http://jmscr.igmpublication.org/home/
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v8i10.44

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Case Report

COVID 19 with Dengue Virus – Coinfection Double trouble?

Authors
Urvashi Khan[1], Anil Kumar[2], Ashok Kumar[3]
[1]MBBS, Post graduate student, Department of Medicine, Santosh Medical College & Hospitals
[2]DNB, IDCCM, IFCCM, MNAMS, Senior consultant & Head, Department of Anaesthesiology & Critical Care Medicine, Santosh Medical College & Hospitals
[3]MD, Professor & Head, Department of Medicine, Santosh Medical College & Hospitals

Background

Coronavirus disease 2019 Outbreak already declared as global pandemic by WHO. During the covid 19 pandemic, post rainy season, there has been a surge of dengue infection in dengue endemic countries in the world. as most of the world is already struggling to fight with covid disease, dengue epidemic coinfection could lead to potentially lethal combination with new challenges and unpredictable outcomes. coinfection with overlapping signs and symptoms makes it difficult to diagnose and treat.

Dengue is the most extensively spread mosquito-borne disease; endemic in more than 100 countries. Dengue caused by DNEV virus is a public health concern in India with manifestations ranging from mild dengue fever to dengue shock syndrome.[1] As per the WHO 1997 classification, symptomatic dengue virus infection has been classified into dengue fever (DF), dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS). The revised WHO classification of 2009 categorizes dengue patients according to different levels of severity as dengue without warning signs, dengue with warning signs (abdominal pain, persistent vomiting, fluid accumulation, mucosal bleeding, lethargy, liver enlargement, increasing haematocrit with decreasing platelets) and severe dengue.[2] In 2019, there was 1,36,422 no. of dengue cases.[3] COVID 19 coinciding with the peak of the dengue season – during the rainy seasons is the recent yet significant outbreak in the country.[4] As of September 2020, there are 7236995 of COVID 19 confirmed cases in India, with 110617 deaths[5]. Surveillance for dengue fever in India is conducted through a network of more than 600 sentinel hospitals under the National Vector Borne Disease Control Program (NVBDCP)[6], Integrated Disease Surveillance Program (IDSP)[7] and a network of 52 Virus Research and Diagnostic Laboratories (VRDL) established by Department of Health Research[8]

The similarity of symptoms between COVID 19 and Dengue often led to confounding diagnosis, with both infections presenting with high fever, bodyache, headache and cold like symptoms. Similarly, routine blood test for preliminary screening often show similar patterns , with the characteristic thrombocytopenia in dengue and newly disseminated serological test kit to rapidly diagnosis COVID 19, but even on this front, there

seems to be a serological overlap between the two diseases. This case aim to show how COVID 19 patients often present with dengue like symptoms and initially show false positive dengue serology results. A case of Dengue and COVID 19 coinfection is also shown, showing the real possibility of coinfection in dengue endemic countries, and the important of utilizing the most appropriate serological test according to the course of the disease.

Case Report

A 58 years old female patient presented with main complaint of high fever for five days and sore throat. There was no complaints of cough, shortness of breath or nasal congestion. She had no history of travel or any contact with COVID positive patients. No past history of any co morbidity. Initial physical examination revealed fever and positive tourniquet test (21 petechiae per square inch). Heart rate, Sp02, blood pressure and ECG were normal.

The onset of symptoms occurred on 10th September, with fever (39.8°C), asthenia, anorexia, and headache. After 5 days she tested positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections by reverse transcription (RT)-PCR, the causative virus of COVID-19.

An itchy erythema rash appeared on her left ankle. She came to the hospital for persistent fever (38.7°C), arthromyalgia, dyspnea (respiratory rate of 24 breaths per minute), and itchy maculopapular rash with dengue antigen report Negative hospitalized the same day in our COVID-19 Hospital for further management and evaluation.

The physical examination revealed a body temperature of 39.8°C, blood pressure of 110/70 mmHg, pulse of 104 beats per minute, and oxygen saturation of 94% at room air. She had sore throat since 5 days and no chest pain. Chest auscultation was normal. She had no hematuria. She described retro-orbital eye pain, with anorexia, nausea, and vomiting. There was no mucosal involvement, as well as hand and feet not affected. The itching had stopped, and there was no scratching lesion. At admission, she had no thrombocytopenia (platelet count 230 × 109/mL), No leucopenia (6.3 × 109/mL), lymphopenia (1.6 × 109/mL), and No neutropenia (7.6 × 109/mL). Neutrophil to lymphocyte ratio 4.75.Liver function test were subnormal (aspartate aminotransferase 72 U/L and alanine aminotransferase 65 U/L). C-reactive protein was normal (4.7 mg/L). Serotype 1 dengue was confirmed by positive serology (immunoglobulin M IgM) on day 6 after the onset of symptoms. The chest xray performed at admission was normal.

Pateint received covid19 treatment in the form of Ivermectin, Doxycyline, Amoxicillin clavulanic acid, Tab Pantoprazole, Tab Vit c, Tab Zincovit, injection Clexane subcutanoesly 0.6 mg once daily. subsequent labs were normal along with clinical course of the disease. There was no bleeding manifestation along with any dengue related complications. Patient successfully discharged after 10 days of supportive care and management.

Discussion

Misdiagnosis between Dengue and Covid- 19

Many of the cases are having mild to moderate symptoms. Few of the patients report with complaints of fever, cough, muscle aches, or fatigue with normal chest radiography, resembling other viral infections, thereby making it difficult for physicians to differentiate Covid- 19 from dengue, which leads to primary examination misdiagnosis.[9,10] Further, clinical manifestations on the skin, such as rashes and petechiae, have been reported in Covid- 19 patients,[11] which are also commonly found in dengue.[12] Misdiagnosis between Covid- 19 and dengue based on clinical presentation was also reported in Thailand, where patients presented with petechiae and thrombocytopenia, were diagnosed as dengue but were later diagnosed with Covid- 19 after developing respiratory symptoms and undergoing

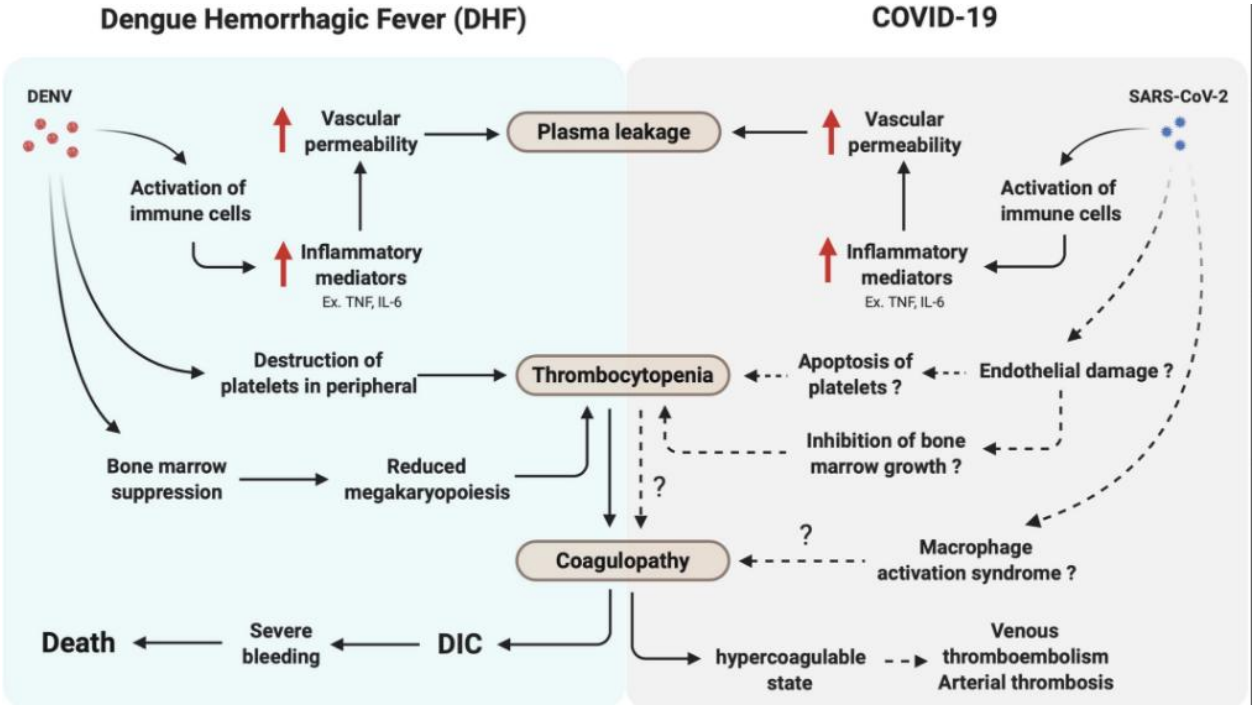
reverse transcription polymerase chain reaction (RT- PCR) testing.[12, 13]

Beyond the similar clinical manifestations of Covid- 19 and dengue, misdiagnosis may be due to serological cross- reactivity between SARS- CoV- 2 and DENV. It was hypothesized that patients with previous exposure to DENV possess anti- DENV antibodies that are cross- reactive with SARS- CoV- 2 antigens.[9] Alternatively, there may be antigenic similarities between SARS- CoV- 2 and DENV, such that upon SARS- CoV- 2 infection, the body is triggered to generate anti- DENV antibodies derived from memory B cells.[9] These possibilities might have caused the false- positive phenomena in rapid dengue serology tests.

Misdiagnosis due to serology cross- reactivity between Covid- 19 and dengue was first reported in Singapore where patients were initially confirmed to have dengue through dengue IgM and IgG rapid serological testing, but were later found to be positive for Covid- 19 using RT- PCR testing.[14] The wide range of Covid- 19 clinical symptoms and lack of a specific and affordable test to differentiate Covid- 19 and dengue have led to serious impacts on community health in the dengue- endemic countries.

Shared pathophysiology between Covid- 19 and dengue

Covid- 19 and dengue exhibit some pathophysiological similarities, such as capillary leakage, thrombocytopenia, and coagulopathy (Figure 1).[15]



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 induce the activation of immune cells leading to the release of pro- inflammatory cytokines such as TNF and IL- 6. This event promotes increased vascular permeability that leads to plasma leakage. In DHF cases, the destruction of platelets in the peripheral region by DENV has been suggested as the cause of thrombocytopenia which in the end culminates as coagulopathy, disseminated intravascular coagulation, and in some cases, resulting in the death. While thrombocytopenia was also evident in Covid- 19 patients, pathophysiological mechanisms on how such event has occurred remain to be elucidated. Current data indicating

that endothelial damage coupled with platelet apoptosis and impaired bone marrow growth might be the drivers of thrombocytopenia and coagulopathy in SARS- CoV- 2- infected patients. The sequential pathophysiological process leads to the occurrence of DIC and the death of Covid- 19 patients remains to be demonstrated.

Further Perspective

As dengue- endemic region, some countries in Asia experiencing of overlapping outbreaks of dengue and Covid- 19. This poses a challenge for accurate diagnosis and treatment since both infections share similar symptoms and laboratory features in the early phase. Special emphasis on mosquito control programs, awareness related to dengue illness prevention is must in endemic countries. In addition, cross- reactivity between antibodies against DENV and SARS- CoV- 2 serology tests have been documented in reports. Therefore, a simple and affordable rapid test capable of differentiating SARS- CoV- 2 and DENV with high sensitivity, is urgently needed. In addition, there is an urgent need to establish additional laboratories to perform specific RT- PCR testing for SARS- CoV- 2 in the region.[16]

References

1. Halstead SB, Dengue, Lancet 2007;370 (9559):1644-52
2. Ganeshkumar P, Murhekar MV, Poornima V, Saravanakumar V, Sukumaran K, Anandaselvasankar A, John D, Mehendale SM. Dengue infection in India: A systematic review and meta-analysis. PLoS neglected tropical diseases. 2018 Jul 16;12(7):e0006618.
3. Epidemiology of dengue hemorrhagic fever in India: analysis of five decades data from the National Disease Surveliance. BMC res Notes 2019;12:350
4. Dengue Hemorrhagic fever in India .SE Asian Trop Med 1987:18(3):269-74
5. COVID 19: Ministry of health republic of India;2020
6. National Vectorborne Disease Control Program, Directorate General of Health Services. http://nvbdcp.gov.in/DENGU1.html
7. National Centre for Disease Control, Directorate General of Health Services. Integrated Disease Surveillance Program: Diseases under surveillance. http://www.idsp.nic.in/showfile.php?lid=3923
8. Department of Health Research, Govt of India. Establishment of a network of Laboratories for managing epidemics and Natural Calamities (VRDL) http://dhr.gov.in/schemes/establishment-network-laboratories-managing-epidemics-and-natural-calamities
9. Biswas S, Sukla S. COVID-19 infection and transmission are observably less in highly Dengue-endemic countries.
10. Huang Y, Tu M, Wang S, Chen S, Zhou W, Chen D, Zhou L, Wang M, Zhao Y, Zeng W, Huang Q. Clinical characteristics of laboratory confirmed positive cases of SARS-CoV-2 infection in Wuhan, China: A retrospective single center analysis. Travel medicine and infectious disease. 2020 Feb 27.
11. Criado PR, Pagliari C, Carneiro FR, Quaresma JA. Lessons from dermatology about inflammatory responses in Covid- 19. Reviews in medical virology. 2020 Sep;30(5):e2130.
12. Joob B, Wiwanitkit V. COVID-19 can present with a rash and be mistaken for Dengue. Journal of the American Academy of Dermatology. 2020 May;82(5):e177.
13. Joob B, Wiwanitkit V. COVID-19 in medical personnel: observation from Thailand. Journal of Hospital Infection. 2020 Apr 1;104(4):453.

14. Yan G, Lee CK, Lam LT, Yan B, Chua YX, Lim AY, Phang KF, Kew GS, Teng H, Ngai CH, Lin L. Covert COVID-19 and false-positive dengue serology in Singapore. The Lancet Infectious Diseases. 2020 May 1;20(5):536.
15. Lorenz C, Azevedo TS, Chiaravalloti-Neto F. COVID-19 and dengue fever: A dangerous combination for the health system in Brazil. Travel Medicine and Infectious Disease. 2020 Apr 9.
16. Harapan H, Ryan M, Yohan B, Abidin RS, Nainu F, Rakib A, Jahan I, Emran TB, Ullah I, Panta K, Dhama K. Covid- 19 and dengue: Double punches for dengue- endemic countries in Asia. Reviews in Medical Virology.:e2161.