ABSTRAK


Kata kunci: sindroma syok dengue, karakteristik, anak

Clinical characteristics and outcome of pediatric patients with dengue shock syndrome at Sanglah hospital in 2014

ABSTRACT

Dengue shock syndrome (DSS) represents severe clinical manifestation of dengue virus infection. Morbidity and mortality still high because dengue virus infection is endemic in Indonesia. Despite its high morbidity and mortality there still no study describing the clinical manifestation and outcome of DSS in Sanglah hospital. Objective of this study was to describe clinical characteristics and outcome of pediatric patients with DSS at Sanglah hospital in 2014. This study was a retrospective study performed at Sanglah hospital. Subjects were pediatric patients with DSS that diagnosed and treated from January 2014 until December 2014. Total samples were 88 patients with DSS and 9 (10%) died. We found 14 patients (15%) that admitted to hospital without any sign of shock but then progress to DSS. Forty-one (47%) patients were assessed as compensated shock and 34 (39%) as decompensated shock. Dengue shock syndrome patients mostly had secondary dengue infection (96%). The prevalence of DSS at Sanglah hospital in 2014 is 88/279 (31,5%). Presentation of shock occurred mostly in fever day 4 and 5. Dengue shock syndrome more likely occurred in secondary dengue infection. The mortality rate was still high, 9/88 (10%).

Keywords: dengue shock syndrome, characteristics, pediatric

BACKGROUND

Dengue is the most important mosquito-borne viral disease affecting humans. Dengue is a disease caused by the dengue virus (a RNA virus), and there are four serotypes (DEN 1-4), classified by Albert Sabin in 1944. The natural host of this virus is a human and the agent is dengue virus belonging to the family and genus Flaviridae flavivirus. This virus transmission to humans through the bite of infected mosquitoes, particularly Aedes aegypti and Aedes albopictus that endemic in almost all corners of Indonesia.1-4

Dengue is a disease that is found in most tropical and subtropical regions, especially southeast
Asia, Central America, USA, and the Caribbean. Currently about 100 million clinically apparent cases are estimated to occur each year;² resulting in approximately 20,000 deaths.³ Dengue hemorrhagic fever (DHF) is still an issue and concern in the international community. Data from around the world suggests Asia ranks first in the number of patients with dengue each year. Meanwhile, starting from 1968 until 2009, the World Health Organization (WHO) noted that the state of Indonesia as the country with the highest dengue cases in Southeast Asia.¹,³

Infection with any serotype can cause a broad range of disease manifestations, from inapparent infection to severe and fatal disease.⁴ The most notable complication is an unexplained vasculopathy that manifests as a transient increase in vascular permeability resulting in leakage of plasma from the circulation. Substantial plasma losses may occur, leading to the potentially fatal dengue shock syndrome (DSS). Although adults do experience shock, vascular leakage is generally more severe in young children,⁵ and in endemic areas like Indonesia DSS is seen primarily in the pediatric population. Thrombocytopenia and coagulation derangements also occur, and a variety of bleeding manifestations ranging from minor skin petechiae to major mucosal bleeding may be seen.

Despite the increasing burden of dengue globally, only a few small retrospective reports have described the clinical characteristics and outcomes of DSS.⁸,¹⁰,¹¹ There still no study describing the clinical manifestation and outcome of DSS in Sanglah hospital. We performed a retrospective descriptive study aiming to enroll all children presenting with DSS from January 2014 to December 2014.

METHODS

At Sanglah hospital, children aged <12 years with DSS are managed on the pediatric intensive care unit (PICU). We commenced a cross-sectional retrospective study in which children admitted with clinically diagnosed DSS that is, a history consistent with dengue, with hemodynamic compromise (either narrowing of the pulse pressure or cold extremities, with evidence of impaired perfusion) thought by the treating clinician to be due to vascular leakage and to require volume resuscitation were eligible to participate. Patients transferred from other facilities for tertiary care after initial resuscitation was included. The Sanglah Hospital Ethical Committee and Udayana University Research Ethics Committee approved this study.

Study participants were recruited based on consecutive sampling. In this study we calculated the minimal sample were 52 samples. From January to December 2014, 279 patients were admitted because of dengue infection. Eighty-eight patients were diagnosed as DSS and included to this study. Demographic characteristics, clinical history, and examination findings were collected from medical record together with detailed information required. Disease classification was performed using the WHO 1997 and 2009 criteria.⁴,¹² A positive dengue-specific IgG on or before day 7 of illness defined a secondary infection, whereas negative dengue-specific IgG results, were required to define a primary infection.

Compensated shock in DSS was defined as circulatory failure with sign and symptom such as tachycardia, weak pulse, narrowing pulse pressure, and cold extremities. The sign and symptom of decompensated shock was hypotension or undetectable blood pressure and unpalpable pulse.

This study was descriptive study. Continuous and categorical variables were summarized as median, frequency and percentage, respectively. All analyses were performed with the statistical software in computer program.

RESULTS

From January 2014 to December 2014, a total of 88 children admitted to Sanglah hospital with DSS. It occurs throughout the year with high incidence began earlier this year and reached the highest peak in May, which found 16 (18%) patients (Figure 1). It was almost the same incidence in both sexes, we get 43 (49%) male patients and 45 (51%) female patients. In most cases we have found that school age range 6-12 years amounted to 59 (67%) patients. At preschool age (1-5 years) we got 28 (32%) patients, only 1 patient with DSS at the age of less than 1 year.

Based on the nutritional status, most patients DSS with well nourished that was 53 (60.2%) patients. Ten (11%) were obese but there are no patients with poor nutritional status. When the patient admitted to hospital, 13 (15%) patients not presents clinical sign of shock but then progress to DSS. Patients who show signs and symptoms of shock include 41 (47%) compensated shock and 34 (39%) uncompensated shock. In this study, we get the onset of shock conditions vary from day 3 to day 6 of fever. Fifty (57%) patients DSS was presented on day 4 of fever.

For NS1 examination was only performed on 3 (3%) patients with overall positive results. 85 (97%) patients were not examined NS1. Serological examination showed IgG anti-dengue positive in 84 (956%) patients, negative 2 (2%)
patients. IgM positive was obtained in 15 (17%) patients. Based on the serological examinations, infections occurred in 84 (96%) cases of DSS was a secondary infection. Demographic information and selected clinical characteristics for all 88 patients with DSS are described in Table 1. For all parameters, no data were missing. The median age was 6 years, varying from age less than 1 year to 12 years. The median day of illness at shock was 4, although 27 patients (31%) overall presented on 5 day of fever.

Patients who came to the hospital with DSS referred from various health centers like hospitals, private hospitals, medical practices and health centers, but mostly direct visits that 75 (85.2%) patients. Antibiotics and blood culture examination was only performed in 9 patients with clinically severe shock. There were 8 culture results sterile and 1 result contaminants. Some complications in the condition of shock that we get among other repetitive shock 8 (9.1%), pleural effusion 4 (4.5%), DIC 4 (4.5%) and MOF 2 (2.3%). 70 (79.5%) patients walking we get complications. Length of stay in patients with DSS varies between 1-9 days with an average length of stay of 3.6 days. During the 1-year study, from 88 patients we treated as DSS, 9 (10.2%) patients died. Almost all patients had an IgG response consistent with secondary infection, although 2 of 88 cases were not tested. Only 2 cases had primary infections, including 1 infant aged 9 months, and 1 child aged 1 year.

### DISCUSSION

This study described the clinical features and outcome of DSS cases in Sanglah Hospital year 2014. With medical records corresponding period of the study we collected consecutively, there were 88 cases of DSS treated. Percentage incidence of DSS on the sex of male and female were similar (48.9% vs. 51.1%). According to data by the Ministry of Health in 2008, the spread of dengue infection in the community does not depend on patient gender.²
Dengue shock syndrome cases occur throughout the year, every month there is at least one patient treated. High incidence in the beginning of the year with a peak incidence in May in which 18% of the patients treated. Incidences began to decline in mid-year and then increased again at the end of the year. Dengue shock syndrome treated patients besides coming directly (85%) but also external referrals from various medical centers such as the district hospital (3%), private hospitals (6%), medical practices (5%) and public health centers (1%).

Dengue infection is most common in pediatric patients under 15 years old. In Sanglah Hospital, pediatric patients were under the age of 12 years. Dengue shock syndrome patients in these study was stratified by age in 3 groups, less than 1 year, 1-5 years (preschool) and 6-12 years (school age). Most cases found in school age with 59 (67%) patients. This indicates a high risk of transmission of dengue infection at school.

We found 60% DSS patients with well-nourished nutritional status based on Waterlow. The results are consistent with previous research by Safitri, et al\textsuperscript{20} which 86.85% well-nourished patients experiencing dengue infection in varying degrees of severity. Most cases of DSS were well nourished but we got worse outcomes in patients with obesity. Of the 9 cases of death in this study, 4 patients were obese and 1 patient overweight.

Patients when admitted to hospital were not always obtained with conditions of shock, 13 (15%) patients came without shock but later occur while being treated. This needs special attention in which patients with a diagnosis of Dengue require close observation. Forty-one (47%) patients came with compensated shock condition and 34 (39%) patients with uncompensated shock. In theory, incidence of dengue shock syndrome is often found in fever day 4-5.\textsuperscript{21} This is consistent with the results of this study; shock was found on fever day 4 (57%) and day 5 (31%).

Investigations were carried out in cases of dengue infection include serological examination NS1 and anti-dengue IgG and IgM. Examination of NS1 was still minimal in enforcing dengue infection. In addition to the price, NS1 test results also do not provide a change in the management. Anti-dengue serology is usually done on illness day 6 to determine infection status and still can be detected until 60-90 days after the onset. This research obtained 96% incidence of DSS was a secondary infection. This is consistent with the theory that the clinical manifestations of dengue infection are more severe in cases of secondary infection.\textsuperscript{22}

Increased permeability commences during the febrile phase, but shock develops only when leakage exceeds the capacity of the homeostatic compensatory mechanisms to maintain adequate plasma volume.\textsuperscript{23,24} potentially compounded by functional cardiac impairment. Although defervescence and shock are often temporally linked, it is important that clinicians managing suspected dengue cases understand that DSS can occur earlier. Identification of more reliable warning signs of likely deterioration would be useful both for individual case management and to facilitate effective use of limited healthcare resources.

The use of antibiotics is not recommended, but 9 cases of severe shock have received antibiotic therapy such as cefotaxime and ceftriaxone. Nine cases of blood culture results obtained 8 sterile and 1 contaminants. Dengue infection is an infectious disease caused by a virus, so antibiotics are not necessary unless there is a secondary infection caused by bacteria. Secondary infections in DSS can occur in the presence of bacterial translocation from the gastrointestinal tract. Improper use of antibiotics can also cause an increase in the cost of treatment and the side effects of antibiotics.\textsuperscript{24}

Length of stay ranged from 1 to 9 days with an average of 3.6 days and median 4 days. This was in accordance with the criteria that the patient can go home for 72 hours after the shock condition is resolved. In this study, there were some complications occur include repetitive shock (9%), pleural effusion (5%), DIC (5%) and MOF (2%). The mortality rate was still high at 9 (10%) of 88 patients.

CONCLUSION

The prevalence of DSS at Sanglah hospital in 2014 was 88/279 (31.5%). The mortality rate was 9/88 (10%). We found 13 patients (15%) that admitted to hospital without any sign of shock but then progress to DSS. Forty-one (47%) patients were assessed as compensated shock and 34 (39%) as decompensated shock. Shock commonly occurred...
in fever day 4 and 5 (57% and 31%) and have tendency to recurrent (9%). The etiology of DSS mostly was secondary dengue infection (96%) based on serology examination. It is important to observe closely the sign and symptom of DSS to prevent worse prognosis. Education to society is very important to raise awareness of DSS.

REFERENCES