



Neonatal Dengue – A Case Report

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ABSTRACT

Introduction: Neonatal dengue is a rare but potentially lethal infectious disease, infected through maternal vertical transmission during pregnancy or via mosquito bites. **Case:** A 3-day-old, 3120-gram female neonate was admitted to the neonatal intensive care unit with fever and jaundice. Her mother was re-admitted for dengue infection 24 hours postpartum. The patient was hemodynamically stable, with no thrombocytopenia, and underwent phototherapy to treat jaundice (total bilirubin 15,7 mg/dL, indirect bilirubin 14,8 mg/dL). Neonatal dengue was diagnosed on the third day of admission since her temperature rose to 38,8°C and the NS1 antigen was reactive. The platelet count dropped from 257,000/mm³ to the lowest count of 15,000/mm³ on the sixth day of admission with the appearance of petechiae on her face, chest, back, and abdomen. No active bleeding was observed. Adequate treatment and close hemodynamic monitoring would lead to better outcomes. **Discussion:** Neonatal dengue is a rare condition that can occur through vertical transmission from the mother or horizontal transmission via mosquito vectors, with diagnosis supported by tests such as the NS1 antigen or RT-PCR. Clinical manifestations in newborns vary widely, ranging from mild fever to severe complications such as thrombocytopenia, shock, and liver dysfunction. **Conclusion:** Neonatal dengue is a potentially lethal infectious disease. Early diagnosis and prompt treatment are needed, especially in endemic regions.

Keywords: Case report, dengue infection, neonatal, thrombocytopenia.

ABSTRAK

Pendahuluan: Dengue neonatal adalah penyakit menular yang jarang terjadi namun berpotensi mematikan, yang ditularkan melalui transmisi vertikal dari ibu selama proses bersalin ataupun gigitan nyamuk. **Kasus:** Seorang bayi perempuan berusia 3 hari dengan berat badan 3.120 gram dirawat di unit perawatan intensif neonatal dengan keluhan demam dan ikterus. Ibu dirawat kembali karena terinfeksi dengue 24 jam post-partum. Pasien dalam keadaan stabil secara hemodinamik, tanpa trombositopenia, dan menjalani fototerapi untuk mengobati ikterus (bilirubin total 15,7 mg/dL, bilirubin tidak langsung 14,8 mg/dL). Diagnosis *neonatal dengue* ditegakkan pada hari ketiga perawatan karena suhu tubuhnya naik menjadi 38,8°C dan hasil NS1 reaktif. Kadar trombosit awal 257.000/mm³, turun hingga 15.000/mm³ pada hari keenam masa rawat inap, diikuti dengan timbulnya petekiae di wajah, dada, punggung, dan perut. Tidak terlihat adanya perdarahan aktif. Pemantauan hemodinamik ketat dan hidrasi adekuat berkontribusi terhadap prognosis yang baik. **Pembahasan:** Dengue neonatal adalah kondisi langka yang dapat terjadi melalui penularan vertikal dari ibu atau penularan horizontal melalui vektor nyamuk, dengan diagnosis didukung oleh tes seperti antigen NS1 atau RT-PCR. Gejala klinis pada bayi baru lahir sangat bervariasi, mulai dari demam ringan hingga komplikasi berat seperti trombositopenia, syok, dan gangguan fungsi hati. **Simpulan:** Dengue neonatal adalah penyakit menular yang berpotensi mematikan. Diperlukan diagnosis dini dan penanganan segera, terutama di daerah endemik. **Lisa Amelia Wijaya, Putu Ayunda Trisnia, I Kadek Suarca. Dengue Neonatal – Laporan Kasus.**

Kata Kunci: Laporan kasus, infeksi dengue, neonatus, trombositopenia.

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INTRODUCTION

Dengue infections have emerged as a significant worldwide health issue over the past two decades. Dengue infection is caused by the Dengue Virus (DENV) from the flavivirus genus of the Flaviviridae family. The incidence of dengue has increased globally in recent years. Unexpectedly, there was a

surge in dengue cases in 2023, resulting in the highest number of cases ever recorded. Over six million dengue cases and more than 7,300 deaths were reported, impacting over 92 countries during 2023, with Asia accounting for 70% of all global cases.^{1,2}

Dengue virus is transmitted by the primary

vector, the *Aedes aegypti* mosquito, and comprises four types of single-stranded RNA viruses: DEN-1, DEN-2, DEN-3, and DEN-4. Besides mosquito-related transmission, maternal-fetal hemodynamic transmission can also lead to neonatal dengue. Breastfeeding transmission also has to be considered, since the dengue virus has

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been detected in the breast milk of a viremic mother. The global incidence of neonatal dengue remained unclear.^{3,4} Even though it is rarely found, neonatal dengue could manifest as a serious and life-threatening disease. Early detection is necessary to ensure prompt and adequate treatment for neonates whose mothers were infected with dengue during the perinatal period.

CASE

A 3-day-old female neonate was admitted due to a high fever since the evening before admission. Her mother, aged 25 years, gravida 2, gave birth through caesarean section at 4041 weeks' gestational age due to premature rupture of membranes > 12 hours, and a history of asthma exacerbation one month before delivery. She received routine antenatal care without comorbidities. She was discharged a day postpartum with the baby, with normal vital signs and physical examination. She was re-admitted by midnight because of a high fever since the evening, approximately 24 hours postpartum. The mother's temperature fluctuated between 39.8°C and 40.8°C, with decreasing thrombocyte levels, reaching the lowest levels of 53,000/mm³ on the sixth day (**Table 1**). She underwent exploratory surgery on the seventh day due to suspected

internal abdominal bleeding, presenting with abdominal pain and moderate anemia (hemoglobin levels 7.6 mg/dL). She received a 200 mL PRC blood transfusion prior to surgery. The exploration surgery, involving the removal of 500 mL of blood clots, proceeded smoothly without any massive bleeding or complications. She was discharged on the 10th day, without any complaints, fever, nor abnormal platelet count, but still exhibited leukocytosis managed with oral medications.

Her baby, 3,120 grams female neonate, was born by cesarean section at a Class C hospital, appropriate for gestational age, with APGAR scores of 8 and 9 at 1 and 5 minutes, respectively. No congenital malformations and physical abnormalities were found. The neonate had already been discharged on the first day after birth with normal vital signs, general appearance, and blood test results. She was re-admitted on the third day because of a fever that started in the evening. The neonate suffered from high fever and icterus on her face and abdomen with a Kramer score of 3–4. On admission, she was hemodynamically stable, and her temperature was 38°C. She was initially diagnosed with neonatal hyperbilirubinemia, as her direct bilirubin was 0,9 mg/dL, she underwent phototherapy for 2 x 24 hours and

received 60 mL formula milk every 3 hours. Intensive monitoring was maintained since her mother was having a dengue infection.

Until two days of admission, no fever was reported. She had her last phototherapy treatment. On the third day of hospitalization, her temperature rose to 38.8°C without warning signs, such as persistent vomiting, hepatomegaly, spontaneous mucosal bleeding, clinical fluid accumulation, or petechiae (**Table 2**). The Kramer score for the jaundice had dropped to 1–2. The NS1 antigen test was reactive. Her platelet counts dropped from 309,000/mm³ at birth to 257,000/mm³ upon admission and 220,000/mm³ on the third day. She was given intravenous antibiotic treatment (150 mg cefotaxime every 12 hours) for clinical neonatal sepsis and fluid therapy (D5 ¼ NS at 8 mL/hour). She also received 60 mL breastmilk every three hours and 40 mg paracetamol drop, if the temperature was above 37.5°C.

She had no fever until the fifth day, with stable vital signs and no warning signs of dengue infection. Petechiae appeared on her face, right chest, back, and lower abdomen on the sixth day. Complete blood count test showed severe thrombocytopenia (platelet

Table 1. The mother daily vital signs and laboratory results during admission.

Mother's Examination	Day of Admission								
	1	2	3	4	5	6	7	8	9
Vital Signs									
Temperature (°C)*	39.8	40.5	40.8	36.4	36.7	36.8	37.5	37	37.3
Blood pressure (mmHg)	110/60	110/70	110/70	110/70	110/70	100/70	100/80	120/82	110/80
Heart rate (bpm)	104	72	82	80	88	82	98	74	82
Respiratory rate (bpm)	20	20	22	22	20	20	20	20	20
Laboratory Results									
NS1 antigen	Reactive								
White blood cell (x10 ³ /mm ³)	5.47	3.35	2.67	2.79	3.67	6.21	8.25	7.36	11.88
Neutrophils (%)	91.3	87.7	83.4	79.8	64.2	69.2	79.4	73.3	87.4
Lymphocytes (%)	4.5	9.1	14.3	17.9	24.0	20.2	16.3	14.5	12.0
Platelet (x10 ³ /mm ³)	233	147	124	79	118	53	103	133	188
Hemoglobin (mg/dL)	10.5	9.3	9.4	10.4	11.4	10.9	8.1	7.6	10.6
Hematocrit (%)	31.2	27.1	28	31	32.2	31.7	24.1	22.5	31.3

*Highest temperature during that day



Table 2. Neonate's daily vital signs during admission.

Vital Signs	Day of Admission					
	1	2	3	4	5	6
Temperature (°C)*	38	36.5	38.8	37.6	36.6	37
HR (bpm)	144	140	140	140	144	136
RR (bpm)	40	40	40	44	40	42

Abbreviations: HR: Heart rate; RR: Respiratory rate.
*The highest temperature during that day

Table 3. Neonate's laboratory results during admission

Laboratory Test	Day of Admission		
	1	3	6
NS1 antigen	NA	Reactive	NA
Total bilirubin (mg/dL)	15.7	5.6	NA
Direct bilirubin (mg/dL)	0.9	0.8	NA
Indirect bilirubin (mg/dL)	14.8	4.8	NA
WBC (x 10 ³ /mm ³)	8.54	5.67	4.26
Neutrophils (%)	53.6	45.4	39.8
Lymphocytes (%)	30.0	15.0	43.5
Platelet (x 10 ³ /mm ³)	257	220	15
Hemoglobin (mg/dL)	17.1	15.6	13.9
Hematocrit (%)	48.6	44.3	40

Abbreviations: NA: Not assessed; WBC: White blood cells.

count 15,000/mm³, white blood cell count at 4,260/mm³, and hematocrit levels at 40% (**Table 3**). Her hemoglobin levels had decreased from 16.6 mg/dL at birth to 13.9 mg/dL on the sixth day. No signs of active bleeding were observed, and urine output was every 3 hours. Neonatal dengue with severe thrombocytopenia was diagnosed, and she was referred to a Class A central general public hospital for further examination and treatment due to limited facilities at the current hospital. At the referral hospital, she was treated with platelet concentrate transfusion, intravenous antibiotics (ampicillin and gentamycin), and paracetamol (only if temperature > 37.5°C). She was discharged on the ninth day of treatment (including three days in the referral hospital) in good condition and with decreased petechiae.

DISCUSSION

Neonatal dengue cases have been reported

in several studies.⁵⁻⁸ It can be acquired or through vertical transmission from maternal dengue, although it is an uncommon transmission mode. Vertical transmission is defined as a positive result of dengue diagnostic tests from either the umbilical cord, placenta, or newborn peripheral blood collected immediately postpartum.^{5,7} Dengue RNA can be detected by the nonstructural protein 1 antigen (NS-1) rapid diagnostic test, which has 99.2% sensitivity and 96.0% specificity starting from day one of the febrile phase to day 10 after onset.⁶

A prospective study by Arragain, et al., (2017)⁵ on DENV-positive mothers who developed fever during 7 days before to 2 days after delivery, showed that 9 out of 10 neonates were affected. The range of disease onset in newborns was from 0 to 8 days after the mother's onset. The studies demonstrated a 90% DENV transmission rate. Three of 4 cord

blood samples and 3 of 3 placentas tested positive for qRT-PCR. Twelve breast milk samples were tested, and 9 samples were positive, even though the culture test was negative for all breast milk samples.⁵

A case series of neonatal dengue was reported by Alen, et al., (2023).⁷ Two cases were vertically transmitted, and three cases were horizontally transmitted. Horizontal transmission is marked as an acquired form of neonatal dengue, which can occur when the same family member got dengue infection and is transmitted by mosquitoes as a vector.⁷ Several manifestations can present in neonatal dengue; the maternal-fetal transmission might not affect the severity of infection.⁸ Kamineni, et al., (2021) reported a case of neonatal dengue with fever developed on the fourth day of life. The mother got dengue infection three days before vaginal delivery. The baby developed mottled skin, feeding intolerance, and poor perfusion, without organomegaly, and received fluid and antibiotic therapy intravenously. Thrombocytopenia was observed with a persistent platelet drop from 198,000 cells/mm³ to 13,000 cells/mm³, and recovery began on the 11th day of life.⁹

Neonatal dengue shock syndrome was described by Subashri, et al., (2023) as capillary leakage, thrombocytopenia, distributive shock, and severe liver failure from birth.¹⁰ Yadav, et al., (2021), described a newborn whose mother had a fever three days before giving birth.¹¹ The neonate tested negative for the NS-1 test during the first 36 hours of life, but developed a new onset of fever at 72 hours of life, with positive NS1 antigen and RT-PCR tests. Clinical manifestations of the baby were generalized erythematous rashes, decompensated shock, severe transaminitis, and severe thrombocytopenia with upper gastrointestinal bleeding. Antibiotic, fluid therapy, and three platelet transfusions were given.¹¹

In this case, the newborn developed new-onset fever spikes on the 3rd day of life, without any thrombocytopenia, but accompanied by neonatal jaundice. Neonatal jaundice was improving with phototherapy. She was afebrile on the second day of treatment, but developed a fever on the



third day of admission. She had reactive NS1 antigen along with decreasing thrombocyte levels, but still within normal limit. This condition is related to the incubation period of the dengue virus during 4 to 10 days, and viremia is usually detected around 6 to 18 hours before the onset of symptoms.¹² Similar to the previous study by Arragain, *et al.*,⁵ this study found that the mother had positive NS1 in 24 hours postpartum. Vertical transmission also might happen in pregnant women with fever approximately during 10 days before delivery to 10 hours after delivery.^{3,8} Since the placenta, cord blood, and breastmilk were not tested for NS1 antigen in this study, vertical transmission, either from mother or breastmilk, still needs to be considered.

Dengue was treated symptomatically with close hemodynamic monitoring.³ The baby was given D5 1/4 NS 4 mL/hour along with 60 mL breast milk every 3 hours to maintain fluid intake between 150 and 200 mL/kg body weight/day.³

Severe dengue symptoms can occur by day

5 when fever subsides, accompanied by platelet counts below 30,000/mm³ or serious bleeding, and thrombocyte transfusion can be considered.³ Her platelet counts dropped to 15,000/mm³ on the sixth day of admission with presentation of petechiae on the face, thorax, and abdomen; she was referred to a central general public hospital for further monitoring and treatment. She got platelet concentrate transfusion, intravenous antibiotics, and symptomatic treatment, and was discharged with healthy condition.

The prognosis of neonatal dengue varies depending on its severity. It can be potentially lethal if underdiagnosed and treated late. Awareness and prompt investigation of neonates born to dengue-infected mothers are required.^{3,13,14}

There were several limitations of the study. The IgM and IgG for either the maternal or neonate were not performed due to limited facilities, whereas these tests could determine the onset of dengue infection and predict the transmission routes.^{13,15} The placenta,

cord blood, and breastmilk were also not tested for NS1 antigen, making it difficult to clearly define possible transmission routes. Limited facilities in the secondary hospital also inhibit the adequacy of treatment, as platelet concentrate was unavailable. Further research, prompt laboratory examinations, and treatment were needed to improve knowledge and awareness about neonatal dengue.

CONCLUSION

Neonatal dengue is a potentially lethal infectious disease. Early diagnosis and prompt treatment are needed, especially in endemic regions. Close hemodynamics monitoring and adequate hydration result in better outcomes.

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