

# Skin Lesions in Hospitalized Cases of Dengue Fever

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## ABSTRACT

**Objective:** To determine the frequency and types of skin lesions in cases of dengue fever in patients admitted in three hospitals of Karachi.

**Study Design:** Case series.

**Place and Duration of Study:** Three tertiary care hospitals of Karachi, from November 2006 to February 2007.

**Methodology:** One hundred patients of dengue fever with positive anti-dengue Immunoglobulin M (IgM) serology were included in the study. The admitted patients in PNS Shifa Hospital, Jinnah Postgraduate Medical Centre (JPMC) and Civil Hospital, Karachi were selected for the study. Presenting features were noted. The patients were physically examined for the presence of skin and mucosal lesions and findings were recorded. Total and Differential Leukocyte Count (TLC and DLC), platelet count and Liver Function Tests (LFTs) were done in all the patients.

**Results:** All the patients had low leukocyte and low platelet counts. The common presenting symptoms were high-grade fever with or without rigors, headache, body aches, backache, vomiting, sore throat with cough and generalized weakness (seen in 86% patients). The uncommon presenting features were diarrhea, abdominal pain, bleeding from gums and nose-bleeds (seen in 14% patients). Sixty-eight (68%) patients had skin lesions. The most common skin presentation was generalized macular blanchable erythema involving trunk and limbs, seen in 44 (65%) cases. Discrete petechial lesions were seen on various body areas in 24 (35%) cases. Palmer erythema was seen in 20 (30%) patients. Generalized itching was seen in 16 (23%) cases. Isolated itching of palms and soles was seen in 20 (30%) cases. Twenty-eight (28%) patients had deranged LFTs. Out of those, 4 patients had raised serum bilirubin level whereas rest of the 24 had raised ALT.

**Conclusion:** Dengue fever commonly presents with specific skin lesions. The skin lesions can be a clue to the diagnosis in difficult cases.

**Key words:** Dengue fever. IgM serology. Skin lesion. Macular erythema. Petechiae.

## INTRODUCTION

The word 'dengue' seems to be derived from the Swahili phrase "Ka-dinga pepo", which describes the disease as being caused by an evil spirit.<sup>1</sup> The first definite clinical report of dengue fever is attributed to Benjamin Rush in 1789, but the viral etiology and its mode of transmission via mosquitoes were not established until the early 20th century.<sup>2</sup>

Dengue virus causes about 100 million cases of acute febrile disease annually. Currently, dengue is endemic in 112 countries. Ethnicity is non-specific, but the disease's distribution is geographically determined.<sup>3</sup> Fewer cases have been reported in the black population than in other races.<sup>4</sup> In endemic areas, a high prevalence of immunity in adults may limit outbreaks in children. Worldwide, children younger than 15 years comprise 90% of Dengue Haemorrhagic Fever (DHF) subjects.<sup>5</sup> However, in the Americas, DHF occurs in both adults and children.<sup>6</sup> In Pakistan, dengue fever has been

around for the past 20 years. The first documented report was in 1985.<sup>7</sup> During the previous two epidemics in Karachi, dengue fever was more commonly seen in the 20 to 40 years of age group, however, some unpublished data did show children as major victims.<sup>8</sup>

Dengue fever and dengue haemorrhagic fever are acute febrile diseases, found in the tropics and Africa,<sup>4,10</sup> and often found in urban areas of tropical nations.<sup>11</sup> The dengue fever is caused by a virus of Flaviviridae group, which also includes yellow fever virus and Japanese encephalitis virus.<sup>12</sup> Dengue virus has four serotypes, DENV-1 to DENV-4.<sup>13</sup> Infection with one of these serotypes conveys life-long immunity but not cross-protective immunity to the other serotypes. Infective *Aedes aegypti* mosquito prefers to feed on human during daylight hours.<sup>14</sup> The incubation time is 3-14 days, most often 4-7 days. This is followed by the onset of fever, violent headache, chill and rash developing after 3-4 days.<sup>15</sup> The classic dengue fever lasts about 6-7 days, with a smaller peak of fever at the trailing end of the disease (the so-called "biphasic pattern"). Most people have a complete recovery without any complication.<sup>16</sup> The diagnosis of dengue fever is usually made clinically. The classic picture is high fever with no localising source of infection, a petechial rash with thrombocytopenia and relative leukopenia. According to the WHO definition of dengue haemorrhagic fever, which has been in use since 1975, all four criteria must be fulfilled.<sup>17</sup>

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Dengue haemorrhagic fever (DHF) usually occurs during a second dengue infection in persons with pre-existing actively or passively (maternally) acquired immunity to a heterologous dengue virus serotype. Increased vascular permeability, bleeding, and possible Disseminated intravascular coagulation (DIC) may be mediated by circulating dengue antigen-antibody complexes, activation of complement, and release of vasoactive amines. In the process of immune elimination of infected cells, proteases and lymphokines may be released and activate complement coagulation cascades and vascular permeability factors. Cases of Dengue haemorrhagic fever (DHF) also show higher fever, haemorrhagic phenomena, thrombocytopenia, and haemoconcentration. A small proportion of cases lead to Dengue Shock Syndrome (DSS), which has a high mortality rate.<sup>18</sup>

Skin lesions are common presenting features of dengue fever and can, at times, be diagnostic. The characteristic combination of fever, rash and headache are called the "dengue triad".<sup>19</sup> The type of skin lesions seen in dengue fever are generally not well-known to general doctors and there seems to be confusion and mixing up about the skin lesions. General practitioners and other non-dermatologists require a clear understanding of the various types of skin lesions seen in cases of dengue fever.<sup>20</sup>

The aim of this study was to determine the frequency and types of skin lesions in cases of dengue fever in patients admitted in three tertiary care hospitals of Karachi.

## METHODOLOGY

One hundred cases of dengue fever, confirmed by anti dengue immunoglobulin M (IgM) serology, were included in the study. Only admitted cases were included in the study. All ages and both genders were included. The patients with negative serology were excluded. The patients who had other acute or chronic concurrent ailments along with dengue fever were also excluded. The admitted patients in three tertiary care hospitals of Karachi, PNS Shifa Hospital, JPMC and Civil Hospital, were selected for the study.

The data of the patients including age, gender and duration of illness was recorded. Detailed history of presenting symptoms was taken. Thorough physical examination was done to see the presence of skin and mucosal lesions, which were recorded. The laboratory investigations carried out in those patients were Total and Differential Leukocyte Counts (TLC and DLC), platelet count and Liver Function Tests (LFTs). Those cases were then followed till the time of their discharge from the hospital for the subsequent development of any new skin or mucosal lesions. The inference of the study was drawn from the record.

Data analysis was performed through SPSS-version 12.0. Frequencies and percentages were computed to present all categorical variables such as presenting symptoms and skin lesions. Age was presented by mean  $\pm$  SD. As it was a case series study so no inferential test was applied.

## RESULTS

One hundred admitted cases of dengue fever with positive IgM serology for dengue virus were seen for the presence of skin and mucosal lesions. Seventy-six (76%) were males and 24 (24%) were females. The youngest patient was 11 years old and the oldest was 42 years old with the mean age at presentation being  $28 \pm 17$  years. In all those patients, the total leukocyte and platelet counts were found to be lower than the normal range. The Total Leukocyte Counts (TLC) ranged from  $1.3 \times 10^9/L$  to  $3.9 \times 10^9/L$  (normal range  $4-11 \times 10^9/L$ ). The platelet counts ranged from  $18 \times 10^9/L$  to  $116 \times 10^9/L$  (normal range  $150-400 \times 10^9/L$ ). The common presenting symptoms were high-grade fever with or without rigors, headache, body aches, backache, vomiting, sore throat with cough and generalized weakness. These features were seen in 86% of cases of dengue fever. The uncommon presenting features were diarrhea, abdominal pain, bleeding from gums and nose bleeds. These features were seen in 14% of cases. Sixty-eight (68%) patients had skin lesions, whereas 32 (32%) cases did not have any skin lesions during the course of illness. A combination of skin lesions was also seen in the same patient. The most common skin presentation was generalized macular, blanchable erythema involving trunk and limbs seen in 44 (65%) cases. Discrete petechial lesions were seen on various body areas in 24 (35%) cases. Palmer erythema was seen in 20 (30%) patients. It was diffuse and blanchable. Generalized itching was seen in 16 (23%) cases. The frequency of other features is shown in Table I. Bilateral conjunctival haemorrhages were seen in 12 (17%) cases (Figure 1). Telogen effluvium was also seen in a few cases, self-reporting 2-3 months after acute viral episode. The complete data in this regard could not be collected as most of the patients were lost during the follow-up period. Twenty-eight (28%) patients had

**Table I:** Skin lesions in cases of dengue fever. (Total number of cases =100, Number of cases having skin lesions = 68)

Type of skin lesions	Frequency (%)
Generalized macular blanchable erythema (trunk and limbs)	44 (65%)
Discrete petechial lesions	24(35%)
Palmer erythema (diffuse and blanchable)	20 (30%)
Generalized itching	16 (23%)
Itching palms and soles	20 (30%)
Bilateral conjunctival haemorrhages	12 (17%)
Bleeding from gums	04 (6%)
Large ecchymotic patches (face and arms)	03 (4%)

deranged LFTs without having raised bilirubin level and 24 having raised ALT.

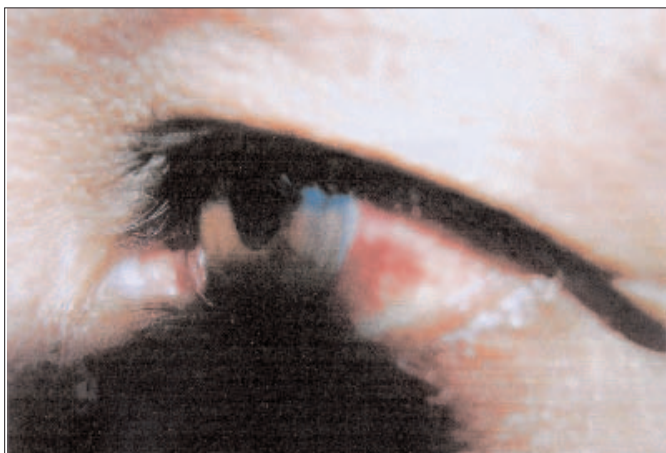


Figure 1: Conjunctival haemorrhages.

## DISCUSSION

Dengue fever usually starts suddenly with a high fever, malaise, headache, facial flushing, retrobulbar pain, conjunctival suffusion and severe backache. The illness can last upto 10 days, but complete recovery can take as long as a month. Dengue infection is a major public health problem, affecting mainly children in the south east Asia region. Upto 2-3 epidemics per year have been reported. Older children and adults are usually more sick than young children.<sup>21</sup> It was observed that dengue fever mainly affected younger age group, the mean age of presentation in this study being  $28 \pm 7$  years. Second infection by hetero type virus may lead to Dengue haemorrhagic fever (DHF). Presentation as Dengue Shock Syndrome (DSS) is rare. Dengue Shock Syndrome (DSS) along with neurological manifestations and intracranial bleeding without extra-cranial haemorrhagic manifestations is even rarer.<sup>22</sup> Dengue infection further worsens the disease process in patients with aplastic anemia due to uncontrolled haemorrhagic diathesis and major organ failure, which may prove fatal in these already immune compromised patients, if not treated in time.<sup>23</sup>

In this study, a large number of cases (68%) had skin lesions as one of the presenting features. This makes skin manifestations as one of the common presenting features of dengue fever. The most frequent skin presentation seen was generalized maculopapular blanchable erythema, which usually started at 3rd or 4th day of fever and lasted for 7-10 days. This rash probably occurs when the virus enters the bloodstream. The presence of the virus within the blood vessels, especially in cutaneous blood vessels, causes vasodilatation and increased capillary permeability resulting in generalized blanchable erythema. Petechial and larger ecchymosed lesions were seen in a smaller number of cases in which the platelet count was very

low. In this study, generalized and isolated itching of palms and soles without erythema or any other skin lesions was observed in a large number of cases. The itching was severe causing considerable discomfort to the patients. Generalized itching and severe itching of hands and feet without any other specific lesions on skin elsewhere were not documented before. Diffuse blanchable palmer erythema was also seen in a considerable number of cases. All the patients of dengue fever in this study had leukopenia and thrombocytopenia. This is similar to such other studies in which thrombocytopenia was one of the diagnostic criteria along with raised hematocrit and elevated liver enzymes in the presence of relevant clinical history and physical examination, in the absence of dengue serology.<sup>24</sup>

Although liver is not the target organ of dengue virus, several liver pathological findings including fatty change, centrilobular necrosis, and monocyte infiltration in the portal tract, are reported. In a study by Wichman *et al.* among Thai patients, 5.8% patients of dengue fever showed the liver dysfunction.<sup>25</sup> In this study, 28% patients had deranged LFTs.

This study was carried out in a limited number of patients at three tertiary care public hospitals of Karachi. It is recommended that such studies should also be carried out at other places of Pakistan and a larger number of patients may be included in the study.

## CONCLUSION

Skin and mucosal lesions are a frequent presentation of dengue fever and can be helpful in the diagnosis of this disease.

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