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Original Research Article

Demographic and clinical features associated with dengue fever during an outbreak in North India

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ABSTRACT

Background: Dengue is a viral mosquito borne disease that poses high medical burden in many regions of the world. Early diagnosis and prompt treatment are critical in reducing the overall morbidity and mortality associated with dengue fever. So, this study was conducted to study the overview of dengue fever and its clinical manifestations during an outbreak in patients in a tertiary care hospital.
Methods: It was a cross sectional study which was conducted at a tertiary care hospital GMC Jammu. Nonprobability convenience sampling technique was used to enroll the study participants.
Results: The 222 dengue patients were included in this study with mean age of the patients 33.2±11.32 SD years. Among the dengue patients, 74 (33.3%) tested positive for antigen Ns1Ag. IgM antibodies was positive in 20 (9.0%), IgG antibodies was positive in 10 (4.5%) and 18 (8.1%) of the patients tested positive for both IgG and IgM antibodies. Overall prevalence of antibodies that are specific to dengue was 22%.
Conclusions: Dengue specific antigen was present in most of the patients. The major clinical and laboratory outcomes were fever, myalgia, headache/joint pain/body aches, diarrhea and vomiting. An overall prevalence of 22% of dengue specific antibodies was found in the patients.

Keywords: Dengue outbreak, Dengue fever, Dengue antibodies

INTRODUCTION

Dengue fever is a vector-borne viral infection caused by single-stranded RNA flavivirus, which belongs to the family *Flaviviridae*.[1] Dengue is endemic in both tropical and subtropical areas of the world, mostly in urban and semi-urban areas. About half of the world's population is now at risk of dengue with an estimated 100-400 million infections occurring each year. The incidence of dengue has grown dramatically around the world in recent decades, with cases reported to WHO increased from 505 430 cases in 2000 to 5.2 million in 2019. Majority of cases are asymptomatic or mild and self-managed, and hence the actual numbers of dengue cases are under-reported.[2] There is an estimate of 390 million dengue virus infections per year of which 96 million manifest clinically.[3] A study on the prevalence of dengue estimates that 3.9 billion people are at risk of infection with dengue viruses. The Americas, South-East Asia and Western Pacific regions are the most seriously affected, with Asia representing around 70% of the global disease burden.[4]

The clinical manifestations of dengue may vary from being asymptomatic, or with fever, myalgias, and rash to dreaded complications, such as shock and hemorrhagic fever.[5,6] A study done by Pothapregada et al revealed some atypical manifestations of dengue fever in the sample population which included lymphadenopathy, biphasic pyrexia, hepatitis, febrile diarrhea, refractory shock, altered consciousness, portal hypertension, cholecystitis, acute respiratory distress syndrome, myocarditis, and pericardial effusion.[7] Dengue diagnosis relies on laboratory evaluation so early diagnosis and

prompt treatment are very important to reduce the overall morbidity and mortality of dengue.[8] As the disease is usually self-limiting and currently there is no antiviral therapy available, treatment includes symptomatic management with hydration, analgesics, and control of complications.[9-11] So our research aimed to study the overview of dengue fever and its clinical manifestations during an outbreak in patients in a tertiary care hospital.

METHODS

It was a cross sectional study which was conducted at a tertiary care hospital GMC Jammu, India between 1st July and 31st December 2021. Nonprobability convenience sampling technique was used to enroll the study participants. All patients, irrespective of gender and age, who presented to the inpatient department of Medicine, GMC, Jammu during the study period and were positive for dengue infection based on either nonstructural protein 1 (Ns1Ag) antigen or dengue virus-specific antibodies (immunoglobulin G (IgG) and immunoglobulin M (IgM)) were included. Those patients with unconfirmed diagnosis and co-infection with hepatitis B or C were excluded from the study. Pregnant women were also not included in the study (Figure 1). Thus, a total of 222 patients were studied. Informed verbal and written consent was obtained from the patients after explaining the aim of the study and confidentiality of the patient and data was ensured. A pre-structured proforma used for data collection. Socio-demographic data and details of clinical history and careful clinical examination were collected from the patients. Besides the routine test such as hematocrit, total leucocyte count, platelet count, liver enzyme (ALT and AST), blood urea, and serum creatinine, other investigations were performed according to the clinical conditions of the patients.

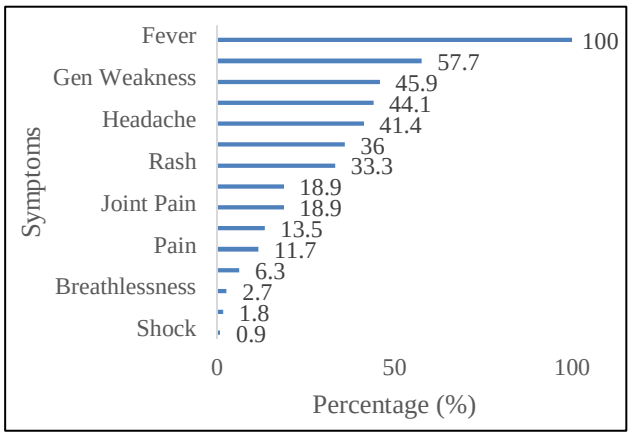

Figure 1: Distribution of symptoms of the dengue patients.

All statistical analyses were performed using the SPSS statistical version 23.0. Categorical variables were presented as numbers and percentages. All continuous values, including hemoglobin (Hb), platelet count, and other red blood cell indices, were presented as mean and standard deviation. All categorical variables were presented as frequency and percentage. Univariate logistic regression was applied to adjust impact of clinical and laboratory variables on bleeding manifestation. A $p<0.05$ was considered as significant. This study was approved by institutional ethics committee GMC, Jammu.

RESULTS

Two hundred twenty-two patients who were suffering from dengue were included in this study. The mean age of the patients was 33.2±11.32SD years and 78.4% of the total were males. More than half (66.7%) were from urban area and rest 33.3% were from rural area. Out of total 222, 6.8% were hypertensive, 4.5% were diabetic and 2.7% were suffering from hypothyroidism. The mean pulse rate was 87.24±9.3 SD. Among the dengue patients, 74 (33.3%) tested positive for antigen Ns1Ag. IgM antibodies was positive in 20 (9.0%), IgG antibodies was positive in 10 (4.5%) and 18 (8.1%) of the patients tested positive for both IgG and IgM antibodies. Overall prevalence of antibodies that are specific to dengue, i.e., IgG, IgM, and both of these, was 22%. The mean number of days of illness on admission was 4.5±1.8 SD. Maximum (79.3%) of the patients were having normal chest x-ray with pleural effusion in 14.4% and costophrenic blunting in 6.3%. Blood transfusion was required in 18.9% of the dengue patients (Table 1).

Table 1: Baseline characteristics of dengue patients, (n=222).

Variables	N	Percent (%)
Age (Mean± SD) (In years)	33.2±11.32	
Gender		
Male	174	78.4
Female	48	21.6
Residence		
Urban	148	66.7
Rural	74	33.3
Comorbidities		
Hypertension		
No	207	93.2
Yes	15	6.8
Diabetes		
No	212	95.5
Yes	10	4.5
Hypothyroidism		
No	216	97.3
Yes	6	2.7
Pulse (Mean ± SD)/min	87.24±9.3	
Chest x ray		
Normal	176	79.3
Pleural effusion	32	14.4
Costophrenic blunting	14	6.3
Blood transfusion		
No	180	81.1
Yes	42	18.9

The clinical symptoms of the dengue patients are summarized in the Figure 1. All (100%) of the patients were having fever, followed by myalgia (57.7%), generalized weakness (45.9%), vomiting (44.1%), headache (41.4%), abdominal pain (36%) and rash in 33.3% of the patients. Neurological manifestation was present in 1.8% and shock in 0.9%.

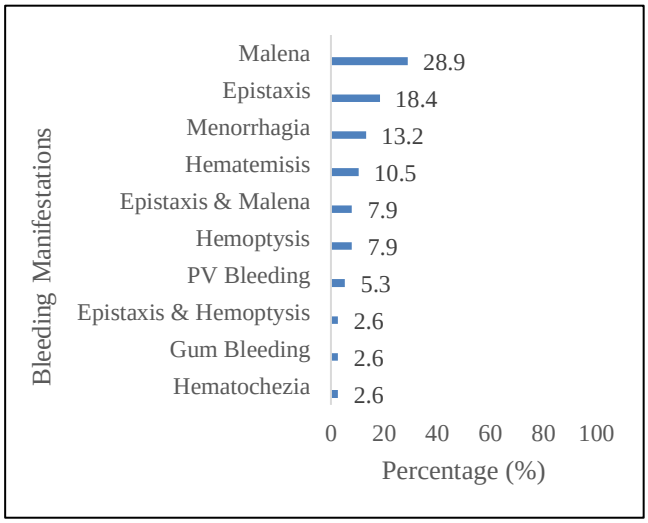

Figure 2: Distribution of patients with bleeding manifestations, (n=76).

Table 2: Descriptive statistics of laboratory parameters, (n=222).

Parameters	Mean (sd)	Minimum	Maximum
RBC (millions/ cumm)	4.46 (0.8)	2.22	8.09
Hemoglobin (mg/dl)	13.42 (2.45)	1.6	18.6
Hematocrit (%)	42.6 (6.44)	26.2	59.8
Total leukocytes count (x1,000)	5.48 (2.53)	0.004	14.0
Platelets count (x1,000)	59.57 (3.57)	10.0	200.0
Serum urea (grams)	24.9 (16.11)	10.0	109.0
Serum creatinine (mg/dl)	0.85 (0.42)	0.1	4.1
Serum bilirubin (mg/dl)	0.83 (0.73)	0.1	5.0
SGOT (IU/L)	176.6 (162.5)	15.0	913.0
SGPT (IU/L)	132.8 (129.9)	15.0	865.0
ALP (IU/L)	118.3 (72.5)	39.0	428.0
Total protein (gm/dl)	6.5 (0.86)	3.2	8.5
Serum albumin (gm/dl)	3.5 (0.41)	2.3	4.4

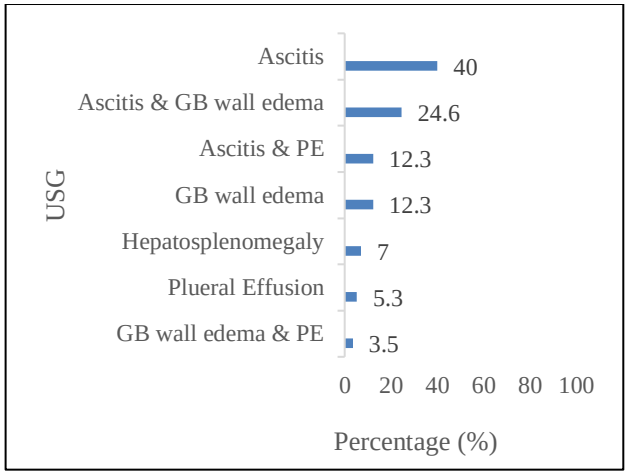

Figure 3: USG findings of the dengue patients, (n=114).

Table 3: Univariate logistic regression for bleeding in dengue patients.

Dependent variable bleeding (Yes)	OR	95% CI	P value
Age (In years)	0.9	0.9-1.00	0.007
Sex	5.8	2.6-12.5	0.0
Hypertension	7.3	0.9-61.8	0.06
Diabetes mellitus	2.3	0.5-9.6	0.2
Day of illness on admission	0.9	0.8-1.1	0.8
Generalized weakness	1.0	0.6-1.2	0.9
Rash	0.6	0.3-1.2	0.1
Neurological complications	0.0	0.0	0.9
Shock	0.0	0.0	0.9
Platelet count	1.0	1.0-1.0	0.1

DISCUSSION

Dengue poses a large burden on the public health systems worldwide. We studied 222 dengue patients admitted in the inpatient department of Medicine, GMC, Jammu. The mean age of the patients was 33.2±11.32 SD years. Males constituted 78.4% of the total and more than half (66.7%) were from urban area. In our study, the overall prevalence of dengue antibodies was 22% which was similar to a study done in Uttar Pradesh that reported a prevalence of 23%.[12] The prevalence was higher than a similar study which was conducted in Hyderabad, where the seroprevalence of IgM was 16.5% and IgG was 12.4%.[13,14]

In our study 100% of the patients were having fever, followed by myalgia (57.7%), generalized weakness (45.9%), vomiting (44.1%), headache (41.4%), abdominal pain (36%) and rash in 33.3% of the patients. Neurological manifestation was present in 1.8% and shock in 0.9%. A study reported that most of the

symptoms of the patients associated with dengue were mainly fever, skin rash, headache, joint pain, vomiting, and diarrhea, which is similar to the findings of our study.[13]

The main bleeding manifestations in dengue patients were Malena, epistaxis and menorrhagia, hematemesis, hemoptysis and per vaginal bleeding. A study done by Shakya et al. revealed atypical bleeding presentations in dengue patients including petechiae, subconjunctival hemorrhage, nosebleeds, as well as menorrhagia in women.[15]

The bleeding manifestations in dengue patients is multifactorial and is directly related to platelet count. The bleeding manifestations in our study (34.2%) was similar to another study, where bleeding occurred in 34.78% of patients with dengue fever.[16] Age and gender of the patients were found as significant risk factors leading to bleeding, while others were not found to have a significant impact on bleeding. In contrast to our study, a study reported that the platelet transfusion was significantly related to bleeding (OR 1.60; 95% CI: 1.43-1.78; p<0.001) in dengue positive patients.[17]

CONCLUSION

We concluded from the study that dengue specific antigen was present in most of the patients, which can be transmitted to others. Males were slightly more infected than females. The major clinical and laboratory outcomes were fever, myalgia, headache/joint pain/body aches, diarrhea and vomiting. About 34.2% of the patients presented with bleeding manifestations. Moreover, an overall prevalence of 22% of dengue specific antibodies was found in the patients.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Suleman M, Lee HW, Zaidi SS, Alam MM, Nisar N, Aamir UB et al. Preliminary Sero epidemiological survey of dengue infections in Pakistan, 2009-2014. Infect Dis Poverty. 2017;6(1):48.
2. Dengue and severe dengue. Available at: https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue. Accessed on 15 August, 2023.
3. Brady OJ, Gething PW, Bhatt S, Messina JP, Brownstein JS, Hoen AG et al. Refining the global spatial limits of dengue virus transmission by evidence-based consensus. PLOS Neglected Trop Dis. 2012;6(8):e1760.
4. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL et al. The global distribution and burden of dengue. Nature. 2013;496(7446):504-7.
5. Duong V, Lambrechts L, Paul RE, Ly S, Lay RS, Long KC et al. Asymptomatic humans transmit dengue virus to mosquitoes. Proc Natl Acad Sci U S A. 2015;112(47):14688-93.
6. Muller DA, Depelsenaire AC, Young PR. Clinical and laboratory diagnosis of dengue virus infection. J Infect Dis. 2017;215(1):S89-95.
7. Pothapregada S, Kamalakannan B, Thulasingam M. Clinical profile of atypical manifestations of dengue fever. Indian J Pediatr. 2016;83(2):493-9.
8. Patel K, Patel D, Das VK. Hematological parameters and its utility in dengue fever: a prospective study. Int J Sci Res. 2016;5:1077-9.
9. Chan CY, Ooi EE. Dengue: an update on treatment options. Future Microbiol. 2015;10:2017-31.
10. Mohan K, Malaiyan J, Nasimuddin S, Devasir RS, Meenakshi-Sundaram PR, Selvaraj S et al. Clinical profile and atypical manifestation of dengue fever cases between 2011 and 2018 in Chennai, India. J Family Med Prim Care. 2020;9(2):1119-23.
11. Lee TH, Lee LK, Lye DC, Leo YS. Current management of severe dengue infection. Expert Rev Anti Infect Ther. 2017;15(1):67-78.
12. Kumar M, Verma RK, Mishra B. Prevalence of dengue fever in Western Uttar Pradesh, India: a gender-based study. Int J Appl Basic Med Res. 2020;10(1):8-11.
13. Ali A, Rehman HU, Nisar M, Rafique S, Ali S, Hussain A et al. Seroepidemiology of dengue fever in Khyber Pakhtunkhawa, Pakistan. Int J Infect Dis. 2013;17(7):e518-23.
14. Khaskheli A, Qazi N, Harani M, Ujan I: Pattern of dengue virus infection cases admitted in tertiary care hospital at Hyderabad, Sindh. J Liaquat Uni Med Health Sci. 2010;9:142-4.
15. Shakya S, Gupta RKN. Clinical profile and outcome of the atypical manifestations of dengue fever at a teaching hospital in North India. Int J Med Health Res. 2020;6:111-4.
16. Shivbalan S, Anandnathan K, Balasubramanian S, Datta M, Amalraj E: Predictors of spontaneous bleeding in dengue. Indian J Pediatr. 2004;71:33-6.
17. Arshad H, Bashir M, Mushtaq US, Imtiaz H, Rajpar R, Alam MF et al. Clinical Characteristics and Symptomatology Associated with Dengue Fever. Cureus. 2022;14(7):e26677.

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