

CASE REPORT**What to Expect in Primigravidae Adolescent Pregnancy with Malaria in Remote Area: A Case Report**

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Abstract

Background: Malaria is an infection transmitted by parasite-infected *Anopheles* mosquito. Pregnancy is one of the risk factors for infection and worse prognosis;

Case: Here we present a case of primigravidae adolescent pregnancy with malaria in a remote area. Patient presented with fever 10 days prior. Laboratory work-up showed microcytic hypochromic anemia, grade III thrombocytopenia, positive *P. falciparum*, and IUFD as disease outcome. The most common malaria-related hematological consequences are anemia and thrombocytopenia. Anemia in malaria is caused by the obligatory destruction of erythrocytes during the acute phase and might be related to bone marrow dyserythropoiesis. Several theories suggest mechanisms of thrombocytopenia in *P. falciparum* malaria such as increased platelet aggregation, bone marrow alteration, microvascular sequestration, and endothelial activation. Intrauterine Fetal Death (IUFD) might be related to microvasculature blockage or inflammation by the infected erythrocyte (IE). Inflammation in the intervillous regions of the placenta results in placental malaria (PM). PM may cause intrauterine growth restriction, premature delivery, and low birth weight, thus increasing newborn mortality;

Conclusion: Malaria in pregnancy has a devastating impact on both mother and fetus. Patient's characteristics and background greatly influence malaria outcomes and treatment continuity. Holistic treatment is recommended to enhance patient prognosis and health-seeking behavior

Keywords: malaria; adolescent pregnancy; primigravidae; remote area; IUFD



INTRODUCTION

Malaria is a blood-borne disease caused by Plasmodium spp., with Plasmodium falciparum (*P. falciparum*), the deadliest species. Pregnant women, particularly first-time mothers, are at high risk of developing severe malaria caused by *P. falciparum*. Long-term childhood exposure to the parasites can cause the development of protective antibodies; however, first-time pregnant mothers are vulnerable again. In 2015, an estimated 438,000 malaria deaths were reported worldwide, with children under the age of five accounting for roughly 69% (306,000). 90% of malaria deaths were reported in Africa, with the remainder occurring in South-East Asia and the Eastern Mediterranean. Malaria poses a significant risk to the pregnant woman and her fetus/newborn. In malaria-endemic areas, it is estimated that at least 25% of pregnant women are infected with malaria, accounting for more than 20% of total maternal deaths.

Malaria is responsible for over 10,000 maternal and 200,000 neonatal deaths each year worldwide. Malaria in pregnancy poses a significant health risk to both the mother and the fetus, resulting in complications such as abortion, stillbirth, intrauterine growth retardation, and low birth weight. The heavy infiltration of Plasmodium falciparum-infected RBCs in the placenta's intervillous spaces appears to be the cause of all complications observed. Infected RBCs in the placenta create an inflammatory environment with an increase in inflammatory cells and cytokines, which harms the placenta. Increased inflammatory responses in the infected placenta led to oxidative stress, which causes placental cell death. We present a case of primigravidae pregnancy with malaria and IUFD as the disease outcome

CASE REPORT

A 16-year-old primigravidae postpartum girl, who lived in Daiama Village, East Rote, was referred to General Hospital of Rote Ndao obstetric-gynaecology department due to continuous fever 10 days prior, accompanied by lethargy, shivering, headache, and bloating. Patient had a vaginal delivery of a stillborn 2 days earlier at home with no health care professionals help. Patient admitted there was no fetal movement since the evening of the delivery day.

On physical examination, the vital signs were normal, with the exception of a tachycardia (104 beats per minute/ bpm). The patient conjunctiva was found to be anaemic. The obstetric status showed fundal height 2 fingers below the umbilicus, positive uterine contraction, positive lochia and plethora production of breast milk. Patient then underwent several tests. Significant findings on complete blood count (CBC) showed anemia (8.6 microcytic (22.4) hypochromic (23.3), and thrombocytopenia (28.000). Plasmodium falciparum was detected using a Giemsa stain on microscopy.

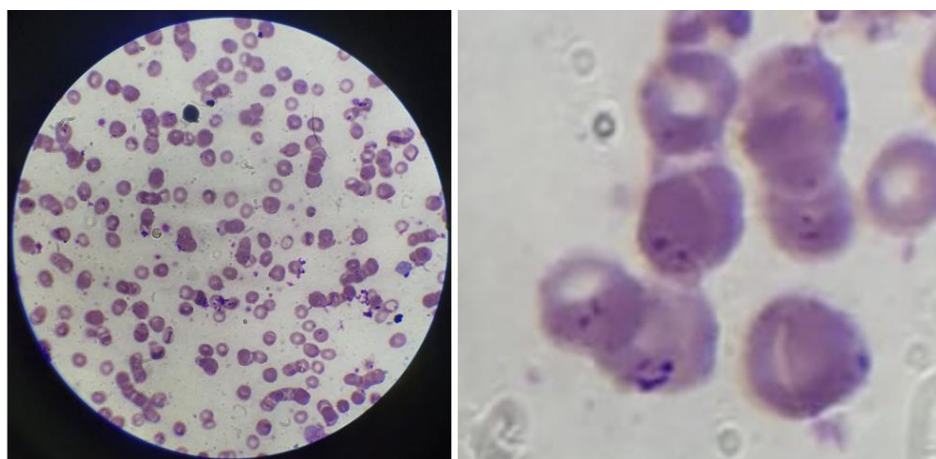


Figure 1. Microscopic appearance of trophozoite phase of *Plasmodium falciparum* in the patient

Patient was treated as an inpatient for 2 days and was administered intravenous infusion of Ringer Lactate, intravenous Ranitidine 2x50 mg, oral paracetamol 3x500 mg, and oral DHP 1x3 tablets, and primaquine 1x1 tablet. A follow-up CBC was taken, showing a significant decrease in haemoglobin to 7.1. Afterward, the patient was allowed to be treated as an outpatient and was given Paracetamol. Patient was supposed to return to the hospital within 3 days after discharge. However, patient did not come neither to the community health center nor the hospital

RESULT AND DISCUSSION

This report presents a case of malaria infection in primigravidae adolescent pregnancy. Patient had a continuous shivering fever with headache, lethargy, and bloating. Considering the patient's demographic, suspicion of malaria infection was raised, which was then confirmed by RDT and Giemsa stain under microscopic examination.

Patient characteristics hold a great role in infection susceptibility and disease prognosis. Very young maternal age (≤ 16 years) was associated with a high risk of preterm birth and low birth weight compared to older women.¹ In malaria case, adolescent (13-19 years old) was found to have increased clinical malaria during pregnancy incidence, as well as peripheral malaria parasitemia at delivery and placental infection prevalence.² The susceptibility of malaria in pregnancy is due to the combination of immunological and hormonal changes and the infected erythrocytes (IE) sequestration in the intervillous placental space.³ The number of parity is correlated to malaria susceptibility. Primigravidae is more frequently infected and has higher densities of placental parasites compared to multigravida in stable transmission zones. It is attributed to the *P. falciparum* IEs adhesion to receptors on the vascular endothelium, and specific membrane protein expression, for example, VAR2CSA.³ VAR2CSA antibodies are found to be pregnancy-specific and rise with parity.⁴ Following IE sequestration in the placenta, macrophages, and B cells gather in the

intervillous gaps. Macrophages are more frequently seen in placentas from primigravidae who lack particular immunity to placental IE than in those from multigravidae. The severity of the inflammatory immune infiltrate varies between women and is inversely associated with acquired immunity.⁵ These lead to less ability in preventing heavy IE accumulation in the placenta, hence, hold a higher risk of severe malaria.⁴

Furthermore, malaria is a true haematological infectious disease that affects practically all blood components. The most common malaria-related haematological consequences are anemia and thrombocytopenia.⁶ Malarial anaemia has a complex etiology. Malaria is an intraerythrocytic parasite so there is obligatory destruction of red cells containing parasites at schizont rupture.⁷ Moreover, the haemolytic anaemia of malaria is compounded by bone marrow dyserythropoiesis during and immediately after the acute illness. In acute malaria, bone marrow dyserythropoiesis might last for days or weeks after starting malaria treatment. As a result, reticulocyte counts are typically low during the disease's acute symptomatic phase.⁸

Earlier research has shown that the degree of thrombocytopenia is related to parasite density, the severity of malaria infection, and clinical outcomes. In spite of the fact that the precise mechanisms causing thrombocytopenia in *P. falciparum* malaria are not well understood, a number of suggestions have been put out. These include increased platelet aggregation, bone marrow alteration, microvascular sequestration, and endothelial activation.⁹

According to the latest guidelines of malaria in Indonesia, treatment that the patient has received was already in accordance as the guideline, which is Dihydroartemisinin-Piperakuin (DHP) 3 tablets a day for 3 days and 1 tablet of primaquine for 1 day for patient's weight (45 kg).¹⁰ During observation in the hospital, patient hemoglobin decreased to 7.1 g/dL. Patient did not receive blood transfusion. In accordance to the guidelines, blood transfusion is required in endemic area children with Hb \leq 5 g/dL or hematocrit \leq 15.

The IUFD in our patient most likely due to malaria. IE resulted from malaria have the ability to bind to organ tissues and prevent splenic clearance, which can also lead to microvasculature blockage or inflammation.¹¹ The outcome is that IEs build up inside the placenta, which causes an inflammation in the intervillous regions of the placenta resulting placental malaria (PM). Malaria in pregnancy due to *P. falciparum* may cause intrauterine growth restriction, premature delivery, and low birth weight and thus increase newborn mortality.¹¹

Patient was required to do a routine follow up. As mentioned in malaria guidelines, patient has to undergo treatment evaluation on day 3, 7, 14, 21 and 28.¹⁰ However, patient did not show up neither at the nearest CHC nor at the hospital. This might be related to patient's background and health seeking behavior. Females, lesser education, and low income families are less likely to use formal health care.¹² This patient was discharged with no further symptoms related to malaria. In Indonesia, one is considered sick and needs help



when there is disruption in everyday activities.¹³ This patient lives around 15.8 km and 65.3 km from the nearest health care service, CHC Sotimori, and RSUD Ba'a, respectively. Hence, factors such as distance between patient residence and nearest health care service as well as indirect treatment cost, including transportation might related to this loss to follow up case.¹³

CONCLUSION

Malaria in pregnancy has a devastating impact on both mother and fetus. Patient's characteristics and background greatly influence malaria outcomes and treatment continuity. Holistic treatment is recommended to enhance patient prognosis and health-seeking behavior.

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