

COVID-19 Pandemic and Children Dengue Infection Emergence in South East Asian 2020: Double Trouble

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ABSTRACT

Co-epidemics can create a burden on healthcare systems within the affected regions. The international, at gift, is facing the pandemic of coronavirus ailment. Nonetheless, many regions international be afflicted by endemics that are not of much less risk than the present day pandemic. The concurrent move of dengue and coronavirus disorder 2019 (COVID-19) may additionally produce many destructive outcomes—which includes co-infections; delays in prognosis, treatment, and mitigation measures; overwhelming of the healthcare system; underreporting of instances; deterioration in surveillance and control interventions; and exacerbation of social inequalities.

Keywords: Dengue Infection, COVID-19, Diagnosis, Co-Infection.

INTRODUCTION

Novel coronavirus disorder 2019 (COVID-19) is a respiratory illness as a result of extreme acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It became first said as a plague in Wuhan, China, and spread global, causing a virus ailment¹. Symptoms of COVID-19 can variety from slight signs of fever, cough, headache, muscular pain, nausea, and vomiting to a excessive infection causing pneumonia, acute respiration misery syndrome (ARDS), septic surprise, and multi-organ failure.² Simultaneously, the dengue virus (DENV) transmitted by *Aedes aegypti* and *Aedes albopictus* is an epidemic ailment within the South East Asian especially Indonesia.³

The Indonesian Pediatric Association (IDAI) presented a record of the COVID-19 mortality rate in children and revealed that 70 percent of deaths related to corona virus infection occurred in those under the age of 6. In total, 2,712 children contracted COVID-19, with 51 of them dying from March 17 to July 20. Until December 10, 2020, Indonesia had the highest number of COVID-19 cases in Southeast Asia. Children under 18 years constituted 11.5% of cases and 2.9% of deaths in Indonesia on December 10, 2020, which reached 18,336 cases.^{4,5}

The similarity of signs between dengue and COVID-19 frequently caused confounded prognosis, with both infections providing with excessive fever and flu-like symptoms. Similarly, ordinary blood check for initial screening frequently show similar styles, with the function thrombocytopenia in dengue often acting as nicely in COVID-19 infection. The concurrent move of dengue and COVID-19 may additionally produce many unfavourable outcomes—inclusive of co-infections; delays in diagnosis, remedy, and mitigation measures; overwhelming of the healthcare machine; underreporting of instances; deterioration in surveillance and manage interventions; and exacerbation of social inequalities. Physicians often depend upon serological checks to verify dengue and newly disseminated serological check kit to hastily diagnose COVID-19, however even in this front, there

seems to be a serological overlap between the 2 sicknesses.^{6,7} This evaluation will talk the Dengue infection and COVID-19 infection in every day exercise.

Dengue Infection and COVID-19 Overlapping : Co-contamination and co-prevalence of Covid-19 and dengue have introduced a big burden on healthcare systems in dengue - endemic regions. The complexity of diverse disease severities, prolonged infectious intervals, and shared clinical manifestations and pathogenesis have made their analysis, treatment, and aid allocation tough, specially in developing international locations in Asia with high incidence of dengue and other arboviruses.^{8,9,10}

Thrombocytopenia is one of the primary characteristics of DENV contamination. Eleven In dengue, NS1 induces complement-mediated pathways, which purpose platelet lysis. DENV infected endothelial cells show off higher expression of E-selectin and P-selectin and boom the interplay of platelets with monocytes, leukocytes, and endothelium, which make contributions to thrombocytopenia.¹² In addition, multiplied tiers of platelet-associated immunoglobulin (PAIgM or PAIgG) are mentioned in dengue instances and also are correlated with thrombocytopenia.¹³ Thrombocytopenia is also discovered in Covid-19 sufferers.¹⁴ A meta-evaluation found that thrombocytopenia is related to the severity of Covid-19. SARS-CoV-2 contamination has been presupposed to result in endothelial damage and intervene with the pastime of positive receptors to inhibit bone marrow boom and induce apoptosis, main to ordinary hematopoiesis and ultimately ensuing in thrombocytopenia.¹⁵ Moreover, immune machine-mediated unique destruction of platelets has also been determined in Covid-19 patients, which may also rise up from the elevated ranges of immune complexes and autoimmune antibodies. It is hypothesized that the cytokine storm damages the bone marrow hematopoietic progenitor cells, ensuing in a decline in number one platelet manufacturing and a decline in platelet be counted in peripheral blood.¹⁶ The pathophysiology of SARS-CoV-2 infection and DENV related thrombocytopenia is depict in figure 1.

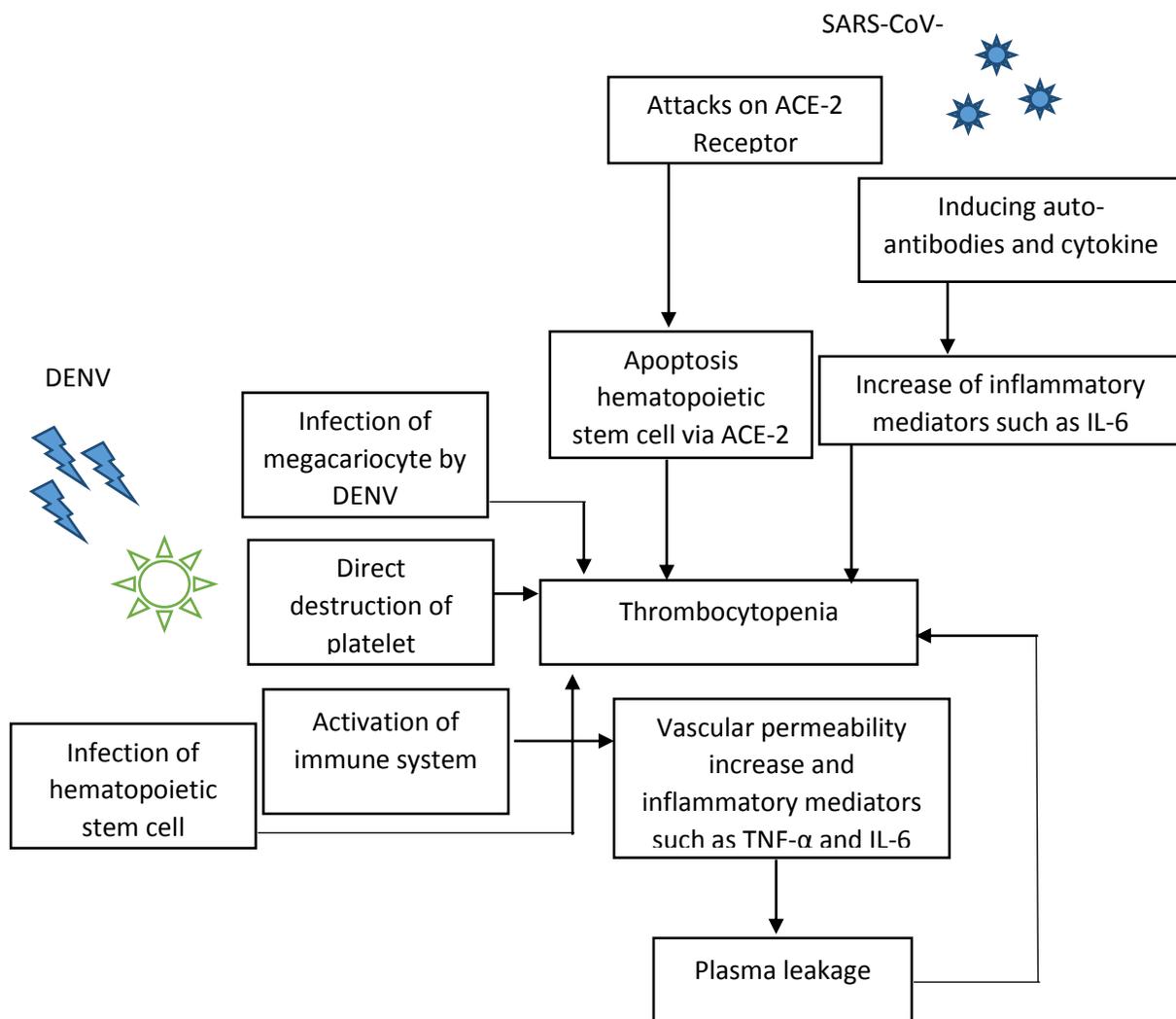


Figure 1. Pathophysiological similarities between DHF and Covid 19. Plasma leakage, thrombocytopenia, and coagulopathy are the hematological hallmarks of DHF and Covid 19. Both DENV and SARS CoV 2 result in the activation of immune cells main to the release of seasoned inflammatory cytokines inclusive of TNF and IL 6. This occasion promotes accelerated vascular permeability that ends in plasma leakage. In DHF instances, the destruction of platelets inside the peripheral place by way of DENV has been suggested because the motive of thrombocytopenia which ultimately culminates as coagulopathy, disseminated intravascular coagulation, and in some instances, resulting inside the loss of life. While thrombocytopenia become additionally glaring in Covid 19 patients, pathophysiological mechanisms on how such occasion has occurred continue to be to be elucidated.^{10,11,16}

3. Clues to Differentiate Dengue Infection and COVID-19

In dengue-endemic international locations, healthcare carriers confronted challenges to first of all distinguish

COVID-19 from dengue as they both exhibit non-precise presentations, which includes fever, headache, stomach pain, malaise, and nausea. Not handiest medical functions, but additionally they percentage laboratory findings including leukopenia and thrombocytopenia, which put extra stress on healthcare people to combat. Due to the pandemic of COVID-19, the protocol in maximum hospitals consists of the screening of patients for SARS-CoV-2 thru nasopharyngeal swab. Serologic dengue such as IgG and IgM can pass react with SARS-CoV-2 antibody rapid check examination.¹⁷

Another disadvantage of the dengue serological testing became determined in countries stricken by both dengue fever and COVID-19. Studies conducted in those countries documented a false-advantageous dengue IgM in showed COVID-19 patients highlighting the opportunity of antigenic similarity among those viruses wherein SARS-CoV-2 may additionally trigger the manufacturing of anti-DENV antibodies by way of the immunological reminiscence cells. Regarding COVID-19, currently

available information illustrated that inflamed sufferers may display a detectable IgM between day 10 and day 21 post-infection, and the common seroconversion time for IgM and IgG seems at day eleven, day 12, and day 14, respectively.¹⁸ Thus, the early phase of the sickness may additionally give false-terrible antibody results. Antibody's production in slight instances might also take longer than this common time, and in a few instances, they have been not detected at all.

It additionally emphasizes the need for further deep mobile and immunological studies to understand whether the presence of each viruses can affect antibodies' reaction. Understanding such mechanisms will assist avoid incorrectly interpreting the positive and terrible outcomes and save you the deadly outcomes as a result of the misdiagnosis of both viruses.¹⁹ However, a number of viruses have been observed to purpose infections simultaneously, even with SARS-CoV-2.²⁰ Thus, due to the low sensitivity of the serological assessments, there may be a chance wherein a capacity coinfection of dengue fever and COVID-19 can occurred.

CONCLUSION

As dengue endemic place, a few international locations in Asia experiencing of overlapping outbreaks of dengue and COVID 19. This poses a project for correct diagnosis and remedy on account that both infections proportion comparable signs and laboratory functions within the early phase. In addition, cross reactivity between antibodies in opposition to DENV and SARS CoV 2 serology exams have been documented in reports. Therefore, a easy and lower priced rapid check capable of differentiating SARS CoV 2 and DENV with high sensitivity which include fast antigen trying out or PCR take a look at of SARS-CoV-2 must be emphasized.

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