



Case Report: Dengue Shock Syndrome with Active Severe Bleeding

Denada Florencia Leona^{1}*

¹Medical Faculty of Universitas Andalas

ABSTRACT

Background. Dengue shock syndrome is the most severe degree of dengue fever that occurs due to increased capillary permeability so that fluid flows from the intravascular to the extravascular, resulting in a decrease in intravascular volume and hypoxemia. Patients with DSS who are treated late, especially those with active bleeding, will eventually cause cell and organ damage and the patient will die within 12-24 hours. The aim of this case report was to learn how to detect early DSS and find out the initial treatment during golden period.

Case Presentation. A 14 year old male patient was admitted to the emergency room with the main complaint of vomiting blood since 10 hours before entering the hospital. The patient was diagnosed with dengue shock syndrome based on the history, physical examination and supporting examinations. The patient had had a high fever for 5 days and never came to see the doctor.

Conclusion. Neglected case of dengue fever could become much severe and life-threatening.

Keywords: Dengue Shock Syndrome, Severe Bleeding, Neglected, Poor Prognosis

BACKGROUND

Dengue virus infection is one of the causes of illness in children and adults in Southeast Asia who need to receive hospital treatment.¹ Dengue virus infection in humans results in a spectrum of clinical manifestations that vary between the mildest disease (mild undifferentiated febrile illness), dengue fever (DF), dengue hemorrhagic fever (DHF) to dengue hemorrhagic fever accompanied by shock (dengue shock syndrome). The description of these varied clinical manifestations shows an iceberg phenomenon visible above sea level, while mild cases of dengue (silent dengue infection and dengue fever) are the basis.

The pathognomonic sign between dengue fever and dengue hemorrhagic fever is increased blood capillary permeability which causes leakage from the intravascular to the extravascular compartment. In severe DHF plasma loss is significant, the patient becomes hypovolemic, shows signs of circulatory compromise, and may go into shock. Dengue hemorrhagic fever has a 5% chance of causing death, but if it develops into dengue shock syndrome it will increase mortality to 40%.

Dengue shock syndrome (DSS) is one of the emergencies in the field of infection. A problem that has developed in Indonesia recently is the tendency for patients suffering from dengue fever to fall into a more severe condition, namely dengue fever shock syndrome. Various factors contribute to the occurrence of dengue fever syndrome, namely genetic factors, host resistance, virulence of the dengue fever virus, intensity of infection, the *Aedes aegypti* vector, environmental conditions that are still friendly to vectors and management that still needs to be optimized.²

Treatment for DSS is resuscitation with parenteral administration of fluids, with the aim of restoring and maintaining fluid requirements during periods of increased brain permeability. Special care is required to avoid fluid overload with all its complications. If fluid resuscitation is initiated at an early stage, shock is usually reversible, and once the problem of plasma leakage is resolved, the patient can recover well. The WHO recommendation is initial volume replacement with crystalloid fluids followed by plasma or colloids in patients with shock.³

The increase in the number of cases and the increase in infected areas is due to better transportation facilities for the population, the existence of new settlements, low public behavior towards cleaning mosquito nests, the presence of mosquito vectors in almost all corners of the country and the presence of four types of virus cells that circulate throughout the year. The health department has tried various strategies to deal with this case. Initially the strategy used was to eradicate adult mosquitoes through fumigation, then a blanket strategy using larvicide which was sprinkled in air-protecting areas that were difficult to clean. However, these two methods have not yet shown satisfactory results. The focus of efforts to eradicate dengue fever vectors by the community is by carrying out the eradication of mosquito nests.⁴ The aim of this case report was to learn how to detect early DSS and find out the initial treatment during golden period.

CASE PRESENTATION

A 14 year old male patient was admitted to the emergency room with the main complaint of vomiting blood since 10 hours before entering the hospital. The patient was diagnosed with dengue shock syndrome based on the history, physical examination and supporting examinations. Based on the history, physical examination and laboratory results, the patient was suspected of suffering from Dengue Hemorrhagic Fever (DHF) grade IV, also known as dengue shock syndrome.

Anamnesis revealed that the patient had had a high fever for 5 days, continuously, no chills, and no sweating profusely, accompanied by vomiting of blood since 10 hours before entering the hospital. The patients also had black stools, nosebleeds, paleness, joint pain and headaches. On physical examination, we found tachycardia, tachypnea, hypotension and high body temperature. In addition, the patient's acral was also found to be cold.

In laboratory examinations, severe anemia, leukocytosis, and thrombocytopenia were found. Besides, PT and APTT were found exceed the reference values. Furthermore, the patient was also planned to undergo anti-dengue IgG and IgM examinations, which are the gold standard examinations for DHF. Based on World Health Organization (WHO) criteria, the diagnosis of DHF can be made if there is high or continuous fever for 2-7 days, spontaneous bleeding or a positive tourniquet test, thrombocytopenia ($\leq 100,000/\text{ul}$), hemoconcentration or signs of plasma leakage (pleural effusion, ascites). (5,6) This patient has been diagnosed with Dengue Shock Syndrome.

DISCUSSION

WHO divides dengue fever into four levels. The patient is said to be classified as suffering from grade I dengue fever if there is fever and constitutional symptoms, the torsion test is positive, grade II dengue fever if there are symptoms such as Grade 1 accompanied by spontaneous bleeding (on the skin or other bleeding), Grade III if circulatory failure has occurred, pulse pressure $< 20\text{mmHg}$ with normal Systolic pressure, and Grade IV if there is deep shock, hypotension or undetectable blood pressure. DHF Grades III and IV are dengue fever shock syndrome. Meanwhile, to differentiate someone suffering from DHF or Dengue Fever is the presence of thrombocytopenia and hemoconcentration. In this patient there are signs and symptoms of grade IV DHF or also known as Dengue Shock Syndrome.^{5,6}

The history, physical examination and supporting examinations in this patient are consistent with the pathogenesis of DSS, namely after the patient was infected with the dengue fever virus, then there was secretion of vasoactive mediators which then caused an increase in blood vessel permeability, resulting in a hypovolemic state and shock. As a result of secondary infection by different types of dengue virus in each patient, an anamnestic antibody response that will occur within several days results in proliferation and transformation of lymphocytes by producing high titers of anti-dengue IgG antibodies.³ Complement activation system and platelet aggregation which causes the formation of Platelets with abnormal function play a role in causing increased blood vessel permeability, extravasation of fluid from intravascular to extravascular, abnormal coagulation which can end in a state of shock.

The appearance of shock in this patient is in accordance with the process of shock in DHF which usually occurs during or immediately after the temperature drops, between day 3 to day 7 of illness caused by increased vascular permeability resulting in plasma leakage, serous fluid effusion into the pleural cavity and peritoneum, hypoproteinemia, hemoconcentration and hypovolemia which result in reduced venous return, myocardial preload, stroke volume and cardiac output resulting in circulatory dysfunction and decreased organ perfusion.^{1,2}

In the early phase of dengue shock syndrome, the function of vital organs is maintained from hypovolemia by the homeostatic system in the form of tachycardia, vasoconstriction, strengthening of myocardial contractility, tachypnea, hyperpnea and hyperventilation. Peripheral vasoconstriction reduces non-essential perfusion in the skin causing cyanosis, decreased body surface temperature and prolongation of capillary refill time (>2 seconds). The difference between skin temperature and body temperature of $>2\text{C}$ indicates that the homeostasis mechanism is still intact. In the stage of compensated dengue shock syndrome, cardiac output and blood pressure return to normal.⁷

The initial treatment for this patient is oxygen administration. Hypoxemia must be prevented and corrected. Then create venous access and take blood samples for blood gas analysis, hemoglobin levels, hematocrit, platelet count, blood type, and crossmatch, urea, creatinine, electrolytes Na, K, Cl, Ca, Mg, and lactic acid. Then install a urinary catheter and carry out urine collection, urinalysis and measurement of urine specific gravity. The amount of diuresis is calculated every hour (normal 2-3 ml/kgBW/hour). If the diuresis is less than 1 ml/kgBW/hour then there is renal hypoperfusion. Insertion of an oro/nasogastric tube in critically ill children is useful for decompression, monitoring gastrointestinal bleeding and performing gastric lavage with physiologic saline.⁸

To treat shock, give isotonic crystalloid fluid intravenously at a dose of 5-10 ml/kgBW/hour, finished in 1 hour. Then check vital signs, capillary refill time, hematocrit, and urine production. If the patient's condition improves, the crystalloid fluid is reduced slowly. Reduce 5-7 ml/kgBB/hour within 1-2 hours. Then 3-5 ml/kgBB/hour within 2-4 hours. 2-3 ml/kgBB/hour within 2-4 hours. If the condition continues to improve, fluids can continue to be reduced. If the patient's condition does not improve, where vital signs remain unstable, check the hematocrit after administering the first bolus.⁹

If the hematocrit increases or remains high ($\geq 50\%$), give a second crystalloid bolus at a dose of 10-20 ml/kgBW/hour in 1 hour. If after giving this second fluid there is improvement, reduce the dose of crystalloid fluid to 7-10 ml/kgBW/hour within 1-2 hours, and continue to reduce the dose as explained above. If the hematocrit value decreases from the initial hematocrit value ($< 40\%$ in children and adult women, $< 45\%$ in adult men), this indicates bleeding, do a cross match, and require immediate blood transfusion. Next, a bolus of crystalloid or colloid solution may need to be given over the next 24-48 hours. After the shock resolved, IVFD RL 4 hours/kolf three way was given.^{9,10}

Due to gastrointestinal bleeding, the patient was then placed on an NGT and fasted for 8 hours. To overcome plasma leakage the patient was given FimaHes 12 hours/kolf, bolus of 80 mg prosogan, continued drip of 80 mg prosogan which contains Lansoprazole as a proton pump inhibitor class of drug which works to protect gastrointestinal tract and helps the process of platelet aggregation in the gastrointestinal tract. Transamine 3 x 1 ampoule, and Vitamin K 3 x 1 mg were given to stop and prevent recurrent bleeding. The patient was also given Paracetamol 4 x 500 mg to treat fever.¹¹

This patient's prognosis for *quo ada sanationam, quo ad Vitam, quo ad functionam* is *ubia et bonam*. This patient came in shock due to the DHF he was suffering from, but if treated quickly and appropriately, the shock could be resolved. If DSS is treated quickly and completely, it can recover completely without disrupting the function of the body's organs after recovery. Prognosis depends on recognition, prompt appropriate treatment and close monitoring of shock. Signs of a good prognosis are improvement in tachycardia, tachypnea and consciousness, the appearance of diuresis and return of appetite. (8) Dengue hemorrhagic fever has a 5% chance of causing death, but if it develops into dengue shock syndrome it will increase mortality to 40%.^{7,12,13}

Conclusion

Dengue shock syndrome will progress with failure of homeostatic mechanisms. Prognosis is poor in disseminated intravascular coagulation and dengue shock syndrome with repeated or prolonged shocks. This patient showed symptoms of DSS with active bleeding possibly due to delays in hospital admission (due to self-treatment only), so there was not control of the patient's fluid and platelet levels. Properly treated DSS within 12-24 hours will increase the chances of improvement.

Conflict of Interest

No potential conflict of interest relevant to this article was reported

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