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Original Research Article

Study of dengue outbreak in north west zone of Rajasthan, India

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ABSTRACT

Background: Dengue is one of the most important mosquito-borne viral disease globally. The virus is the member of flavivirus group which typically is a single stranded RNA virus. It is 2nd most common arthropod borne disease in India. Due to its atypical presentation often, dengue missed out as a differential diagnosis. High clinical suspicion and proper investigation help in early diagnosis of dengue and its complications.
Methods: A total of 200 patients were selected to be a part of study after applying inclusion and exclusion criteria. Only those patients were included in the study who had classical features of dengue- fever with chills, body ache, headache and thrombocytopenia and had a positive serology against dengue virus. Patients who had malaria, enteric fever, and negative serology were excluded from the study. Other causes of pancreatitis, pneumonitis, ascitis, cholangitis, pleural effusion and thrombocytopenia are rolled out. All patients were subjected to a detailed history and a thorough clinical examination. A complete blood count, liver function tests, renal function tests, chest X-ray and USG abdomen were also done.
Results: Among 200 patients diagnosed as dengue fever,106 were male and 94 female. 78% patient were from urban and majority were from 20-30 years age group. Average duration of stay in hospital is 3.5 days. Along with fever and malaise, pain abdomen, bleeding diathesis, itching, cough were the major complaints in decreasing order. Different findings in the investigations are: Mean WBC counts - 4251, mean platelet counts - 41831, mean hematocret - 41.8, mean MPV- 8.55, number of patients with deranged ALT/AST- 88(44%). In USG ascitis and edematous gall bladder were the major findings followed by hepatomegaly, splenomegaly and pleural effusion. Number of patients required platelet transfusion were 60. Among these 60 patients average number of RDP transfused is 2 units.
Conclusions: Present study concludes that clinical vigilance about various type of presentations is important as timely recognition can influence outcome and may prevent compilations.

Keywords: Dengue, North-west Rajasthan, Outbreak

INTRODUCTION

Dengue is one of the most important mosquito-borne viral disease that has become major health problem worldwide especially in tropical countries like India. The dengue virus, a member of the genus Flavivirus of the family Flaviviridae, is an arthropode-borne virus that includes four different serotypes (DEN-1, DEN-2, DEN-3, and DEN-4).[1] Dengue virus is a positive-stranded encapsulated RNA virus and is composed of three structural protein genes, which encode the nucleocapsid or core (C) protein, a membrane-associated (M) protein, an enveloped (E) glycoprotein and seven non-structural (NS) proteins. It is transmitted mainly by Aedes aegypti

mosquito and also by *Aedes albopictus*. The first reported case of dengue like illness in India was in Madras in 1780, the first virologically proved epidemic of DF in India occurred in Calcutta and Eastern Coast of India in 1963-1964. According to NVBDCP, cases are increasing from 99913 in 2015, 129166 in 2016 to 157220 in 2017. Its distribution varies from state to state. In Rajasthan, dengue cases doubled within 2 years from 4043 in 2015 to 8387 in 2017.[2] This trend has become a cause of concern for the country. Every year during the monsoon months and later, many parts of the country witness outbreaks of dengue infection. Dengue virus infection presents with a diverse clinical picture that ranges from asymptomatic illness to DF to the severe illness of dengue hemorrhagic fever/dengue shock syndrome (DHF/DSS).[3] Patients may present like pain abdomen, bleeding diathisis like rash, hematuria, respiratory symptoms. Four main characteristic manifestations of dengue illness are (i) continuous high fever lasting 2-7 days; (ii) haemorrhagic tendency as shown by a positive tourniquet test, petechiae or epistaxis; (iii) thrombocytopoenia (platelet count <100×109/l); and (iv) evidence of plasma leakage manifested by haemoconcentration (an increase in haematocrit 20% above average for age, sex and population), pleural effusion and ascites, etc. Dengue virus infection exhibit varied clinical presentation, hence, accurate diagnosis is difficult and relies on laboratory confirmation. The condition is usually self-limiting and antiviral therapy is not currently available. Supportive care with analgesics, hydration with fluid replacement, and sufficient bed rest forms the preferred management strategy.

METHODS

Study site

This study was conducted as a hospital based observational study at Sardar Patel Medical College, a tertiary care centre in north-west region of Rajasthan. A total of 200 patients were selected to be a part of study after applying inclusion and exclusion criteria. These were patients who were admitted to Medicine wards at SP Medical College from August 2017 to December 2017.

Study design

It's an observational study conducted in tertiary care centre during the period August - December 2017, for study of deferent aspects of dengue. A total of 200 patients were selected to be a part of study after applying inclusion and exclusion criteria. Only those patients were included in the study who had classical features of dengue- fever with chills, body ache, headache, rash, bleeding manifestations and thrombocytopenia and had a positive serology test i.e. NS1, IgM, IgG antibodies against dengue virus. Patients who had malaria, enteric fever and patient with negative serology were excluded from the study. Other causes of pancreatitis, pleural effusion, cholangitis, ascitis were rolled out. All patients were subjected to a detailed history and a thorough clinical examination. A complete blood count, liver function tests, renal function tests, chest X-ray and USG abdomen were also done.

Serological test

The rapid detection of Dengue infection was performed by commercially available kits. The kit provides two windows, one detection of NS1 antigen and other for dengue specific IgM and IgG antibodies. All tests in this study were carried out in accordance with the manufacturer's instructions and results were examined and interpreted accordingly; the blood sample of individuals containing IgM or/and NS1 were considered as primary/acute dengue infection, i.e. they were infected by DENV for the first time.

The tests indicating IgG + IgM/NS1 were considered as secondary infection, i.e. such patient was already infected by dengue in past. If the individual was detected positive for IgG but negative for other tests (IgM and NS1), were considered as past infection or secondary DENV infection with symptoms. The presence color line (control) in each result window indicates a negative result. NS1 antigen is found from the first day and up to 9 days after onset of fever in sample of primary or secondary dengue infected patients.

Usually IgM does not become detectable until 5-10 days after the onset of illness in cases of primary dengue infection and until 4-5 days after onset of illness in secondary infections. In primary infections, IgG appear the 14th day and persist for life. Secondary infections show that IgG rise within 1-2 days after the onset of symptoms and induce IgM response after 20 days of infection (as per SD Bioline Dengue Kit manual)

Statistical analysis

The data was entered in Excel 2007 and SPSS software package (version 20) was used for statistical analysis. Group comparison for prevalence of IgG and IgM and other clinical symptoms was done using ANOVA.

RESULTS

Different findings of present study are

In this study, among 200 patients, 106 were male and 94 female. As shown in Table 1, which shows age wise distribution of patients. Most of the patients belong to age group 21-30year, second most 31-40years. It indicates dengue is more prevalent in adult age group (Table 1). Table 2 shows area wise distribution of patients. According to it most of the patients (72%) came from urban background. Its due to presence of tertiary centre in the urban area (Table 2 and Figure 2).

Table 1: Age wise distribution.

Age in years	No. of patients	%
<20	30	15%
21-30	82	41%
31-40	50	25%
41-50	20	10%
>50	18	9%
Total	200	100

Table 2: Area wise distribution.

Area	No. of patients
Urban	156 (78%)
Rural	44 (22%)

Table 3 shows the complaints at the time of admission. According to it majority of patients presented with fever and malaise followed by pain abdomen, bleeding diathesis. Itching and respiratory complaints were seen in 14 patients only (Table 3).

Table 3: Complaints at the time of admission.

Complaints	No. of patient
Fever and malaise	194
Pain abdomen	52
Bleeding diathesis	42
Itching	14
Respiratory complaints	14

Mean duration of hospital stays -3.5 days. Number of patients required platelet transfusion were 60.

Among these 60 patients mean number of RDP transfused were 2 unit. Different findings in the investigations were Mean WBC counts-4251, Mean platelet counts-41831, Mean hematocret-41.8, Mean MPV-8.55, Number of patients with deranged ALT/AST-88(44%).

Table 4 shows the different USG findings in dengue patients. Majority of patients had ascitis (59), edematous gall bladder (48), hepatomegaly (23) and spleenomegaly (16) as USG findings in decreasing order. Very few patients had rare findings like pleural effusion (8), consolidation (4) and pancreatitis (3) (Table 4).

Table 4: Different USG findings.

USG findings	No. of patients
Ascitis	59
Edemtous gall bladder	48
Hepatomegaly	23
Splenomegaly	16
Pancreatitis	3
Pleural effusion	8
Consolidation	4

Table 5: Serological finding.

Serology test	No. of patients
NS1	127
Ig M	48
Ig G	25

Table 5 shows serological finding in dengue patients. According to it majority of patients came positive in NS1 (127), followed by IgM (48) and IgG (25) (Table 5).

DISCUSSION

In the present study authors found 106 males and 94 females were affected, and most of them were in the age group of 21-30 and majority were from urban. Similar observations made by Kumar S et al, at Bikaner.[4] Authors found 52 cases presented with acute abdomen similar observation made by Shabbir et al, who reported acute abdomen presentation in 32% of the cases.[5] Acute abdominal pain presentation was found only in 4.15% of the cases in a study done by Weerakoon et al in Sri Lanka.[6] Thus authors are observing changing clinical pattern of dengue fever similar to other illness like malaria. High percentage of acute abdomen presentation in current study may also be because our hospital is tertiary care referral hospital therefore serious patients come to authors' institution or it may also be due to change in virulence of dengue virus.

In the study done by Kumar S et al, at Bangalore, Karnataka, India, a total of 100 patients of dengue fever were studied, out of which 70 patients had elevated AST levels and 73 had elevated ALT levels. Fever followed by headache was the most common symptoms at presentation while vomiting and pain abdomen in the early stage suggested hepatic dysfunction. 46% of the patients had hepatomegaly, 15% of patients had splenomegaly with or without hepatomegaly. Pleural effusion was the second most common finding seen in 26% of patients at presentation. Icterus and ascites were seen in 13% and 14% of patients respectively. AST and ALT were statistically higher in these patients and in those developing complications like DHF, DSS, hepatic failure, ARDS, ARF and encephalopathy.[7]

In the study done by Shukla V et al, at Era's Lucknow Medical College it was shown that the average platelet count was 35,000.[8] In the present study authors found average platelet count is 41,831.

In a study done by Babaliche P et al, at Belgaum, Karnataka, India it was shown that 25% of the patients had an elevated total bilirubin level.[9] This was similar to a study done by Asim A et al, in Lahore, Pakistan in 2014 where he had divided the patient shaving elevated liver enzymes in to three groups i.e. mild (two-fold increase in LFT), moderate (3-4 fold increase in LFT) and severe (greater than 4 fold increase in LFT based on the degree of elevation of the liver enzymes.[10]

Kunal G et al, showed that 85% of the patients had an elevated AST level.[6] ALT levels were raised in 73% of the patients, 32 of whom mild, 30 had moderate and 11 had severe elevation of the enzyme.[11] In present study authors found 44% patient had deranged AST/ALT levels.

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