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CASE REPORT

Malaria and COVID-19 in an Indigenous Patient, Overlapping of Two Febrile Illnesses

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ABSTRACT

Coronavirus disease 2019 (COVID-19) is an illness caused by a novel coronavirus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Malaria is a parasitic infection caused by the parasite genus Plasmodium. We present the case of a 69-year-old male indigenous patient from Amazonas, Venezuela, who complained of fever, cough, loss of taste and smell, and diarrhea. A SARS-CoV-2 PCR test was positive, and treatment was started. However, over the next few days, his condition worsened. In addition to his previous symptoms, the patient reported profuse sweating accompanied by fever and myalgia. Therefore, a blood smear and ELISA were performed, which were positive for Plasmodium falciparum, for which treatment with antimalarial agents was also started. *J Microbiol Infect Dis 2022; 12(1):27-30.*

Keywords: *COVID-19, Malaria, Coinfection, Plasmodium falciparum, SARS-CoV-2*

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an illness caused by a novel coronavirus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), primarily transmitted by respiratory droplets and airborne particles. In December 2019, the first cases were reported in Wuhan, China. Later, it was declared a pandemic on March 11, 2020, by the World Health Organization (1). Malaria is a parasitic infection produced by the parasite genus Plasmodium which is transmitted by Anopheles mosquitoes. Both entities can produce acute life-threatening diseases and are currently substantial global health threats, especially in low- and middle-income countries(1). COVID-19 infection has several epidemiological and clinical similarities with malaria. Both diseases have higher occurrences in areas with high poverty and poor health care access. They also share fever, myalgias, fatigue, headaches, and gastrointestinal symptoms. Due to the current global situation, most of the attention is centered on COVID-19, which can delay malaria diagnosis and treatment (2).

CASE

We present a clinical case of a 69-year-old male indigenous patient who lives in Amazonas, Venezuela, who complained of high fever, cough, loss of taste and smell, and diarrhea. During his physical examination, he had an oxygen saturation of 93%, for which he was hospitalized. A SARS-CoV-2 PCR test was ordered, which resulted positive, followed by a chest x-ray (Figure 1). The chest x-ray showed increased radiopacity due to diffuse interstitial alveolar pattern, predominantly in the lower lobes of both lung fields and the middle right lobe, suggesting diffuse viral pneumonia due to COVID-19. Therefore, the patient was transferred to a COVID ward, where he received treatment with oxygen through a nasal cannula, intravenous azithromycin 500 mg and ceftriaxone 1 gm once daily for three consecutive days, intravenous remdesivir 100mg once daily for five straight days, intramuscular

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dexamethasone 6 mg once daily, and oral aspirin 80 mg once daily for ten days. However, despite the treatment, his general condition worsened. In addition, he complained of fever preceded by chills and followed by profuse sweating with myalgia. A blood smear, which showed Plasmodium falciparum trophozoites, and ELISA were performed, which resulted in positive for Plasmodium falciparum. As a result, he was treated with the first dose of intravenous hydroxychloroquine 800mg, followed by 400mg once daily for five days; and artemether/lumefantrine 20mg/120mg, four tablets per dose for three consecutive days as it follows: the first dose was given followed by a second dose 8 hours later, the following two days each dose was be given twice daily with 12 hours apart. After the treatment was given, the patient's condition improved significantly. Therefore, he was later discharged after 15 days of hospitalization.

DISCUSSION

The clinical features of COVID-19 vary from asymptomatic to severe symptoms, including fever, cough, sputum production, and fatigue. It may also include headache, arthralgia, myalgia, nausea, and vomiting. Patients with malaria usually present with fever, headache, chills, and sweating (3). Fever is a cardinal sign of both diseases; therefore, during the COVID-19 pandemic, it is essential to consider both diagnoses in patients living in or traveling to endemic areas. Also, both entities may cause respiratory symptoms (4). This is why focusing only on COVID-19 could lead to misdiagnosis and worsening of symptoms of malaria (5). Other common manifestations are headaches, tiredness, and body pain (6). Severe malaria infection is typically associated with multi-organ failure in adults and respiratory distress in children, commonly seen in COVID-19 infected patients (6).

Some cases in the literature have reported the coinfection with malaria and COVID-19. For example, a 47-year-old black male with persistent fever and myalgia who frequently traveled between Portugal and Angola was diagnosed with SARS-CoV-2 infection. However, due to the recent travels to endemic locations, a rapid diagnostic test for malaria parasite antigens was also requested, showing a positive result for Plasmodium falciparum. This patient also received artemether/lumefantrine after being diagnosed with malaria, and after 14 days, he was discharged (5).

It is well known that COVID-19 and malaria produce a procoagulant state via inducing tissue factor expression, causing endothelial dysfunction and activating the coagulation cascade. The hypercoagulable state in COVID-19 is associated with a high rate of venous and arterial thrombotic complications. However, malaria is usually associated with micro-thrombotic complications, but thrombosis of larger vessels, including cerebral venous thrombosis and pulmonary embolism, have been reported. In addition, the excessive pro-inflammatory responses are often the cause of severe symptomatology of malaria, which resembles some cases of COVID-19, suggesting that a coinfection might result in more severe manifestations and poor prognosis (3).

Malaria control and elimination campaigns are being affected in several ways by the COVID-19 pandemic. For example, in Africa, the distribution campaigns of insecticide-treated nets needed to be renewed regularly, and supplies for diagnosis and drug treatments have been delayed or canceled in the past year. In addition, individuals also avoided attending healthcare facilities due to fear of exposure to COVID-19, which delayed the detection and treatment of malaria (7). Therefore, it is crucial to have integrated health care systems to prevent malaria resurgence and control the COVID-19 pandemic.

Regarding the treatment used in this case, recent studies have shown that some antimalarial drugs could also be used to treat COVID-19. For example, hydroxychloroquine has demonstrated that it can impair the glycosylation of the ACE-2 receptor, which is required for the Sars-CoV-2 entry into the human body. Also, this drug has proven to be effective by decreasing a cytokine storm due to its anti-inflammatory effect by reducing the expression of interleukin 6 (IL-6), tumor necrosis alpha (TNF-α), and interferon-gamma (IFN-y). However, these drugs are still being studied (8).

Figure 1: Chest X-ray showed increased radiopacity due to diffuse interstitial alveolar pattern, predominantly in the lower lobes of both lung fields and the middle right lobe, suggesting diffuse viral pneumonia due to COVID-19.

CONCLUSION

COVID-19 infection has several similarities with malaria. Both entities can produce life-threatening diseases and are currently significant global health threats, especially in low-income countries. The unprecedented global COVID-19 pandemic has rapidly spread to all continents, turning into a substantial setback in elimination campaigns against existing non-infectious and infectious diseases, including malaria. This is why the World Health Organization (WHO) has urged countries to ensure the continuity of malaria services during this pandemic. In patients living or coming from endemic areas, such as Venezuela and other Latin American regions, malaria should be considered as a differential diagnosis in patients with acute febrile illness, even in the presence of a positive SARS-CoV-2 PCR test.

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