

Covert COVID-19 and false-positive dengue serology in Singapore

Dengue and coronavirus disease 2019 (COVID-19) are difficult to distinguish because they have shared clinical and laboratory features.^{1,2} We describe two patients in Singapore with false-positive results from rapid serological testing for dengue, who were later confirmed to have severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, the causative virus of COVID-19.

The first case is a 57-year-old man with no relevant past medical, travel, or contact history, who presented to a regional hospital on Feb 9, 2020, with 3 days of fever and cough. He had thrombocytopenia (platelet count $140 \times 10^9/\text{mL}$) and a normal chest radiograph. He was discharged after a negative rapid test for dengue NS1, IgM, and IgG (SD Bioline Dengue Duo Kit; Abbott, South Korea). He returned to a public primary health-care clinic with persistent fever, worsening thrombocytopenia ($89 \times 10^9/\text{mL}$), and new onset lymphopenia ($0.43 \times 10^9/\text{mL}$). A repeat dengue rapid test was positive for dengue IgM and IgG (Dengue Combo; Wells Bio, South Korea). He was referred to hospital for dengue with worsening cough and dyspnoea. A chest radiograph led to testing for SARS-CoV-2 by RT-PCR (in-house laboratory-developed test detecting the *N* and *ORF1ab* genes) from a nasopharyngeal swab, which returned positive. The original seropositive sample and additional urine and blood samples tested negative for dengue, chikungunya, and Zika viruses by RT-PCR,³⁻⁵ and a repeat dengue rapid test (SD Bioline) was also negative. Thus, the initial dengue seroconversion result was deemed a false positive.

The second case is a 57-year-old woman with no relevant past medical, travel, or contact history, who presented to a regional hospital

on Feb 13, 2020, with fever, myalgia, a mild cough of 4 days, and 2 days of diarrhoea. She had thrombocytopenia ($92 \times 10^9/\text{mL}$) and tested positive for dengue IgM (SD Bioline). She was discharged with outpatient follow up for dengue fever. She returned 2 days later with a persistent fever, worsening thrombocytopenia ($65 \times 10^9/\text{mL}$), and new onset lymphopenia ($0.94 \times 10^9/\text{mL}$). Liver function tests were abnormal (aspartate aminotransferase 69 U/L [reference range 10–30 U/L], alanine aminotransferase 67 U/L [reference range <55 U/L], total bilirubin $35.8 \mu\text{mol/L}$ [reference range 4.7–23.2 $\mu\text{mol/L}$]). Chest radiography was normal and she was admitted for dengue fever. She remained febrile despite normalisation of her blood counts and developed dyspnoea 3 days after admission. She was found to be positive for SARS-CoV-2 by RT-PCR from a nasopharyngeal swab. A repeat dengue test (SD Bioline) was negative and an earlier blood sample also tested negative for dengue by RT-PCR.⁶ The initial dengue IgM result was deemed to be a false positive.

Failing to consider COVID-19 because of a positive dengue rapid test result has serious implications not only for the patient but also for public health. Our cases highlight the importance of recognising false-positive dengue serology results (with different commercially available assays) in patients with COVID-19. We emphasise the urgent need for rapid, sensitive, and accessible diagnostic tests for SARS-CoV-2, which need to be highly accurate to protect public health.

We declare no competing interests.

*Gabriel Yan, Chun Kiat Lee, Lawrence T M Lam, Benedict Yan, Ying Xian Chua, Anita Y N Lim, Kee Fong Phang, Guan Sen Kew, Hazel Teng, Chin Hong Ngai, Li Lin, Rui Min Foo, Surinder Pada, Lee Ching Ng, Paul Anantharajah Tambyah
gabriel_zherong_yan@nuhs.edu.sg

Department of Medicine, National University Health System, 119228, Singapore (GY, PAT, AYNL, KFP, GSK, HT, CHN); and Department of Laboratory Medicine, University Medicine Cluster (CKL, BY) and Pioneer Polyclinic, National University Polyclinics (LTML, YXC), National University Health System, Singapore; Department of Medicine, Ng Teng Fong General Hospital, Singapore (LL, RMF, SP); and Environmental Health Institute, National Environment Agency, Singapore (LCN)

- 1 Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet* 2020; **395**: 507–13.
- 2 Yan G, Pang L, Cook AR, et al. Distinguishing Zika and dengue viruses through simple clinical assessment, Singapore. *Emerg Infect Dis* 2018; **24**: 1565–68.
- 3 Lanciotti RS, Calisher CH, Gubler DJ, Chang GJ, Vorndam AV. Rapid detection and typing of dengue viruses from clinical samples by using reverse transcriptase-polymerase chain reaction. *J Clin Microbiol* 1992; **30**: 545–51.
- 4 Lanciotti RS, Kosoy OL, Laven JJ, Velez JO, Lambert AJ, Johnson AJ, et al. Genetic and serologic properties of Zika virus associated with an epidemic, Yap State, Micronesia, 2007. *Emerg Infect Dis* 2008; **14**: 1232–39.
- 5 Lim CK, Nishibori T, Watanabe K, Ito M, Kotaki A, Tanaka K. Chikungunya virus isolated from a returnee to Japan from Sri Lanka: isolation of two sub-strains with different characteristics. *Am J Trop Med Hyg* 2009; **81**: 865–68.
- 6 Lura T, Su T, Brown MQ. Preliminary evaluation of Thermo Fisher TaqMan Triplex q-PCR kit for simultaneous detection of chikungunya, dengue, and Zika viruses in mosquitoes. *J Vector Ecol* 2019; **44**: 205–09.



Lancet Infect Dis 2020

Published Online

March 4, 2020

[https://doi.org/10.1016/S1473-3099\(20\)30158-4](https://doi.org/10.1016/S1473-3099(20)30158-4)