ORIGINAL ARTICLE

DERMATOLOGICAL MANIFESTATIONS OF DENGUE FEVER

Atiya Mahboob, Zafar Iqbal*, Rabail Javed, Azeem Taj*, Asma Munir*, Munir Akhtar Saleemi†, Faryal Yaqub**

Department of Dermatology, *Medicine, **NHRC, Shaikh Zayed Federal Postgraduate Medical Institute, †Fatima Jinnah Medical College/Sir Ganga Ram Hospital, Lahore, Pakistan

Background: Each year dengue related infections are rising in tropical countries. There is not enough data available on dermatological manifestations of dengue fever. This study was conducted to investigate prevalence and type of dermatological manifestations of dengue fever (DF), Dngue Haemorrhagic Fever (DHF), and Dengue Shock Syndrome (DSS). **Methods:** A Prospective study was contacted in Department of Medicine, Shaikh Zayed Hospital, Lahore, from 3rd Oct to 20th Nov 2010. Specific serological tests for DF were done in all 60 patients admitted with suspected diagnosis of DF, DHF or DSS. Forty-eight confirmed cases were evaluated for age, gender, mucocutaneous features and outcome of the disease. **Results:** Forty-eight out of 60 patients had positive serology for dengue fever. Male to female ratio was 1.09:1. Their ages ranged 5–68 years with a mean of 31.5±15.2. DF, DHF and DSS were found in 71%, 19% and 10% respectively. Common dermatological presentations were oral mucous membrane congestion (66.67%), generalised morbiliform rash (64.58%) and eye congestion (64.58%). Purpuric spots along with mucous membrane congestion, generalised morbiliform rash and eyes congestion was observed in 20.83%, 12.5% and 6.25% patients respectively. All except one patient improved clinically. One patient died of respiratory distress and haemorrhage on second day of admission. **Conclusion:** Dermatological features are significantly noticeable in dengue fever patients. These may help us in early diagnosis and better management of patients.

Keywords: Dengue fever, Dengue haemorrhagic fever, Dengue shock syndrome, Dermatological features

INTRODUCTION

Dengue virus (DENV) infection, a mosquito-born disease, has spread rapidly in the last 50 years.[1] It is the most common and widespread arthropod-borne viral infection in the world today[2] being 50–100 million infections/year (WHO, Fact sheet 117, 2002). It is recognised in over 100 countries throughout the tropics and subtropical areas and threatens the health of approximately 40% of the world's population, of nearly 2.5 billion people.[3] The highest burden of disease occurs in tropical developing countries.[4]

Dengue virus is a single stranded RNA virus that belongs to the family Flaviviridae. There are four serotypes, i.e., DENV-1, DENV-2, DENV-3 and DENV-4. The four serotypes are transmitted to humans by mosquitoes, principally the *Aedes aegypti*, and other species, i.e., *Aedes albopictus*, *Aedes polynesiensis*, and several species of the *Aedes scutellaris* complex.[5] The different serotypes of the dengue virus may correlate with clinical presentation. DENV1 and DENV3 are associated with more severe primary infections while DENV2 and DENV4 tend to cause more severe secondary infections.[6]

An infected person during viremia within six days, if bitten by female Aedes mosquito can be source of DEN virus.[7] Symptoms appear 3–14 days after the infective bite. Dengue fever is a febrile illness that affects infants, young children and adults.[8]

DF is an acute illness. It has a sudden onset of symptoms comprising high grade fever, headache, skin rash (dengue triad), exhaustion, severe muscle and joint pain and swollen glands. Infection with one serotype does not protect against the others, and sequential infections put people at greater risk for DHF and DSS.[9] Appearance of haemorrhagic rash or hemorrhagic manifestations in addition to classical DF characterises the dengue haemorrhagic fever (DHF).[10] Dengue shock syndrome is characterised by hypotension, altered mental status and delayed capillary filling.[10] Mortality can occur in dengue haemorrhagic fever and dengue shock syndrome unless prompt and adequate management is provided.[8]

Approximately 50% of classical DF cases present with a dermatological component, most commonly a rash.[11,12] This DF exanthema is often observed in two phases. The initial rash, involving face, neck, and chest flushing is observed within the first 24–48 hours of the disease.[13] Later, 3–5 days after the onset of symptoms, another rash may appear. This rash is characterised by a generalised morbiliform eruption, often with petechiae and islands of normal skin.[11–13] On pressure, the lesions usually blanch. This rash may heal with desquamation and is frequently pruritic at the end of febrile phase.[4] In case of more serious disease such as DHF or DSS, petechiae and ecchymoses are more commonly observed. DHF is also associated with the mucosal involvement, including conjunctival congestion,

haemorrhagic crusting of the lips, small vesicles on the soft palate, erythema, and crusting of the tongue.[12]

Dengue fever has become an endemic, affecting hundreds of citizens; as is seen with other infectious diseases such as malaria.[9] At present there are no vaccines or antiviral drugs available for dengue viruses and the only effective way to prevent epidemic DF/DHF is to control the mosquito vector. Early diagnosis, hospitalisation and proper management increases survival and cure from dengue fever. The load of Dengue virus is rising as an endemic in Pakistan. Despite many studies there is a paucity of literature regarding the dermatological manifestations of dengue. This study may help us in early diagnosis and management of the disease, before development of serious complications thus helping in reducing morbidity and mortality rate.

MATERIAL AND METHODS

Sixty suspected patients for DF, DHF and DSS were admitted in medical wards and were included in the study. After informed consent, their detailed clinical history, systematic and dermatological examination were performed and recorded on a pre-designed Performa. Sera of all cases were tested for anti-dengue immuno-globulins (IgM and IgG) using ELISA. Patients were confirmed to have DF if IgM alone or both IgM and IgG were positive. Patients were followed-up during their stay in hospital.

Data were analysed using SPSS-15. Demographic variables were reported as frequency and percentages. Numerical data was reported as Mean±SD.

RESULTS

Sixty patients with suspected DF were included in the study. Out of these, 38 cases (17 males and 21 females) were found to positive for IgM and 10 cases (8 males and 2 females) had positive IgM and IgG to dengue virus. Among these 48 patients, 25 were males and 23 were female. The data is tabulated in Table-1–3.

Table-1: Age and gender distribution of patients

Age (Years)	Male	Female	Total	Percentage
<10	1	1	2	4.17
11–20	6	6	12	25.00
21–30	5	6	11	22.92
31–40	4	7	11	22.92
41–50	3	2	5	10.42
51–60	4	0	4	8.33
61–70	2	1	3	6.25

Table-2: Dermatological Involvement in patients with Dengue Fever (n=48)

Dermatological involvement	Male	Female	Total	%
Skin and m. membrane	18	19	37	77.08
Mucous membrane	2	2	4	8.33
Skin	1	2	3	6.25
No involvement	4	0	4	8.34
Total	**25**	**23**	**48**	**100**

Table-3: Morphological pattern of mucocutaneous involvement of patients with Dengue Fever (n=48)

Signs	Males	Females	Total	%
Oral mucous membrane congestion	16	16	32	66.67
General morbiliform rash	14	17	31	64.58
Eyes congestion	15	16	31	64.58
Oral mucous membrane congestion & general purpura	4	6	10	20.83
Gen. morbiliform rash & purpura	3	3	6	12.5
Nasal congestion and bleeding	4	1	5	10.41
Eyes congestion and purpura	2	1	3	6.25
Ankle Oedema	2	0	2	4.17
Gingival bleeding	1	1	2	4.17
Morbiliform rash & purpura of h+f	1	0	1	2.08
Morbiliform rash of h+f	1	0	1	2.08
Oedema of legs	0	1	1	2.08
Facial oedema	0	1	1	2.08

h=hands, f=feet

DISCUSSION

It is evident that the threat from the dengue fever is large and growing. The past 6 decades have witnessed a worrisome rise in epidemics as well as an increase in disease severity.[12] It might be due to changing climate, urbanisation, poor living conditions, and inadequate waste disposal.

The striking features of DF are fever, headache, flushed faces, conjuctival injection, lymphadenopathy, backache, severe malaise, muscle and bone pains, nausea, vomiting and mild sore throat.[14] There are several significant dermatological features of DF, DHF and DSS. Dengue fever commonly presents with specific skin lesions. The skin lesions can be a clue to the diagnosis in difficult cases.[12]

This study includes more males than females as is also reported in other studies from Pakistan[15] and India[16]. In our study mean age of patients was 31.5±15 years whereas in another study it was 47.5±17.9.[17]

In present study DF, DHF, DSS were found in 70.83%, 18.75%, and 10.42% of patients respectively. In a study from Pakistan[10] these values were 78%, 19.4% and 2.42% respectively. This closely relates with present study except the frequency of DSS. In another study from Pakistan[18] the values of these conditions between years 2000 and 2004 were 73%, 24% and 2.4% while after 2005 these values were 58%, 39% and 3% respectively.[19] In a study from India the values for DF, DHF and DSS were 23.1%, 66.9% and 32% respectively, while in another study from India[16] these were 83.9%, 8.8% and 7.3% respectively.

In present study all cases presented with fever, and skin rash appeared in 83.33% patients 1–6 days after onset of fever. In other studies the skin involvement was seen in 82%[20], 65%[21], 53.7%[17], 46.8%[12], 36.4%[15], 28%[8] and 21.7%[16] of patients.

In present study mucous membrane with or without skin involvement was seen in 85.38% of patients. In a study from France mucocutaneous changes were found in 46.15% cases of DF.[19] Among various mucous membrane involvements, congestion of oral

mucous membrane was observed in 66.67%, while 20.83% patients in addition to oral mucous membrane congestion had cutaneous purpuric lesions. Conjuctival injection was seen in 34 (70.83%) of patients. Among these, 3 patients had generalised purpuric lesions also.

Our 5% patients had nasal mucous membrane congestion and bleeding. In a study from India[22] 8 (23.5%) patients had epistaxis. Similarly 26% of patients from Liaquat National Hospital[8] had nasal bleeding. Gingivae were hyperaemic and bleeding from gums was seen in our two patients while in study from Pakistan, and 3 (7%) patients had bleeding from gums.[8] In one study[21] from Pakistan, haemorrhagic manifestations of DF in gums and epistaxis were seen in 40% of patients while in a study from Japan[23] nasal bleeding was more common in children and gum bleeding was more common in adults. In a study from India[12] mucosal involvement was seen in 29.8% of patients with conjunctival involvement being the most common (20.9%), followed by involvement of lips (4.8%) palate (2.4%) and tongue (1.6%).

In present study generalised morbiliform rash was present in 64.58% followed by cutaneous purpuric rash with oral mucous membrane congestion, generalised morbiliform eruption, and eyes injection. Morbiliform rash with or without purpuric lesions, limited to palm and soles was seen in one patient each. In studies from Pakistan[24,25] and India[12] generalised morbiliform rash was observed in 65%, 81.73%, and 48.3% respectively, whereas in a study from France[19] rash was observed as macular, discrete, itching with peripheral extensions rather than maculopapular (morbiliform) in 33% cases. In studies from Pakistan and India[24,12] ecchymotic and petechial spots were observed in 35%, and 41.4% patients respectively.

Oedema of ankles, legs, and face were rare findings in this study. In current study only one patient died of dengue shock syndrome where as in other reported study death rate was 2.4%.[12] In present there is no frontline treatment or vaccination against dengue fever. Therefore a rapid response and detailed knowledge of medical personnel is of utmost importance.

CONCLUSION

This study highlights cutaneous manifestations resulted in dengue fever and its related complications. Significant number of patients showed different forms of skin lesions which can be used for early diagnosis and prevention of complications of dengue fever.

REFERENCES

1. Khan E, Hasan R. Dengue infection in Asia; A regional concern, Editorial. J Post Graduate Med Inst 2012;20(1):1–6.
2. World Health Organization, Scientific Working group on dengue meeting report, Geneva, Switzerland. Geneva: WHO; 2000.
3. Lupi O, Tyring SK. Tropical dermatology: viral tropical diseases. J Am Acad Dermatol 2003;49:979–1000.
4. Plummer RS, Kulkarni RP, Sethi A. Dengue Fever: the funadamentals. [Editorial]. J Coll Physicians Surg Pak 2009;19:127–30.
5. Nathan MB, Dayal-Drager R, Guzman M. Epidemiology, burden of disease and transmission. WHO. Dengue guidelines for diagnosis, treatment, prevention and control. New edition. Geneva: WHO; 2009.p.1–21.
6. Mackenzie JS, Gubler DJ, Petersen LR. Emerging flaviviruses: The spread and resurgence of Japanese encephalitis, West Nile and dengue viruses. Nat Med 2004;10(12):98–109.
7. Gubler DJ. Epidemic dengue/dengue hemorrhagic fever as a public health, social and economic problem in the 21st century. Trends Microbiol 2000;10(2):100–3.
8. Ahmad S, Arif F, Yahya Y, Rehman A, Abbas K, Ashraf S, *et al.* Dengue fever outbreak in Karachi 2006 —A study profile and outcome of children in 15 years of age. J Pak Med Assoc 2008;58(1):4–8.
9. Gubler DJ. Dengue/dengue haemorrhagic fever: history and current status. Novartis Found Symp 2006;277:3–16, Discussion 16–22,71–3, 251–3.
10. Akram DS, Ahmad S. Dengue Fever. Infect Dis J 2005;14(4):124–5.
11. Wilson ME, Chen LH. Dermatological infectious diseases in international travellers. Curr Infect Dis Rep 2004;6(1):54–62.
12. Thomas EA, John M, Bhatia A. Cutaneous manifestation of dengue viral infection in Punjab (North India). Int J Dermatol 2007;46:715–9.
13. Pincus LB, Grossman ME, Fox LP. The exanthema of dengue fever: clinical features of two US tourists travelling abroad. J Am Acad Dermatol 2008;58:308–16.
14. Ahsan T. Dengue fever a regular epidemic? Editorial J Pak Med Assoc 2008;58(1).1–2.
15. Khan E, Kisat M, Khan N, Nasir A, Ayub S, Hasan R. Demographic and Clinical Features of Dengue Fever in Pakistan from 2003–2007: A Retrospective Cross-Sectional Study PloS One 2010;5(9):e12505.
16. Kumar A, Rao CR, Pandit V, Shetty S, Bammigatti C, Samarasinghe CM. Clinical Manifestations and Trend of Dengue Cases Admitted in a Tertiary Care Hospital, Udupi District, Karnataka. Indian J Community Med 2010;35(3):386–90.
17. Lee MS, Hwang KP, Chen TC, Lu PL, Chen TP. Clinical characteristics of dengue and dengue hemorrhagic fever in a medical centre of southern Taiwan during the 2002 epidemic. J Microbiol Immunol Infect 2006;39(2):121–9.
18. Wasay M, Channa R, Jumani M, Zafar A. Changing patterns and outcome of dengue infection; report from a tertiary care hospital in Pakistan. J Pak Med Assoc 2008;58:488–9.
19. Desruelles F, Lamaury I, Rondier M, Goursand R, Mahe A, Castanet J, *et al.* Cutaneous manifestations of Dengue. Ann Dermatol Venerol 1997;124(3):237–41.
20. Itoda I, Masuda G, Suganuma A, Imamura A, Ajisawa A, Yamada K, *et al.* Clinical features of 62 imported cases of dengue fever in Japan. Am J Trop Med Hyg 2006;75(3):470–4.
21. Ahmed S, Ali N, Ashraf S, Ilyas M, Tariq WU, Chotani RA. Dengue fever outbreak: a clinical management experience. J Coll Physicians Surg Pak 2008;18(1):8–12.
22. Faridi MM, Aggarwal A, Kumar M, Sarafrazul A. Clinical and biochemical profile of dengue hemmorhagic fever in children in Delhi. Trop Doct 2008;38(1):28–30.
23. Hanafusa S, Chanyasanha C, Sujirarat D, Khuankhunsathid I, Yaguchi A, Suzuki T. Clinical features and differences between child and adult dengue infections in Rayong province, southeast Thailand. Southeast Asian J Trop Med Public Health 2008;39(2):252–9.
24. Saleem K, Shaikh I. Skin lesions in hospitalized cases of dengue fever. J Coll Physicians Surg Pak 2008;18:608–11.
25. Butt N, Abbassi A, Munir Sm and Shaikh QH. Hematological and biochemical indicators for the early diagnosis of dengue viral infection. J Coll Physicians Surg 2008;18:252–85.

Address of Correspondence:

Dr. Atiya Mahboob, B-5, Married Doctors Residence, Shaikh Zayed Hospital, Lahore, Pakistan. **Cell:** +92-3
Email: Saleemimunir@yahoo.com