



Coinfection of COVID-19 and dengue: a case report

Fx. Wikan Indrarto*

Panti Rapih Hospitals, Yogyakarta/Medical Faculty of Medicine, Universitas Kristen Duta Wacana, Yogyakarta, Indonesia

ABSTRACT

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Dengue hemorrhagic fever (DHF) and corona virus disease 2019 (COVID-19) are two viral infectious diseases that can occur simultaneously and have the potential to complicate each other. Therefore, sustained attention to this phenomenon is required. A 9 y.o. boy was diagnosed with dengue and COVID-19 at the Panti Rapih Hospital in Yogyakarta, Indonesia, in the early phase of the COVID-19 pandemic. Both viral infectious diseases have distinctive clinical and laboratory features. Acute fever, vomiting, weakness, thrombocytopenia, and hemoconcentration that improve from day 5 after infection are typical symptoms of DHF in children. Complaints of fever, runny nose, cough, and pain when swallowing that usually occurs in COVID-19 also appeared. Medical investigations with serological tests for DHF and COVID-19 at the beginning of the COVID-19 pandemic can be used to diagnose these two infections because standard diagnostic tools using the PCR swab test cannot yet be performed. Symptomatic therapy for moderate degrees of these two viral infections is appropriate.

ABSTRAK

Demam berdarah dengue (DBD) dan *corona virus disease* 2019 (COVID-19) merupakan dua infeksi virus yang dapat terjadi secara bersamaan dan berpotensi saling menyulitkan. Oleh karena itu diperlukan kewaspadaan akan fenomena ini. Seorang anak laki-laki berusia 9 tahun didiagnosis dengan DBD dan COVID-19 di RS Panti Rapih Yogyakarta, Indonesia, pada tahap awal pandemic COVID-19. Kedua penyakit infeksi virus tersebut memiliki gambaran klinis dan laboratoris yang khas. Demam akut, muntah, lemah, trombositopeni dan hemokonsentrasi yang membaik mulai hari ke 5, adalah khas untuk DBD pada anak. Keluhan demam, pilek, batuk dan nyeri telan pada COVID-19 juga muncul. Pemeriksaan penunjang medik dengan uji serologi untuk DBD dan COVID-19 pada awal pandemi COVID-19, dapat digunakan untuk penegakan diagnosis kedua infeksi ini, karena parasat diagnosis baku menggunakan uji usap PCR belum dapat dilakukan. Terapi simptomatis untuk derajat sedang kedua penyakit infeksi virus ini adalah memadai.

Keywords:

Dengue hemorrhagic fever;
COVID-19;
clinical picture;
laboratory results;
coinfection

INTRODUCTION

Dengue fever (DF) is a mosquito-borne disease caused by the dengue virus that belong to the Flaviviridae and present with symptoms of fever,

nausea, headaches, myalgia, skin rashes, retro-orbital pains, and arthralgia. The severe form of DF also called dengue hemorrhagic fever (DHF) can cause serious bleeding, shock, and death.¹ Corona virus disease 2019 (COVID-19)

*corresponding author: wikan_indrarto@staff.ukdw.ac.id

is caused by a beta coronavirus called severe acute respiratory syndrome coronavirus (SARS-CoV-2) which mainly affects the lower respiratory tract and causes pneumonia in patients.²

Even though the pathophysiology of the two infections is different, DHF and COVID-19 share clinical symptoms and laboratory features. Thrombocytopenia and platelet dysfunction commonly occur in the both infections and are related to clinical outcomes. Coagulation and fibrinolytic pathways are activated during an acute dengue infection, and endothelial dysfunction is observed in DHF. On the other hand, COVID-19 is characterized by a high prevalence of thrombotic complications, where bleeding is rare and occurs only in advanced stages of critical illness; here thrombin is the central mediator that activates endothelial cells, and elicits a pro-inflammatory reaction followed by platelet aggregation.^{3,4}

Some cases of coinfection by dengue and SAR-CoV-2 have been reported especially in the dengue-endemic regions.³⁻⁶ This coinfection would undoubtedly be a dangerous combination disease if not managed cautiously. The physicians and health authorities should make decision accordingly to prevent the coinfection develops into ecoepidemic. In this case report a 9 y.o. boy diagnosed with coinfection of dengue and COVID-19 was presented.

CASE

On Wednesday, February 3rd, 2020, at 11.42 AM, a 9-year-old boy came to the emergency room at the Panti Rapih Hospital, Yogyakarta, Indonesia complaining of fever on the 4th day, redness on the skin, dizziness, and little nausea. On the examination found Compos Mentis consciousness, blood pressure of 95/83 mmHg, temperature of 38.90 °C, pulse rate of 140x /min, respiratory rate of 20x/min, pain scale of 1, body weight of 65 kg, and blood glucose level of 113 mg/dL. The physical examination found the head: anemia conjunctiva - / -, chest: C/S1-2 regular, pulmo: no basal wet crackles, stomach: supple, BU (+) N, examination: warm, strong pulse, petechiae (+). Managed by working diagnosis: febrile observation day-4 thrombocytopenia suspect DF dd DHF, by infusion, routine blood checks, Ro thorax RLD, IgM/G dengue, rapid COVID-19 antibodies.

On routine blood tests, HB: 15.4 g/dL (H), HCT: 44.7 g/dL (H), leukocytes: 4,300 x 10⁹/L, neutrophils: 42.2% (L), lymphocytes: 45.5% (H), monocytes: 11.6% (H), platelets: 87,000 x 10⁶ L (L). On the RLD photo, there was no connection in the hemithorax, the right and left sinuses, and both diaphragms were good. By impression: no pleural effusion was observed (FIGURE 1).



FIGURE 1. Chest X-ray

In the examination of dengue IgG (+), IgM dengue (-) with the immunochromatography (ICT) method, anti SARS CoV2 IgG (-) : 0.19 (<10U/mL), anti SARS CoV2 IgM (+): 1, 08 (<1) cut off index (COI) with the chemiluminescence immunoassay (CLIA) method.

Furthermore, the patient was managed in the particular ward for COVID-19 patients, while waiting for the results of the gold diagnostic test, the COVID-19 RTPCR nasopharyngeal swab. The Ringer's lactate solution infusion (RL) 120 cc /H, paracetamol 3 x 1 tablet in case of fever, vitamin C, 3 x 250 mg tablet, paracetamol 500 injection mg in the occurrence of high fever, and oral omeprazole 2 x 20 mg in the occurrence of abdominal pain were administered to the patient in the nursing ward.⁷

Fever, dizziness, vomiting, diarrhea, and weakness were found in this patient as the clinical symptoms of COVID-19 and DHF. Meanwhile, the patient was inexperienced with cough, runny nose, sore throat, tongue losing taste, nose losing smell, and nose bleeding. Improvement in fever, dizziness, vomiting, diarrhea, and weakness were found during observation in the ward.

The redness of the skin on the arm where the blood sample was taken (FIGURE 2) and the legs' rashes (FIGURE 3 and 4) were observed in the patient.

Following increasing in the platelet count and decreasing in the hematocrit, the patient's condition was improved. The red patchy rash on the legs and arms (FIGURE 3a and 3b) which is known as convalescence rash also were observed during the recovery phase. The presence of this rash indicated that the dengue infection was resolved.



FIGURE 2. Hematoma on the left arm



A



B

FIGURE 3. Convalescence rash of the left leg (A) and the right leg (B)

The results of daily platelet monitoring (FIGURE 4) showed that severe thrombocytopenia reached a low point of 11,000 on day 5 of fever and increased when conditions improved

before discharge to 146,000/mm³. There was also a decreasing process in hemoconcentration (FIGURE 5) from 44.7% on the 4th day of fever to 35.9%.

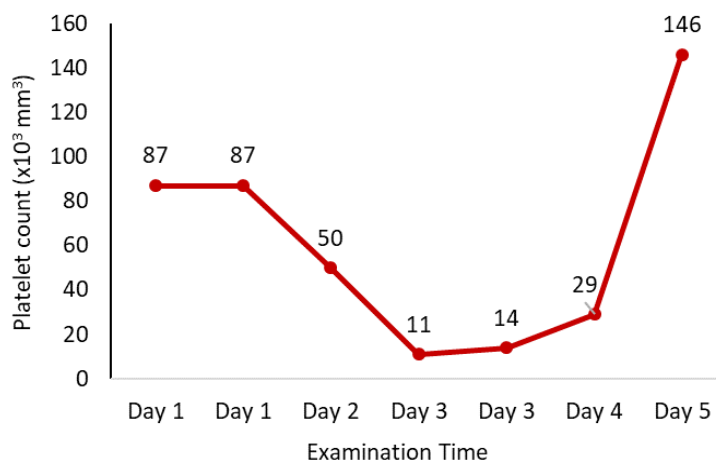


FIGURE 4. An improvement of platelet count during monitoring for 5 days examination

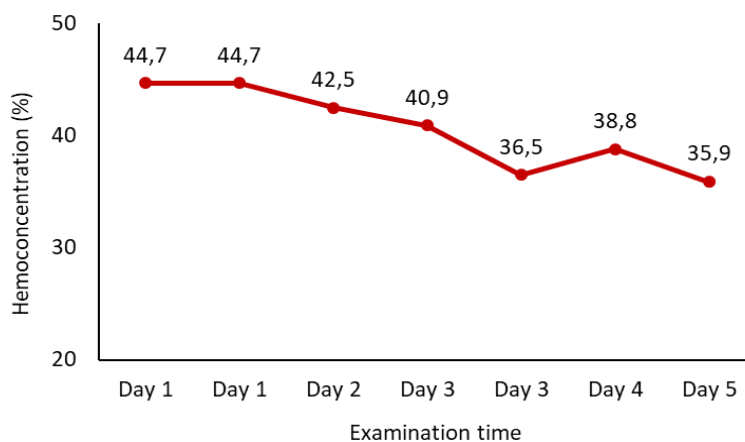


FIGURE 5. Hemoconcentration during monitoring from 44.7 to 35.9%.

On the 4th day of treatment, nasopharyngeal RT-qPCR swab examination results showed a positive result for 2019-nCoV twice. In this patient, NS1-Ag and RT-qPCR were not performed to detect DENV serotype (DENV), because the facilities were not available. The chest radiograph performed on the first day was not repeated, as there were no indications that the chest radiograph was required (FIGURE 1).

The patient was hospitalized for six days and discharged on Tuesday, February 9th, 2021. A further self-isolation was conducted in a private home, with the addition of the azithromycin tablet, 1 x 500 mg, for seven days. Three days after the self-isolation, the symptoms get cured. Further, the patient’s parents agreed that their child’s medical condition could be published for scientific purposes.

DISCUSSION

COVID-19 and DHF have a spectrum of diseases with overlapping clinical manifestations.^{7,8} DHF is one of the most common tropical infectious diseases in tropical areas, including Indonesia and Thailand.⁹ The first COVID-19 case was confirmed in China, spread over the countries, and became a national disaster in Indonesia on March 14th, 2020.⁷

On Wednesday, February 3rd, 2021, a 9 y.o. boy was diagnosed with both of them. The patient presented acute fever and nonspecific systemic symptoms, which made it very difficult to distinguish between COVID-19 and other tropical infections. In the early course of the disease, COVID-19 can appear as fever-like, but then chest X-rays usually show abnormalities similar to pneumonia.⁶ Then, this case was eventually detected as mild COVID-19.

A more sensitive chest computed tomography (CT) scan was not carried out to detect pulmonary abnormalities related to COVID-19 in the patient, due to the absence of respiratory symptoms.¹⁰ Leukopenia with lymphopenia is often found in either DHF or COVID-19 patients.¹¹ In this case, progressive leukopenia with relative lymphocytosis and the presence of atypical lymphocytes leads to decreased platelet count, and increased hematocrit. The results of serial laboratory examinations have unique characteristics according to the clinical course of dengue infection,^{8,12} which also occurred in this case, namely improvements in hemoconcentration (FIGURE 4) and thrombocytopenia (FIGURE 5). In this case, historical records of close contact with COVID-19 survivors were not found. Then, only a rapid test serology for COVID-19 was carried out in the early stage.

This case demonstrated the difficulty of distinguishing COVID-19 from DHF in children, because of the non-specific clinical picture, which

leads to a requirement confirmation of the gold standard diagnostic test, the COVID-19 RT PCR nasopharyngeal swab. In addition, some severe symptoms of these two diseases did not occur. However, hemoconcentration, plasma leakage, and severe thrombocytopenia are typical clinical manifestations of severe DHF, which can help differentiate dengue from COVID-19^{8,12} were found in this case. On the other hand, some cases have raised concerns about becoming worse and fatal, due to the combination of COVID-19 infection with dengue.^{13,14} However, to date this report was prepared, there were no fatal patients,^{15,16} including this case.

Laboratory diagnosis for dengue during the COVID-19 pandemic is a challenge. Dengue antibody serologic tests can show false positives in COVID-19 patients and misdiagnose them with DHF.^{17,18} Serological cross-reactivity between DHF and COVID-19 is also possible.¹⁹ Therefore, an RT-PCR COVID-19 swab examination must be carried out to confirm a diagnosis of COVID-19. Checking the serology of DHF and COVID-19 antibodies thoroughly in an isolation room for suspected cases, while waiting for the results of the RT-PCR COVID-19 swab, is the best strategy. However, these may cause cost overburden in public health systems and hospitals in limited-resource tropical countries. The RT-PCR swab examination for SARS-CoV-2 diagnosis and serology DHF for this patient were free because they were guaranteed by the Social Security Agency of Health, and for COVID-19 suspected cases that meet the criteria, the funding is guaranteed by the Indonesian Ministry of Health, as in other countries.¹³

CONCLUSION

During the ongoing COVID-19 pandemic in tropical areas, COVID-19 must be established in a distinct diagnosis

from other children's fevers. To establish a correct diagnosis, understanding the clinical manifestations, exposure history, general initial laboratory results, and progression of the disease, together, is the best strategy. Furthermore, self-isolation for fever patients must be taken seriously to prevent the spreading of infection.

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