

Case Report

Islands of White in a Sea of Red: A Cutaneous Manifestation of Dengue Fever in a Pregnant Woman

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Article Info

Article history:

Received: 30 April 2021

Accepted: 28 July 2021

Published: 1 September 2021

Academic Editor:

Ahmad Izzat Ahmad Tajjudin

Malaysian Journal of Science, Health & Technology

MJoSHT2021, Volume 7, Special

Issue

eISSN: 2601-0003

[https://doi.org/](https://doi.org/10.33102/mjosht.v7iSpecialIssue.203)

10.33102/mjosht.v7iSpecialIssue.203

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Abstract— Dengue fever is a significant public health problem in Asia, resulting in serious morbidity and even mortality. It is mainly known for causing severe constitutional symptoms and bleeding, often resulting in haemorrhagic shock. Dengue fever may manifest cutaneously in several forms. These include petechial rash, maculopapular rash and what has been termed as islands of white in a sea of red. Most can be attributed to capillary fragility, which led to tests such as the tourniquet test. This case highlights the dengue fever cutaneous presentation of islands of white in a sea of red in a multigravida woman during her first trimester. Her husband and son who was infected at the same time did not develop similar skin condition but developed the more common maculopapular and petechial rashes. The pathophysiology of such lesions is not well understood, and its relation to pregnancy is not known. Blood investigations were typical of dengue fever. The outcome of the patient's pregnancy was also normal. This case highlights the need for doctors to look out for such lesions in dengue patients.

Keywords— Dengue, Island of white in a sea of red, skin

I. BACKGROUND

Dengue fever (DF) is one of the most important public health issues in tropical countries. Seventy per cent of the cases were reported from Asian countries, with Malaysia having one of the highest numbers of cases [1]. It is a mosquito-borne infection caused by the dengue virus from the Flaviviridae family. There are four dengue virus serotypes (DENV-1, DENV-2, DENV-3 and DENV-4), with DENV-1 being the most predominant serotype in Malaysia [2].

Typical presentations of DF include high-grade fever, constitutional symptoms, body aches and bleeding

tendencies. Studies showed that various dengue serotypes and genotypes induced different clinical features in infected patients [3][4]. A local study showed that DENV-1 and DENV-3 were associated with non-severe clinical manifestations, whereas patients with DENV-2 infection developed severe dengue [2]. Another study in Paraguay also showed similar findings where DENV-2 diseases were more frequently linked to the need for fluid expansion, shock, and a more extended stay in the hospital. [3] DENV-3 infected patients were more likely to develop gastrointestinal and musculoskeletal symptoms, whereas DENV-4 infected patients were more likely to develop cutaneous and respiratory symptoms [5].

Cutaneous manifestation occurs in about half of patients infected with DF [6]. Maculopapular/morbilliform eruption was the most prevalent symptom, followed by ecchymotic, petechial, and macular/scarlatiniform eruption [4]. Skin manifestation was associated with lower platelet levels and a higher risk of platelet transfusion, according to a study of nearly 400 dengue infected patients. However, there was no significant difference in the number of complications or deaths in patients with DF with or without skin rash [7].

Compared to pregnant women who did not have dengue, the risk of maternal death was three times higher among dengue-infected women [8]. Those in their first and third trimesters are at a higher risk. Infection during the first trimester has been linked to congenital disabilities and abortion [9],[10]. Prematurity and postpartum haemorrhage were two of the most common complications of infections in the third trimester [11]. This case report highlights the less common cutaneous feature of dengue fever in a pregnant woman.

II. CASE

A 35-year-old multigravidarous nurse pregnant in the first trimester presented with a 2-day history of fever, poor appetite, joint and body aches, and a peculiar reddish rash over her trunk and extremities. The skin lesion is shown in Figure 1. She did not experience any bleeding tendency. At the same time, her husband, a medical doctor and son, also experienced similar symptoms only with different skin rash (maculopapular). They tried managing themselves conservatively from home by bed rest, oral fluids and paracetamol while sending off blood tests to the lab intermittently and closely consulting a friend who is an infectious disease physician by phone.

Her dengue serology, like IgM and IgG, was negative on day two, but Dengue NS1 was reactive. Blood count on days 6, 7 and 8 revealed thrombocytopenia with serial platelet count on a rising trend of $98 \times 10^9/L$, $124 \times 10^9/L$, $158 \times 10^9/L$. Renal profile readings were also normal; sodium 137 mmol/L (normal 135-145), potassium 3.7 mmol/L (3.5-5.0), urea 2.7 mmol/L (normal 2.5-6.7) and serum creatinine 49.9 umol/L (normal 50-100). Liver enzymes were not elevated and within normal limits with alkaline Transaminase (ALT) 11 U/L (Normal 0-55) and alkaline phosphatase (ALP) 40 U/L (Normal 40-150).

All three of them recovered spontaneously without any complications. Pregnancy was followed up and the outcome was good, where she delivered a healthy baby girl.

III. DISCUSSION

The initial rash of DF is transitory facial flushing erythema that appears within the first 24 to 48 hours of the beginning of symptoms and is thought to be caused by capillary dilation. A maculopapular or morbilliform eruption characterises the ensuing rash, which appears 3 to 6 days following the commencement of fever. The generalised rash usually starts on the dorsal surface of the hands and feet and then spreads to the proximal arm, legs, and trunk, lasting a few days before subsiding without peeling of the skin.



Figure 1: Islands of white in a sea of red on patient's right foot.

The morbilliform rash usually does not involve the palms and soles. Occasionally, two other types of rashes may arise [12]. Early symptoms may be accompanied by an eruption of small macules on the pressure sites, indicating the beginnings of a fever. The end of a fever episode is sometimes accompanied by cutaneous changes in purpuric eruptions in the mouth and extremities.

Although the rash in DF is usually asymptomatic, itchiness/pruritus has been documented in a significant minority of patients in various studies [4], [12]. Some individuals get the initial rash and recover completely, while others get the more widespread eruption. Petechiae, purpura, and ecchymosis are common haemorrhagic skin manifestations with a positive Hess test. The tourniquet test, also known as the Hess test, inflates a blood pressure cuff on the upper arm to a point halfway between systolic and diastolic pressures for five minutes. The test is positive when more than 20 petechiae appear within a 2.5 cm^2 patch of skin [13]. Haemorrhagic manifestations usually appear 4 to 5 days after the onset of febrile illness.

In some cases, individual lesions may coalesce, resulting in broad confluent erythema with petechiae and rounded islands of sparing-“white islands in a sea of red” [14] as seen in this patient. The “white islands in a sea of red” is thought to be the result of the virus immunological reaction [15]. In this case, it is unknown why only the pregnant patient developed islands of white in a sea of red while her husband and son did not. While different dengue serotypes have been attributed to specific clinical characteristics [3][4], it is unlikely in this case that the patient was infected with a different serotype from her husband and son due to the proximity of habitation in small apartment unit of about 800 square feet as well as the concurrent timing of infection which can only point to the same source of infection if not mosquito.

While common clinical manifestations of dengue fever during pregnancy are similar to non-pregnant patients (fever, myalgia, arthralgia), only 2% of pregnant women presented with rashes [11]. Pregnancy is a state of hormonal turbulence; hence it is not erroneous to suspect the endocrinal role may play its part in developing such cutaneous lesion. Significant endocrinal changes have been demonstrated in children infected with dengue fever [9].

Studies have shown that dengue fever in pregnant women represents the risk of premature birth, and a bad prognosis is expected when the infection occurs in the first and third trimesters [16]. However, this patient had no complications during the pregnancy, and she delivered a healthy baby girl.

IV. CONCLUSION

This case report highlights the less common cutaneous manifestation of dengue fever. Islands of white in a sea of red may have a relationship with pregnancy. Due to the endemicity of dengue in this country and its possible complications, clinicians should have a high index of suspicion of dengue fever while treating febrile patients with any rashes.

CONSENT TO PARTICIPATE

The patient gave her consent on publication of the case and provided the classical image of islands of white in a sea of red on her right foot.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

ACKNOWLEDGEMENT

We thank Dr Sarah Huueriyyah for her help in blood investigation procurement and reporting.

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