, living in densely populated areas, slums, evacuation areas, and people who work with chemicals that are at risk of causing exposure to lung infections.

- Direct microscopic sputum examination. Sputum examination in addition serves to establish the diagnosis, it is also to determine the potential for transmission and assess the success of treatment. Sputum examination for diagnosis enforcement is carried out by collecting 2 examples of sputum tests collected in the form of sputum Intermittently (SP):
- S (Current): Phlegm is housed in a health facility.
- (Morning): Phlegm is accommodated in the morning immediately after waking up. It can be done at the patient's home or in the inpatient ward whenever the patient is undergoing hospitalization.
 - Molecular Rapid Test Examination Tuberculosis Examination molecular rapid test with xpert Mtuberculosis / RIF method. TCM is a means of diagnosis, but cannot be used for the

evaluation of treatment outcomes.

- Culture Inspection

Culture examination can be carried out with solid media (Lowenstein-Jensen) and liquid media (Mycobacteria Growth Indicator Tube) for the identification of Mycobacterium tuberculosis (MTuberculosis). The aforementioned examination is carried out in laboratory facilities that are monitored for quality. In guaranteeing the results of laboratory examinations, quality examples of sputum tests are needed. In health facilities that do not have direct access to TCM inspection, culture, and sensitivity testing, a sample test transportation system is needed. This aims to reach patients who need access to the examination and reduce the risk of transmission if the patient travels directly to the laboratory.

- Drug sensitivity test examination
Drug sensitivity tests aim to determine the presence or absence of M.tuberculosis resistance to anti-tuberculosis drugs. The drug sensitivity test must be carried out in a laboratory that has passed the quality assurance (QA) test, and obtained national and international certificates.
- Serological examination to date it has not been recommended.

The combination of anti-tuberculosis drugs used in Indonesia are;

Category 1: 2(HRZE)/4(HR)3 or 2(HRZE)/4(HR).

Category 2: (HRZE)S/(HRZE)/5(HR)3E3 or 2(HRZE)S/(HRZE)/5(HR)E.

Child Category: 2(HRZ)/4(HR) or 2HRZE(S)/4-10HR.

A combination of anti-tuberculosis drugs for drug-resistant tuberculosis patients: consists of 2nd line anti-tuberculosis drugs namely Kanamycin, Capreomycin, Levofloxacin, Etionamide, Cycloserine, Moxifloxacin, PAS, Bedaquilin, Clofazimin, Linezolid, Delamanid and other new tuberculosis drugs as well as 1st line anti-tuberculosis drugs, namely pyrazinamide and ethambutol.

Tuberculosis treatment with a combination of First Line anti-tuberculosis drugs used in Indonesia can be given at daily doses or intermittent doses (given 3 times per week) with reference to the recommended therapeutic doses.

Category-1:

This alloy of anti-tuberculosis drugs is given to new patients:

1. Pulmonary tuberculosis patients are confirmed bacteriologically.
2. Patients with pulmonary tuberculosis are clinically diagnosed.
3. Patients with extra-pulmonary tuberculosis. Daily dose (2(HRZE)/4(HR)) Category -2:

This combination of anti-tuberculosis drugs is given to positive BTA patients who have been treated before (re-treatment) namely:

1. The patient relapses.
2. The patient failed on treatment with an alloy of the previous category 1 anti-tuberculosis drug.

3. Patients who are treated again after a breakup (lost to follow-up).

4. Daily dose 2(HRZE)S/(HRZE)/5(HRE)}

Drug Resistant Tuberculosis is a condition in which the germ *M. tuberculosis* can no longer be killed with first-line anti-tuberculosis drugs. Treatment of Drug Resistant tuberculosis patients using a combination of drug-resistant anti-tuberculosis drugs consisting of second-line and first-line anti-tuberculosis drugs, namely:

1. Conventional standard Drug Resistant tuberculosis treatment alloy (20-26 months)

The current drug-resistant anti-tuberculosis drug alloy option is a standard alloy, which at the beginning of treatment will be given equally to all drug-resistant tuberculosis patients.

- The standard alloys given are: Km – Lfx – Eto – Cs – Z– (E)– (H) / Lfx– Eto – Cs – Z– (E)– (H)
- The standard alloy is given to patients who have been laboratory ally confirmed with RR tuberculosis (rapid test results or conventional methods).
- Treatment with standards can be started based on the results of molecular rapid tests of tuberculosis that declare tuberculosis RR.

- If there is a history of using an anti-tuberculosis drug alloy that is suspected to have resisted, for example, the patient has received fluoroquinolones in the treatment of tuberculosis before, then a high dose of Levofloxacin or Moxifloxacin is given. Meanwhile, in patients who have received Kanamycin before, Capreomycin is given as part of the standard anti-tuberculosis drug alloy
- The aforementioned standard drug Resistant anti-tuberculosis drug alloy will be adjusted for the alloy or dosage if:
 1. There is additional evidence of resistance to other anti-tuberculosis drugs based on the results of conventional sensitivity tests for first-line and second-line anti-tuberculosis drugs.
 2. There are severe side effects and the drug cause is already known, then the drug can be replaced when a replacement drug is available or stopped, for example:
 1. If the patient experiences side effects due to cycloserine, for example, a psychiatric disorder appears, cycloserine can be replaced with PAS.
 2. If the patient has hearing loss due to kanamycin, then kanamycin can be replaced with capreomycin.
 3. If the market experiences vision disorders caused by etambutol then the administration of ethambutol can be stopped.
 4. Dosage or frequency is adjusted when:
 - There is a change in body weight
 2. Severe side effects occur and replacement drugs are not available
 3. Short-term RO tuberculosis treatment alloy (9-11 months) 9-month treatment alloy consists of: 4-6 Km – Mfx – Pto – H – Cfz – E-Z / 5 Mfx – Cfz – E-Z.

This alloy is indicated for patients who are not expected to be resistant to fluoroquinolones and second-line injection drugs based on treatment history and or drug sensitivity test results both molecular and phenotypic. Patients who are found to be resistant or likely resistant to FQ and/or second-line injection drugs or have contraindications to the use of 9-month treatment alloys will be given a treatment alloy according to their type of resistance. Patients will receive therapy for 9–11 months, depending on the duration of the intensive phase and then monitored for at least 12 months.

CONCLUSION

Mycobacterium tuberculosis infection mostly affects the pulmonary

organs (pulmonary tuberculosis), but this bacterium also has the ability to infect organs other than the lungs (extra-pulmonary tuberculosis). COVID-19 is a disease caused by *Severe Acute Respiratory Syndrome Coronavirus 2* (SARS-CoV-2).

Clinical examination based on the symptoms and signs of tuberculosis, which includes the main symptom of a pulmonary tuberculosis patient is coughing up phlegm for 2 weeks or more. Considering that the prevalence of tuberculosis in Indonesia is currently high, everyone who comes to the health facility with the symptoms mentioned above is considered a suspected tuberculosis patient, and it is necessary to do a microscopic sputum examination directly.

E-ISSN: 2528-410X
Tuberculosis Coinfection: An
Overview of Case Reports/Case
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