Original Research Article

Skin rash in relation to dengue outcome

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Abstract

Background: The incidence of dengue around the world has dramatically grown with a large number of asymptomatic cases so the dengue cases which are actual present could not be reported and mostly misclassified. An estimate has indicated 390 million dengue infections per year of which 96 million were developing clinical manifestations with varied severity.10 Another study reported that about 3.9 billion people, in 128 countries, were at risk of infection with dengue viruses. One of the common causes of acute febrile illness is Dengue fever (DF). Skin involvement is seen in more than half of the patients. **Aim and Objectives:** To study the demographic parameters among the dengue patients. To determine the clinical features and laboratory parameters among the dengue patients with and without skin rash. To determine outcome among the patients with dengue fever and its association with skin rash. **Material and Methods:** A hospital-based, analytical prospective study was conducted in the Department of General Medicine. Patients older than 16 years of age with clinical features and laboratory reports suggestive of dengue infection were included. The study was conducted for a period of one year from November 2018 to October 2019. These patients were further divided based on the skin rash presence and absence. The data obtained was entered in Microsoft Excel and analyzed in SPSS version-22 trial. Analysis was done using unpaired students t-test, ANOVA. A p-value of less than 0.05 was considered significant. **Results:** In total 194 patients with dengue fever were enrolled into the study. About 27 patients were with skin rash. The patients with skin rash were found to have lower platelet levels during the disease course. Patients with skin rash had higher percentage of platelet transfusion which was statistically significant. **Conclusion:** Cutaneous involvement may facilitate clinical diagnosis but it may not be present among all the patients. Present study confirms that there was no significant difference between patients with dengue fever with or without skin rash in complications and mortality. Further studies with larger sample size, longer duration of follow up and more details regarding skin and mucosal involvement may facilitate in classifying the extent of cutaneous involvement

Key Words: Dengue fever, skin rash, thrombocytopenia.

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INTRODUCTION

Dengue a mosquito-borne disease caused by a single-stranded positive-sense RNA virus belonging to Flaviviridae family with 4 distinct serotypes (DENV-1, DENV-2, DENV-3 and DENV-4).[1, 2] It is transmitted by female Aedes mosquito mainly belonging to the species A.aegypti and A.albopictus.[3] Infection with any one dengue serotype provides lifelong immunity to that serotype virus, but there is no cross-protective immunity to the other serotypes.[4] Dengue virus infection among humans causes a spectrum of illnesses ranging from inapparent or mild febrile illness to dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS).[5] Classic dengue fever characterized by sudden onset of fever (saddle-back), weakness, frontal headache, nausea and vomiting, anorexic, altered taste sensation, a mild sore throat, retro-orbital pain, body aches, joint pains, bradycardia, petechiae, facial flushing and rash (scarlatiniform to maculopapular).[6, 7] WHO has simplified the differential diagnosis of DF and DHF/DSS based on the presence or absence of major organ involvement.[3, 8] Skin involvement occur commonly in DF.[9] During recent years the incidence of dengue around the world has

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dramatically grown with a large number of asymptomatic cases so the dengue cases which are actual present could not be reported and mostly misclassified.[1] An estimate has indicated 390 million dengue infections per year of which 96 million were developing clinical manifestations with varied severity.[10] Another study reported that about 3.9 billion people, in 128 countries, were at risk of infection with dengue viruses.[11]

AIM and OBJECTIVES

1. To study the demographic parameters among the dengue patients.
2. To determine the clinical features and laboratory parameters among the dengue patients with and without skin rash.
3. To determine outcome among the patients with dengue fever and its association with skin rash.

MATERIAL AND METHODS

A hospital-based, analytical prospective study was conducted in the Department of General Medicine. Patients older than 16 years of age with clinical features and laboratory reports suggestive of dengue infection were included. The study was conducted for a period of one year from November 2018 to October 2019. There was no ethical violation. Permission was taken from the institutional ethics committee in prior. The data obtained was entered in Microsoft Excel and analyzed in SPSS version-22 trial. Analysis was done using unpaired students *t*-test, ANOVA. A *p*-value of less than 0.05 was considered significant. Patients with acute febrile illness, thrombocytopenia (progressive), increased hepatic transaminase, detectable dengue IgM and soluble non-structural protein 1 (NS1) of the virus by an enzyme-linked immunosorbent assay (ELISA), with other serological tests reporting negative and sterile blood cultures or seroconversion of the convalescent sera, such patients were diagnosed and enrolled into the study as dengue fever (DF). Patients with laboratory evidence of co-infection were excluded. Based on the skin rash patients were divided into subjects with skin rash and without skin rash during their hospital visit. Patients with petechiae or skin lesions (morbilliform) or both were identified to with skin rash. Other details regarding clinical features, laboratory investigations, organ involvement, treatment, and outcome were also recorded.

RESULTS

About 194 patients with dengue fever were included in the present study. Patients with the presence of skin rash were 27 and 167 patients were without skin rash. Mean age among patients with skin rash was 29 years and 31 years among patients without skin rash (SN). There male to female ratio was slightly equal among both the groups. In both the groups the mean duration of fever was 5–6 days. History of abdominal pain, gastrointestinal bleeding, haematuria, overt bleeding, epistaxis and gum bleeding were more among patients with skin rash when compared to patients without skin rash which were statistically significant. Except heart rate during admission, other variables (vital signs and haemogram) didnot had a significant difference between the groups. Table-1 shows details of both the groups regarding demographic parameters, clinical features and disease outcome. Patient with skin rash had lower levels of platelets. Alanine aminotransferase (ALT) or serum glutamic-pyruvic transaminase (SGPT) levels were abnormal in patients of both the groups. Heart rate and SGPT had shown a statistical significance (p-value <0.05). Platelet count during admission and lowest platelet during disease course were not significant (p-value >0.05). There was no difference in the sequential organ failure assessment score among both the groups. Table-2 shows various outcomes among both the groups, inpatient stay and platelet transfusion had shown a statistical significant association (p-value <0.05).

Table 1: Demographic parameters, laboratory findings, clinical features and disease outcome among dengue patients with and without skin rash

Variables	Dengue with skin rash (n = 27)	Dengue without skin rash (n = 167)
Age [mean ± (SD)]	29 ± 10 years	31 ± 13 years
Sex ratio (Male : Female)	16 : 11	94 : 73
Duration of fever in days [mean (min–max)]	5.5 (3–11)	5.8 (1–20)
Fever with chills	19 (70.3)	112 (67)
Myalgia	25 (92.5)	142 (85)
Arthralgia	5 (18.5)	19 (11.3)
Headache	20 (74)	104 (62.2)
Vomiting	14 (51.8)	74 (44.3)
Abdominal pain	8 (29.6)	31 (18.5)
Loose stool	3 (11.1)	12 (7.1)
Dyspnoea	1 (3.7)	13 (7.7)

Cough	3 (11.1)	22 (13.1)
Low sensorium	1 (3.7)	3 (1.7)
Seizure	0	2 (1.1)
Jaundice	0	2 (1.1)
Overt bleeding	7 (25.9)	21 (12.5)
Gastrointestinal bleeding	3 (11.1)	10 (5.9)
Epistaxis	2 (7.4)	3 (1.7)
Haematuria	2 (7.4)	2 (1.1)
Gum bleeding	1 (3.7)	4 (2.3)
Heart Rate (MEAN ± SD)	102 ± 18	97 ± 15
Mean systolic BP, mmHg (SD)	106 ± 13	108 ± 42
Mean diastolic BP, mmHg (SD)	69 ± 11	69 ± 12
Mean RR, per minute (SD)	22 ± 4	20 ± 4
Mean SpO2, % (SD)	96.6 ± 2.31	96.4 ± 4.8
Mean Hb, g% (SD)	14.5 ± 2.3	14.5 ± 2.1
Mean WBC/mm3	5498	5238
Day 1 Mean Platelet/mm3	65,364	78,445
Mean Creatinine, mg%	1.18 ± 0.5	1.17 ± 0.4
Mean Urea, mg%	24 ± 14	26 ± 15
Mean Protein, g/dl	6.91 ± 0.9	6.92 ± 0.8
Mean Albumin, g/dl	3.8 ± 0.6	3.9 ± 1.8
Mean SGOT, U/L	241	244
Mean SGPT, U/L	187	103
Mean Alkaline phosphate, U/L	111	96
Mean SOFA	3.4 ± 2.4	2.9 ± 2.2

Table 2: Outcome among the patients with dengue fever in relation to presence or absence of skin rash

Variables		Skin rash present	Skin rash absent	p-value
Inpatient stay	Yes	4 (14.9)	65 (38.4)	0.002
	No	23 (85.1)	102 (61.6)	
Platelet transfusion	Yes	4 (14.9)	10 (6)	0.024
	No	23 (85.1)	157 (94)	
Oxygen (O2) supplementation	Yes	1 (3.8)	5 (3)	0.356
	No	26 (96.2)	162 (97)	
Requirement of NIV	Yes	1 (3.8)	3 (1.8)	0.098
	No	26 (96.2)	164 (98.2)	
Requirement of inotropes	Yes	1 (3.8)	5 (3)	0.211
	No	26 (96.2)	162 (97)	
Requirement of dialysis	Yes	1 (3.8)	0	0
	No	26 (96.2)	167 (100)	
Death	Yes	0	6 (3.6)	0.217
	No	27 (100)	161 (96.4)	

DISCUSSION

In dengue fever, skin may be commonly involved which was found in about 50–82 p.c patients.[12] Thomas EA *et al*[13] study reported skin involvement among more than 50 p.c of patients, in the present study skin involvement was seen among 13.9 p.c of the patients. Skin histopathology though possible has not been found to have diagnostic or prognostic value and hence is not necessary.[14] In the similar study conducted by Huang *et al*[9] only a total of 45 patients included, patients without shin rash were older than that of present study, mean age of patients in both the groups were similar to that of present study. In the study conducted by Huang *et al*[9] patients without skin rash had thrombocytopenia and required more platelet transfusion, contrasting our findings of patients with skin rash who had lowest level of platelet and required more platelet transfusion. In the study conducted by Huang *et al*[9] only 5 (11 p.c) patients received platelet transfusion while in the present study 14 (7.2 p.c) patients had received platelet transfusion. Platelet transfusions across both the groups were statistically significant.

Huang *et al*[9]	Present study
Overt bleeding (51%)	Overt bleeding (14.4%)
GI bleeding (11.1%)	GI bleeding (6.7%)

Analysis of various outcomes among patients with dengue fever was also done. Among the patients with skin rash platelet transfusion requirement, O_2 requirement, non-invasive ventilation (NIV) requirement, inotropes requirement and dialysis requirement were of higher percentage but requirement of platelet transfusion had a statistically significant association with skin rash. Percentage of deaths was high among patients without skin rash which was not statistically significant. Several immunological, clinical, endothelial and viral biomarkers were found to have prognostic relevance.[15] Limitations of the study included lack of data on disease onset, pattern, type and extent of skin lesions, presence of mucosal lesions. Availability of these data would have made a more robust description of skin lesion. Also children with dengue fever were not included among whom the complications would be higher.[16] A long-term follow-up of the patients was not done.

CONCLUSION

Dengue fever seems to be one of the commonest causes of acute febrile illness among developing countries. Cutaneous involvement may facilitate clinical diagnosis but it may not be present among all the patients. Present study confirms that there was no significant difference between patients with DF with or without skin rash in complications and mortality. But, further studies with larger sample size, longer duration of follow up and more details regarding skin and mucosal involvement may facilitate in classifying the extent of cutaneous involvement and its association with organ involvement and mortality which may give a clearer and better picture.

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