

COVID-19 and dengue co-infection in a returning traveller

Running title: COVID-19 and dengue coinfection

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ABSTRACT

In march 2020, a pandemic of respiratory infection due to the SARS-CoV2 is underway, dengue fever epidemics are at the same time present in many regions of the inter-equatorial zone. We report the first cases of covid19-dengue co-infection, which occurred in Mayotte, a French island in the Indian Ocean.

Highlight

Infection with the SARS-CoV2 virus gradually spread over the planet, including in tropical areas, currently affected by the dengue epidemic. This brings up a new challenge: the concomitant management of these 2 epidemics with the risk of misdiagnosis and also co-infection. We present here the first case reported to our knowledge of COVID-19 - dengue co-infection. Although the diagnosis of COVID-19 was made, the appearance of a rash led to the diagnosis of dengue fever. The case highlights the risk of misdiagnosis and co-infection in regions reach by the SARS CoV2 epidemics where tropical diseases are endemic or epidemic, such as dengue fever.

Keywords

coronavirus, COVID-19, severe acute respiratory syndrome coronavirus 2, pandemic; dengue fever, tropical diseases, France, Western Europe, Mayotte; coinfection

Main text

A 44-year-old man born in France living in Mayotte for 7 years traveled to France and Switzerland, from March 6 to 14, 2020. A flu-like syndrome started on March 11th in Paris, and on day 4 the nasopharyngeal SARS-CoV2 PCR and a respiratory multiplex PCR were negative. On day 10, back in Mayotte, intense headaches and fever (39°C) appetite loss, fatigue and diarrhea... prompted the clinicians to repeat testing for SARS-CoV-2 and this time it was positive. On day 11, hydroxychloroquine, 600 mg/day and azithromycin, 500 mg/day followed by 250 mg/day were introduced for 5 days. On day 13 there was persistent drowsiness, fever at 38.5 ° C and dysgeusia appeared. On day 16, a diffuse maculopapular exanthema led to blood tests: Leukocytes 4.5 G/L, neutrophils 2.23 G/L, lymphocytes 1.53 G/L, platelets 166 G/L, hemoglobin 16.8 g / dL, normal creatinine, total bilirubin and gamma-GT, creatinine phosphokinase 537 IU/L, ASAT 74 IU/L, ALAT 67 IU/L, and C-reactive protein <5 mg /L. Leptospira spp., Rift Valley fever virus and Chikungunya virus PCR were negative. RT-PCR for type-1 Dengue virus was positive. Patient gradually improved from day 17.

In March 2020, while SARS-CoV2 pandemics predominated in temperate countries, it increasingly penetrated tropical regions, where repeated dengue fever epidemics occur. In Mayotte DENV-1 was circulating in early 2020 (Santé Publique France. URL : https://url-oi.re/ZS/Epidemiologie/2020-03-12_PE_Dengue_Cellule_Mayotte_VF.pdf). While the first case of SARS-CoV2 was reported in Mayotte on March 14, 2020, the epidemic was growing in mainland France with 4,500 confirmed cases and 91 deaths (Santé Publique France. URL : <https://www.santepubliquefrance.fr/maladies-et-traumatismes/maladies-et-infections-respiratoires/infection-a-coronavirus/documents/bulletin-national/covid-19-point-epidemiologique-du-24-mars-2020> , where the patient most likely contracted the infection. Between January and mid-March 2020 in Mayotte, over 2,000 cases of dengue fever were

reported, mostly DENV1 serotypes. It is therefore likely that the patient acquired dengue upon returning from France, as the incubation time for COVID-19 is 3 to 5 days in general, but can be up to 14 days, as it is 2 to 7 days for dengue fever, being up to 14 days as well.

To our knowledge, COVID19 and dengue virus co-infection has not been reported yet, especially in a traveller,¹ although SARS-CoV-2 and Legionella co-infection already has.² In early march 2020, a case of false-positive dengue serology in Singapore in patient with a confirmed SARS-CoV2 infection was reported, warning from the risk of misdiagnosis of COVID-19 in front of a positive dengue serology.³ Some South American authors alerted about the risk of co-infection with dengue and covid19.⁴

In the present case, it was not the biological assessment which challenged the clinicians, but the occurrence of a diffuse exanthema, which prompted the search for dengue fever. In Thailand, at the beginning of the epidemics, a case was reported describing a COVID-19 patient who initially presented with a skin rash, which was initially considered as a dengue infection, before the diagnosis was corrected.⁵ In Lombardy, Italy, erythematous rash was the most common lesion among 88 patients with proved COVID-19 infection. Thus, COVID-19 may present with cutaneous manifestations, which could be confused with dengue fever.

To conclude, COVID1-19 and dengue virus epidemics occur at the same time in tropical areas and lead to 2 major challenges: the misdiagnosis of two infections with similar presentation and the risk of greater severity.

Ethics statement : Informed written consent was obtained from the patient.

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REFERENCES

- 1 Halstead S, Wilder-Smith A. Severe dengue in travellers: Pathogenesis, risk and clinical management. *J Travel Med* 2019; 26(7).
- 2 Arashiro T, Nakamura S, Asami T, et al. Sars-cov-2 and legionella co-infection in a person returning from a Nile cruise. *J Travel Med* 2020.
- 3 Yan G, Lee CK, Lam LTM, et al. Covert covid-19 and false-positive dengue serology in Singapore. *Lancet Infect Dis* 2020.
- 4 Navarro JC, Arrivillaga-Henriquez J, Salazar-Llorca J, Rodriguez-Morales AJ. Covid-19 and dengue, co-epidemics in Ecuador and other countries in Latin America: Pushing strained health care systems over the edge. *Travel Med Infect Dis* 2020:101656.
- 5 Joob B, Wiwanitkit V. Covid-19 can present with a rash and be mistaken for dengue. *J Am Acad Dermatol* 2020.