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CASE REPORT

# Characteristic skin rash among patients with dengue fever: case series

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## ABSTRACT

**Background:** Dengue fever (DF) is caused by the dengue virus, which manifests with systemic features such as fever, malaise, and headache. More than 50% of cases present with a variety of skin lesions.

**Case Presentation:** We present a series of three cases that presented to the clinic with fever associated with gastrointestinal symptoms, including nausea, vomiting, and abdominal pain. Other systematic reviews were unremarkable. The patients subsequently developed a pruritic skin rash characterized by diffuse confluent erythema with petechiae and rounded islands of sparing. After excluding alternative etiologies such as malaria, HIV, and hepatitis C, all three patients were diagnosed with DF.

**Conclusion:** This case series highlights the presence of a characteristic rash in DF. We emphasize the clinical description of this cutaneous manifestation, which is not well-described in previous literature. Although cutaneous manifestations are common in dengue, identifying these specific rash patterns can contribute to accurate and early diagnosis. Patients presenting with fever and rashes in an endemic area should be suspected of having DF.

**Keywords:** Dengue fever, skin rash, dengue rash, case series, case report.

## Introduction

Dengue fever (DF) is caused by the dengue virus (DENV), which is a single-stranded Ribonucleic acid (RNA) flavivirus [1]. The primary carrier and reservoir for the virus are the mosquito *Aedes aegypti* [2]. The clinical symptoms of DF range from a mild, self-limiting form to severe dengue hemorrhagic fever and potentially fatal dengue shock syndrome. Most people infected with DENV do not exhibit any symptoms [3].

Dengue infection can be diagnosed by testing blood samples within the first 5 days of symptoms or during the early recovery phase (more than 5 days of symptoms) to confirm the presence of the virus by either detecting Immunoglobulin M (IgM) antibodies during acute infections or observing an increase in Immunoglobulin G antibody levels in two different blood samples [4]. There is no specific treatment for DF. Patients should seek medical advice, rest, and maintain adequate fluid replacement. To alleviate symptoms such as fever and joint pains, paracetamol may be used; however, aspirin or non-steroidal anti-inflammatory drugs such as ibuprofen should be avoided because of the increased risk of bleeding [5,6]. In cases of severe dengue, hospitalization is necessary to manage fluid volume and address hemorrhagic complications [5,6].

## Case Presentations

### *Case 1*

A 28-year-old Egyptian male with no known medical history presented to the emergency room with a 1-week history of fever not relieved by antipyretics, associated with nausea, vomiting, constipation, epigastric abdominal pain, decreased oral intake, and a pruritic generalized rash over both upper and lower limbs and the abdomen. The patient had no history of contact with sick individuals, no recent travel history, and no family history of similar complaints. Respiratory symptoms, headache, hematemesis, and melena were absent. The patient could not recall any

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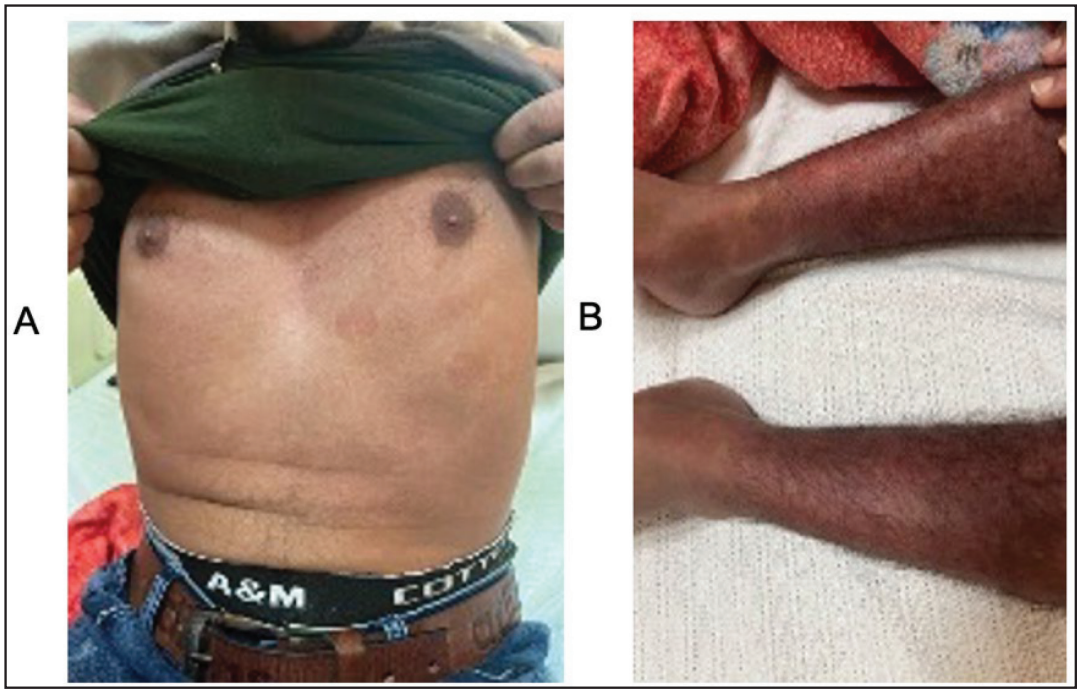


***Figure 1.*** *Generalized confluent erythema with petechiae and rounded islands of sparing in the (a) chest and (b) legs.*

mosquito bites. The remainder of the systematic review was unremarkable. On examination, the patient was conscious, alert, and oriented to time, place, and person, and was hemodynamically stable and afebrile. Dermatological examination revealed generalized confluent erythematous patches with petechiae and rounded islands of sparing, with no mucosal involvement (Figure 1). Laboratory investigations showed thrombocytopenia (platelets: 70 × $10^9$/l), hemoglobin of 14.2 g/dl (normal 13.5-17.5 g/dl), hematocrit of 42% (normal 41%-53%), and white blood cells (WBCs) count of 5.8 × $10^9$/l (normal 4.0-11.0 × $10^9$/l), Aspartate Aminotransferase (AST) of 32 U/l (normal 10-40 U/l), and Alanine Aminotransferase (ALT) of 29 U/l (normal 7-56 U/l). Renal profile was within the normal range: sodium 140 mmol/l (normal 135-145 mmol/l) and potassium 3.9 mmol/l (3.5-5.0 mmol/l). The patient had been diagnosed with DF at an outside hospital.

## *Case 2*

A 16-year-old male with no previous comorbidities presented to the emergency room with a 5-day history of subjective fever, headache, malaise, nausea, vomiting, and diarrhea. Fever was associated with a band-like headache and generalized body ache. The patient reported watery diarrhea with a frequency of 3-4 times per day, without blood. In addition, the patient complained of a chronic pruritic bilateral upper limb rash. There was no history of bleeding from any orifice; other systemic reviews were unremarkable. Upon examination, the patient was conscious, alert, and oriented to time, place, and person, but appeared lethargic and was febrile; otherwise, he was hemodynamically stable. Dermatological examination revealed diffuse confluent erythema and petechiae with rounded islands of sparing (Figure 2). Laboratory investigations showed thrombocytopenia (platelets: 63 × $10^9$/l), hemoglobin of 13.8 g/dl (normal 13.5-17.5 g/dl), hematocrit of 40% (normal 41%-53%), and WBC count of 6.1 × $10^9$/l (normal 4.0-11.0 × $10^9$/l), AST of 35 U/l (normal 10-40 U/l), and ALT of 31 U/l (normal 7-56 U/l). Renal profile was within the normal range: sodium

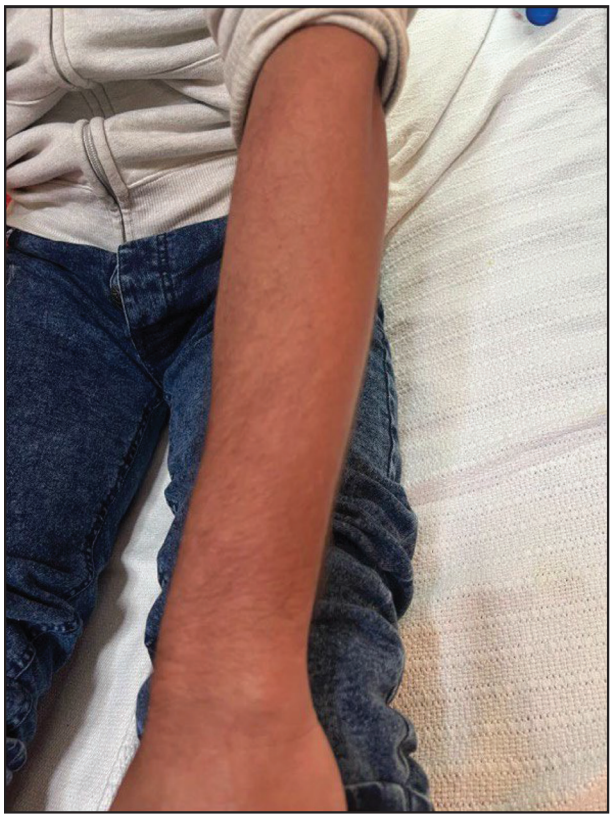

***Figure 2.*** *Diffuse confluent erythema with petechiae and less prominent oval islands of sparing.*

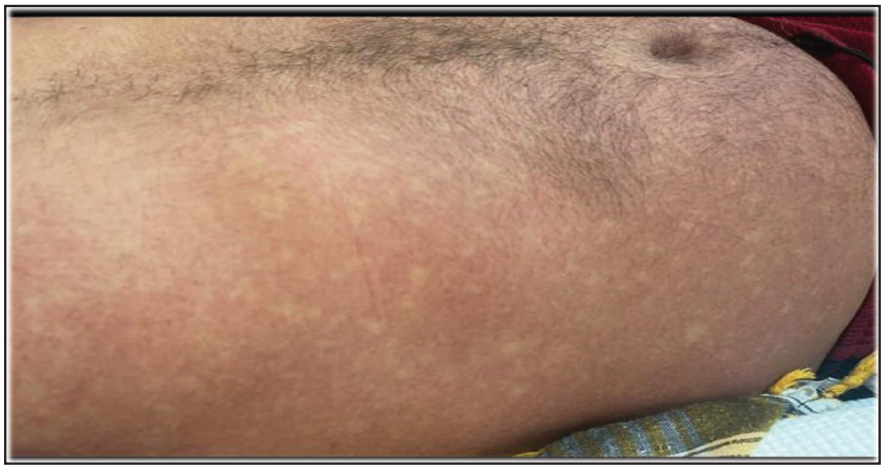

***Figure 3.*** *Diffuse confluent erythema with petechiae and rounded islands of sparing in the chest.*

138 mmol/l (normal 135-145 mmol/l) and potassium 4.1 mmol/l (3.5-5.0 mmol/l). The patient was admitted with a diagnosis of DF.

### *Case 3*

A 29-year-old previously healthy male presented with a 5-day history of subjective fever that partially responded to acetaminophen, accompanied by back pain, diffuse abdominal pain, and hematemesis. He reported a history of multiple mosquito bites and denied any prior similar complaints. Two days after admission, the patient developed a generalized non-pruritic skin rash involving the entire body while sparing the face. Examination revealed diffuse confluent erythema with petechiae and rounded islands of sparing (Figure 3). Laboratory investigations showed thrombocytopenia (platelets: 53 × $10^9$/l), hemoglobin of 14.5 g/dl (normal 13.5-17.5 g/dl), hematocrit of 43% (normal 41%-53%), and WBC count of 5.5 × $10^9$/l (normal 4.0-11.0 × $10^9$/l), AST of 38 U/l (normal 10-40 U/l), and ALT of 34 U/l (normal 7-56 U/l). Renal profile was within the normal range: sodium 133 mmol/l (normal 135-145 mmol/l) and potassium 4.8 mmol/l (3.5-5.0 mmol/l). HIV antibody, hepatitis C antibody, and malaria antigen tests were all negative. DF was clinically suspected, and serological testing returned positive for dengue IgM antibodies (Table 1).

### *Comparative table of lab reports*

***Table 1.*** *Comparative lab reports of all the cases reported in the manuscript.*

| Lab Parameter | Case 1 | Case 2 | Case 3 |
|---|---|---|---|
| Hemoglobin (g/dl) | 14.2 | 13.8 | 14.5 |
| Hematocrit (%) | 42 | 40 | 43 |
| WBC Count (×$10^9$/l) | 5.8 | 6.1 | 5.5 |
| Platelets (×$10^9$/l) | 70 | 63 | 53 |
| Sodium (mmol/l) | 140 | 138 | 133 |
| Potassium (mmol/l) | 3.9 | 4.1 | 4.8 |
| AST (U/l) | 32 | 35 | 38 |
| ALT (U/l) | 29 | 31 | 34 |
| Creatinine (mg/dl) | 0.9 | 0.8 | 1.0 |

## Discussion

Dengue is the most common mosquito-borne viral illness in tropical and subtropical regions, with an estimated 390 million dengue infections occurring per year [7]. It is caused by DENV, a single-stranded RNA virus belonging to the Flaviviridae family with four serotypes (DENV-1 through DENV-4). The disease is primarily transmitted by the bite of infected *A. aegypti* mosquitoes, the principal vector, with an incubation period of 4 to 10 days [2,8].

According to the WHO revised criteria (2009), dengue is classified into two main categories: dengue with or without warning signs, and severe dengue [6]. Non-severe dengue is defined as high-grade fever combined with two or more symptoms or signs in a patient from an endemic region, including nausea, vomiting, exanthema, headache, myalgia, arthralgia, petechiae or a positive tourniquet test, and leukopenia [6,9]. Severe dengue encompasses severe plasma leakage leading to respiratory distress or shock, severe bleeding, and organ dysfunction [6,9].

Hematological abnormalities are frequently observed in dengue infection, with thrombocytopenia being one of the most common laboratory findings and an important diagnostic clue [10]. In the present case series, all patients demonstrated thrombocytopenia, while hemoglobin, hematocrit, and white blood cell counts remained within normal ranges, which may still occur in uncomplicated DF [11]. In addition, liver enzymes and renal function tests remained within normal limits in all cases, suggesting the absence of significant hepatic or renal involvement and supporting the diagnosis of non-severe dengue according to WHO classification [6,12].

Cutaneous rash occurs in more than 50% of patients during the febrile phase of dengue [13]. These manifestations can range from confluent erythema to a generalized morbilliform eruption. In the early 24-48 hours, blanchable facial flushing from capillary dilatation is prominent. Between days 3 and 6 after fever onset, morbilliform or maculopapular eruptions are characteristic [13]. A distinctive feature observed in a minority of cases is the “white island in a sea of

red" pattern of sparing, which is thought to relate to the immune response to the virus. All three cases in this series demonstrated this characteristic rash pattern [13].

## Conclusion

To conclude, the cases we presented demonstrated the characteristic skin rash associated with dengue fever [10]. Although the disease can be confirmed using various methods, RT-PCR remains the gold-standard diagnostic test. The presence of anti-dengue IgM antibodies can be detected approximately one week after infection [4]. The differential diagnosis of dengue fever includes chikungunya fever, scarlet fever, Kawasaki disease, measles, rubella, and roseola. Therefore, dengue fever should be suspected in patients presenting with fever and rash who live in or have recently traveled to endemic regions.

### List of Abbreviations

| | |
|---|---|
| AST | Aspartate Aminotransferase |
| ALT | Alanine Aminotransferase |
| DENV | Dengue virus |
| DF | Dengue fever |
| IgM | Immunoglobulin M |
| RNA | Ribonucleic acid |
| WBC | White Blood Cell |

### Conflict of interests

The authors declare that there is no conflict of interest regarding the publication of this article.


### Funding

None.


### Consent to participate

Written informed consent was obtained from all the participants

### Consent for publication

Written informed consent was obtained from the patient

### Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.


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*Supplementary content (If any) is available online.*

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