


Commentary

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Severe Acute Respiratory Syndrome Coronavirus 2 and Dengue Virus Co-infection: Indian Perspectives

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Abstract

Severe acute respiratory syndrome Coronavirus 2 (SARS CoV-2) and Dengue virus (DENV) Co-infection can be a pertinent issue in a country like India, where Dengue is endemic, and Coronavirus disease 19 (COVID-19) is also reported from all states of the country. The co-infection of these viruses has already been reported in different dengue-endemic countries like Singapore, Thailand, and Bangladesh. The outcome and the dynamics of each of the diseases may be altered in the presence of co-infection. We highlighted the critical characteristic similarities and differences between COVID-19 and Dengue infection & the specific point, which may challenge diagnosing and managing these co-infections. COVID-19 and Dengue co-infection can be deadly in combination with an atypical presentation, providing diagnostic and therapeutic challenges. A high index of suspicion, early recognition of symptoms, and warning signs are vital to prevent double jeopardy.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and dengue virus (DENV) co-infection¹ can be a pertinent issue in a country like India where dengue is endemic. The emergence of co-infection of coronavirus disease 2019 (COVID-19) and Dengue is expected to be a serious public health challenge. The outcome and the dynamics of each of the diseases may be altered in the presence of co-infection. At the same time, there are certain challenges in the diagnosis and management of these co-infections. The key characteristic similarities and differences between COVID-19 and Dengue are summarized²⁻⁸ in Supplementary Materials Table 1.

The response of medical and public health staff to disasters increases when they have more medical knowledge and are prepared to respond.⁹ While travelers from India are not a significant source of diagnosed dengue infections in the Western Hemisphere compared with endemic cases, dengue is periodically epidemic in the Western hemisphere, with thousands of cases diagnosed. Travellers are always at risk when visiting endemic countries. The issue of co-infections is pertinent to countries with nonendemic dengue as international travel recovers from pandemic lows. It poses a significant risk of establishing autochthonous transmission in nonendemic areas.¹⁰ In nonendemic areas, early identification of dengue is essential to start vector control investigations to stop dengue from becoming established in *Aedes albopictus* mosquitoes.

DENV and SARS-CoV-2 virus infection may have similar manifestations, such as fever, headache, myalgia, fatigue, diarrhea, abdominal pain, and vomiting, making it hard to differentiate the 2. Moreover, similar initial laboratory findings, including leukopenia, lymphopenia, thrombocytopenia, and increased transaminase, make differential diagnosis challenging.² As management strategies differ for both diseases, it is imperative to identify the disease, even co-infection, correctly. Concurrent reverse transcriptase polymerases chain reaction (RT-PCR) for COVID-19 and RT-PCR or NS1Ag or IgM test for dengue is necessary to confirm either individual infection or co-infection as shown in Figure 1.

In addition, there is a risk of misdiagnosis, delayed diagnosis, and even wrong diagnosis due to the similar manifestation of SARS-CoV-2 and DENV infection.⁴ Cytokine storm seems to play a pivotal role in the severe form of both dengue and COVID-19. A co-infection may compound the altered antiviral response leading to an unfavorable clinical outcome.⁵ The warning signs of the severity of both infections are eventually divergent and should be recognized early. For example, warning signs of Dengue include abdominal pain, persistent vomiting, bleeding, lethargy, restlessness, hepatomegaly, and low blood pressure; however, the warning sign of COVID-19 has difficulty breathing confusion, pressure feeling in the chest, and cyanosis. In addition, age (>64 y), shortness of breath, past histories of diabetes and heart disease, raised Lactate dehydrogenase, procalcitonin are early warning indicators of severe COVID-19.⁶⁻⁸

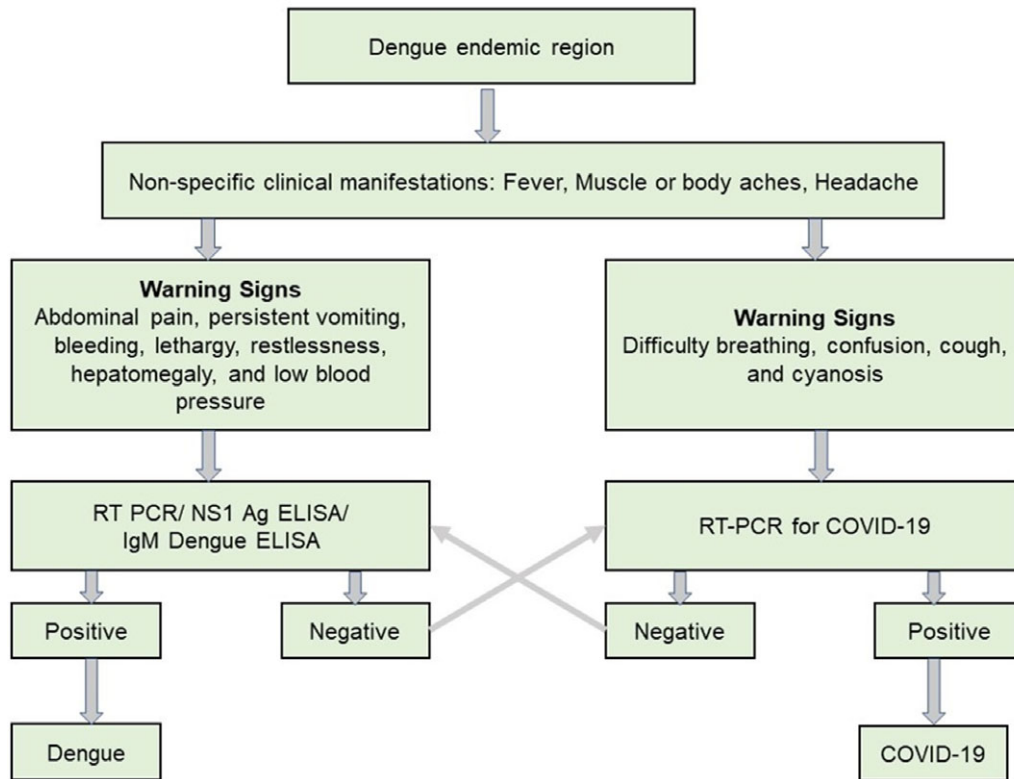


Figure 1. COVID-19 and dengue diagnostic algorithm in dengue-endemic settings.

In Asian countries, this is especially important to clearly identify because initial signs and symptoms of the disease are common.^{8,11} This is further confounded by false-positive dengue antibodies that were found in COVID-19 cases.^{12,13} Clearly, there are difficult days for countries facing these epidemics together because of overlapping clinical presentation. To prevent mis-identification, measures should be taken to differentiate them clearly. Dengue cases have put pressure on already stretched and limited health resources in India. Dengue cases usually begin in July, peak in October, and may stretch until mid-December. The total cases of dengue across India in 2020 were over 30 thousand.¹⁴ Due to the initial lockdown and decreased mobility of patients, it is possible that the detected cases of dengue are a gross under-representation of the true magnitude. The focus on COVID-19 testing can lead to ignorance of dengue, which usually peaks in these months in India.

In addition, misdiagnosis of COVID-19 as dengue and more often vice-versa is a deterrent to appropriate management. Prevention of dengue with aggressive anti-vector campaign consists of avoiding artificial water collection, appropriate clothing, nets to protect against mosquitos, and appropriate integrated vector management.¹⁵ COVID-19 transmission needs to be controlled with social distancing and infection prevention strategies, including wearing proper face coverings and hand sanitization until an effective vaccine coverage is introduced in the population.¹⁶ COVID-19 and dengue co-infection can be a deadly combination with an atypical presentation, providing diagnostic

and therapeutic challenges. A high index of suspicion, early recognition of symptoms, and warning signs are vital to prevent double jeopardy.

Conflict(s) of interest. There are no conflicts of interest.

Supplementary material. To view supplementary material for this article, please visit <https://doi.org/10.1017/dmp.2021.254>

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