

Letter to the Editor

Malaria in travellers in the time of corona

Dana Lev^{1,3,*}, Asaf Biber, MD, DTMH^{1,3}, Tamar Lachish, MD², Eyal Leshem, MD, DTMH^{1,3}, and Eli Schwartz, MD, DTMH^{1,3}

¹The Center for Geographic Medicine and Tropical Diseases, Sheba Medical Center, Ramat Gan, Tel Hashomer, Israel,

²Infectious Diseases Unit, Shaare Zedek Medical Center, Jerusalem, Israel and ³Sackler Faculty of Medicine, Tel-Aviv University, Tel-Aviv, Israel

*To whom correspondence should be addressed. Email: danalev7@gmail.com

Submitted 22 April 2020; Revised 28 April 2020; Editorial Decision 30 April 2020; Accepted 30 April 2020

Key words: COVID-19, Plasmodium vivax, late onset malaria, SARS-CoV-2

Fever is a common symptom among returned ill-travellers and has many possible etiologies. Of potential causes, malaria is by far the most frequent diagnosis leading to hospitalization and death among travellers.^{1,2} Prompt diagnosis and early treatment is crucial due to the risk of severe malaria and fatal complications.

The recent pandemic resulted in high index of coronavirus disease 2019 (COVID-19) suspicion in febrile returned travellers. Since March 2020, according to Israel's Ministry of Health, which rely on WHO guidelines, the following indications require screening for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2): every person who returned from endemic areas of COVID-19 and every person with respiratory symptoms or fever, who returned from abroad during the last 14 days.³ However, focusing on COVID-19 may delay workup, diagnosis and treatment of other causes of fever in returned travellers from the tropics, mainly malaria.

Herein, we present three cases of delayed diagnosis and treatment of malaria because of concerns about possible exposure to SARS-Cov2 and neglecting malaria (Table 1):

In Case 1, the patient suffered high fever and headaches, 4 days after returning from Sub-Saharan Africa, without taking malaria prophylaxis. He avoided seeking medical care, due to possible COVID-19 exposure at the emergency room (ER). After 3 days, emergency medical services (EMS) came for COVID-19 screening which was negative, and advised against referring to the hospital. Eventually, he decided to approach ER and was diagnosed with falciparum malaria.

In Case 2, the patient presented to the primary care clinic with fever and headaches, 6 weeks after returning from Indonesia, without taking malaria prophylaxis. He was tested at community clinic for COVID-19 which was negative, and also avoided

seeking medical care, due to possible COVID-19 exposure at the ER. At the third visit at his primary care physician, malaria test was advised too and he was referred to ER where he was retested for COVID-19. Malaria test was performed again and the treatment was delayed until the COVID-19 test returned negative again.

In Case 3, the patient presented with fever and headaches, 4 weeks after returning from 6 months of travelling in Solomon Islands, Philippines and India. COVID-19 test was negative at the community level. Due to her persistent febrile illness she was referred to the ER, where second COVID-19 test returned negative and she was planned for discharge. After repeated medical history, malaria smear was performed with diagnosis of *Plasmodium vivax*. The late-onset malaria occurred despite malarone prophylaxis, which does not prevent the formation of hypozoites.⁴

This situation encompasses potential risks, as important diagnosis of treatable disease with potential of deteriorating to severe disease and death might be delayed. An outbreak of an uncommon disease with high media coverage may deviate the attention. For example, during the Ebola epidemic in West Africa (2015), the US Centers for Disease Control and Prevention (CDC) received reports of delayed laboratory testing for malaria in travellers returning to the USA because of infection control concerns related to Ebola. Among 33 travellers who returned from malaria-endemic areas and tested negative for Ebola, 5 of them were eventually diagnosed with malaria.⁵

In the above-mentioned cases, delayed malaria testing was hindered as physicians' attention was towards COVID-19 only. Additional reason for the diagnostic delay was patients' concern about exposure themselves to COVID-19 in the ER.

Table 1. Clinical characteristics of malaria patients during COVID-19 outbreak

Cases	Gender/age	Destination	Time from symptom onset to diagnosis	No. of corona testing	Final diagnosis
1	M, 21	Kenya, Uganda	5 days	1	<i>Plasmodium falciparum</i>
2	M, 29	Indonesia	10 days	2	<i>P. vivax</i>
3	F, 23	Solomon Islands, Philippines, India	4 days	2	<i>P. vivax</i>

These reports demonstrate diagnostic delay of malaria which fortunately concluded with no catastrophic consequences; however, these could lead to severe malaria. It is essential that all febrile travellers returning from malaria-endemic regions should be evaluated for malaria too even if COVID-19 is positive as co-infection is not uncommon.⁶

In addition, Sub-Saharan Africa is at the early stages of COVID-19 epidemic. Medical practitioners there should be aware that even when the magnitude of the disease will increase, malaria is still the major cause of mortality in this region.

Author contribution

D.L. performed literature review and manuscript drafting. E.S., E.L., T.L. and A.B. managed the case and did critical review.

Funding

The authors have declared no sources of funding.

Conflict of interest

None declared.

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