Original Research Article

Clinico Epidemiological Profile of Pediatric Patients with Dengue Fever Admitted in RIMS Adilabad during 2018 Dengue Outbreak

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Abstract

Dengue viral infection is an epidemic in tropical and subtropical countries including India. Epidemics are very common in areas of poor sanitation where there are substandard housing and the need for water storage Adilabad district is a backward district with poor tribal population and epidemics of dengue are very common in this region. Methods: This study was conducted in the Department of Pediatrics, Rajiv Gandhi Institute of Medical Sciences [RIMS], Adilabad the data was collected during the months of September 2018 to December 2018. There was an outbreak of dengue during this period and child patients reported to RIMS hospital with signs and symptoms of dengue fever according to WHO guidelines were included. Exclusion criteria were fevers of unknown origin, children positive for malaria, enteric fever and signs and symptoms not suggestive of dengue. A total of (n=67) patients were identified during the study period from September 2018 to December 2018 out of which (n=46) were male and (n=21) were female patients. 5ml of blood was obtained in a vacutainer by experienced technicians and CBP, Hematocrit, Dengue serology, were performed NS1Ag, IgM and IgG were performed. Results: In the present study a total of n= 67 patients were included as per the inclusion criteria. Out of the 67 (n=46) were male and (n=21) were female patients. The clinical signs and symptoms of the patients were assessed and the common presentation in all the dengue causes was a fever in n=67 (100%) cases. The range of temperature was from 101 °F to 105 °F at the time of admission. Myalgia and headache were present in n=35 (52.23%) cases. Leukocytopenia was seen in 2(2.9%) and leucocytosis was seen in 17 (25.37%) cases. The mean platelet counts were found to be between 50,000 to 100,000 37(55.22%) cases. The platelet counts were observed to be falling from the first day till the 4th day and in 8 (11.94%) cases the platelet count was reduced to less than 50000/mm^3 on the 5th day. NS1Ag was found to be positive in 44.77% cases. The dengue serology for detection of IgM and IgG was performed in the patients IgM was found to be positive in 22(32.83%) IgG was found to be positive in 19(28.35%) of cases. Conclusion: The tribal Adilabad region is one of the important dengue epidemic areas with dengue outbreaks common. The present study has shown that children aged between 8-12 years are the common victims of dengue infection. Male children were commonly affected twice as compared to females. Rapid diagnosis and early treatment ensure complete recovery of the patient without any complications. Efforts must be directed to prevent such outbreaks in this area.
Keywords: Dengue, Epidemiology, pediatric patients, Adilabad.

INTRODUCTION

Dengue Fever/Dengue Hemorrhagic Fever is one of the leading causes of hospitalization of children in Southeast Asia [1]. It is caused by the flavivirus and it is characterized by the presence of biphasic fever including myalgia, arthralgia, rash, leucopenia, thrombocytopenia, and lymphadenopathy [2]. It is caused by serotypes of single-strand RNA flavivirus (dengue virus [DENV]-1, -2, -3 and -4) transmitted by Aedes aegypti mosquito which generally acquires the virus during feeding on the blood of an infected person and when it bites the non infected person the virus is transmitted [3]. It has an incubation period of 4-10 days, infection by 4 virus serotypes can produce a wide spectrum of illness although most infections are asymptomatic and subclinical and the recovery of infection from one serotype can confer life-long protection against that serotype but not against the other three serotypes [4]. In developing countries like India epidemics of dengue are straining the limited resources of public health care system. Aedes aegypti has been propagated in regions like rapid urbanization, environmental degradation the lack of water supply and improper management, sanitation and disposal of solid

waste. The first dengue fever case in India was reported from Vellore and first DHF occurred in Calcutta in 1963 [5]. The annual incidence of Dengue in India is estimated to be 7.5 to 32.5 million [6]. The dengue infection in many cases is self-limiting but complications such as hemorrhage and shock and life-threatening [7]. DHF is characterized by the appearance of hemorrhagic manifestations in addition to the above the dengue shock syndrome is characterized by shock, capillary leakage and altered mental status [8]. DSS is life-threatening and if not monitored and treated properly it could be fatal. Children below 15 years are usually more susceptible to develop dengue hemorrhagic fever. The pathogenesis of DHF/DSS is thought to be an antibody-dependent enhancement in secondary infections with a virus of different serotype [9]. This was found in many epidemical studies from Cuba and [9-11]. Some reports have suggested the host genetic determinants of disease and severity and it has been found that the black patients may have lower incidences of DHF as compared to other patients [12-14]. Studies in this field have also shown that children are more susceptible to develop DHF as compared to adults [15, 16]. Thrombocytopenia is one of the manifestations of the dengue infection it is due to alteration in megakaryo cytopoieses by the infection of human hematopoietic cells and impaired progenitor cell growth. This results in a myriad of platelet dysfunctions (platelet activation and aggregation), increased destruction or consumption (peripheral sequestration and consumption). The transient imbalance between mediators of inflammation like cytokines and chemokines that occurs during severe dengue is due to the heavy burden of viral load leading to derangement of hemocoagulation followed by plasma leakage, bleeding, and shock. As the tribal district of Adilabad is one of the endemic areas for dengue we had a dengue outbreak during the rainy season the year 2018 and since the pediatric patients were more commonly involved we studied the epidemiology of dengue in tribal Adilabad region.

MATERIALS AND METHODS

This study was conducted in the Department of Pediatrics of Rajiv Gandhi Institute of Medical Sciences [RIMS], Adilabad. Ethical clearance for the study was obtained from Institutional Ethical Committee and written consent was obtained from the parent/guardian of the child involved in the study after explaining the procedure of the study in their local language. The data was collected during the months of September 2018 to December 2018. There was an outbreak of dengue during this period and child patients reported to RIMS hospital with signs and symptoms of dengue fever according to WHO guidelines were included. Exclusion criteria were fevers of unknown origin, children positive for malaria, enteric fever and signs and symptoms not suggestive of dengue. A total of (n=67) patients were identified during the study period from August 2018 to October 2018 out of which (n=46) were male and (n=21) were female patients. They were subjected to detail history and examination to find the symptoms and signs. The clinical examination was done at the time of admission and follow all the vital signs of the children were monitored regularly during the course of stay in the hospital if required tourniquet test was done to observe bleeding manifestations. Plasma leakage if suspected was assessed for the patients with Chest X-ray, physical examination and hematocrit changes. 5ml of blood was obtained in a vacutainer by experienced technicians and CBP, Hematocrit, Dengue serology, were performed. NS1Ag, IgM and IgG were performed by Rapid Dengue Combo (NS1Ag, IgG/IgM) manufactured by Bio labs Diagnostics Mumbai. The patients were treated with oral paracetamol, Intravenous fluids, blood products, and inotropes as per the WHO dengue guidelines [5]. All the data collected was entered in Excel sheet and evaluated with SPSS version 17.

RESULTS

In the present study, a total of n= 67 patients were included as per the inclusion criteria. Out of the 67 (n=46) were male and (n=21) were female patients. The male to female ratio was approximately 2:1. The most common age group of the patients involved with dengue fever was 8 -12 years having n=27 (40.29%) of the patients and the next common age group involved in the study was 5 – 8 years n=21 (31.3%). The age group 2 - 5 having n=14 (20.8%) patients and from 2 – 5 years age group had 3(4.7%) similarly 12 -14 years had n=2(2.91%) patients shown in Table-1.

Table-1: Showing the profile of the patients involved in the study

Age group	Male	Female	Total	Percentage
0 – 2	1	2	3	4.7
2 – 5	9	5	14	20.8
5 – 8	17	4	21	31.3
8 – 12	17	10	27	40.29
12 - 14	2	0	2	2.91
Total	46	21	67	100

The clinical signs and symptoms of the patients were assessed and the common presentation in all the dengue causes was fever in n=67 (100%) cases.

The range of temperature was from 101 °F to 105 °F at the time of admission. Myalgia and headache were present in n=35 (52.23%) cases. The presence of Rash

was found in n=21(31.34%) cases and vomiting was in n=11 (16.42%) cases. Purpura was seen in n=4(7.46%) and hypotension was seen in n=6(8.95%) and diarrhea

was n=4(5.97%) pleural effusion and splenomegaly was noted in n=1(1.4%).

Table-2: The clinical signs and symptoms of the patients in the study

Signs/symptoms	Male	Female	Total	Percentage
Fever	46	21	67	100
Myalgia	23	12	35	52.23
Headache	23	12	35	52.23
Vomiting	5	6	11	16.42
Diarrhea	3	1	4	5.97
Rash	9	12	21	31.34
Abdominal pain	12	9	21	31.34
Hypotension	4	2	6	8.95
Hepatomegaly	3	0	3	4.47
Splenomegaly	1	0	1	1.4
Purpura	3	1	4	7.46
Pleural effusion	1	0	1	1.4
Ascites	0	0	0	0.0

The Total Leucocyte Count was found to be normal in 48(71.64%) and leukocytopenia was seen in 2(2.9%) and leucocytosis was seen in 17 (25.37%) cases. The mean platelet counts were found to be between 50,000 to 100,000 in 37(55.22%) cases. The platelet counts were observed to be falling from the first day till the 4th day and in 8 (11.94%) cases the platelet count was reduced to less than $50000/mm^3$ on the 5th

day. NS1Ag, IgM and IgG were performed in all the cases and NS1Ag assay is considered to be a very useful marker in the acute phase of infection. NS1Ag was found to be positive in 44.77% cases. The dengue serology for detection of IgM and IgG was performed in the patients IgM was found to be positive in 22(32.83%) IgG was found to be positive in 19(28.35%) of cases shown in Table-3.

Table-3: Showing the laboratory investigations of the patients in the study

Laboratory findings	Male	Female	Total	Percentage
Leucocyte Count				
Normal Total Leucocyte Count	33	15	48	71.64
Leukocytopenia	02	00	02	2.9
Leucocytosis	11	6	17	25.37
Platelet count				
Normal platelet count	13	9	21	31.34
50,000 – 100,000	28	9	37	55.22
Platelet count < 50,000	5	3	8	11.94
Dengue Antibody				
IgM	12	10	22	32.83
IgG	11	8	19	28.35
NS1Ag positive	19	11	30	44.77

The mean duration of stay of the patients in the hospital was between 1-5 days in 44 patients and in 22 patients the mean duration of stay was 5 – 10 days and

only in 1 patient the duration was greater than 10 days given in Table-4.

Table-4: Showing the mean duration of stay of patients in the hospital

Mean Duration of Hospital stay [days]	Male	Female
1-5	**32**	**12**
5 – 10	**13**	**09**
> 10	**01**	**00**

DISCUSSION

Dengue has now become an important disease of tropical and subtropical regions of the world like India. The spread of mosquito-borne viral diseases has

become active in backward and tropical regions like Adilabad. The clinical manifestations of Dengue fever are quite variable depending on the page of the patient and the type of virus strain involved [17]. In the present study, we found the male preponderance in the dengue

cases which is in agreement with other similar studies done in the past throughout India [18, 19]. The probable reasons may be due to increased outdoor activities in male children. In the present study, the most commonly affected age group was 8 – 12 years having 40.29% of cases a similar finding has been reported by Acharya S *et al.*, [20] with 40% of cases in between age groups 5-10 years. Other studies in this area have reported similar distribution [21, 22]. The distribution of dengue cases by age and sex is important because it helps in identifying the population which is mostly at risk with the disease and preventive programs can be planned accordingly. As known the clinical presentation of dengue infection varies widely while the majority of patients recover after a short illness other signs of progress to severe disease manifested by vasculopathy, plasma leakage, and hemorrhagic diathesis. In the year 2009 WHO has classified dengue in two major entities, Dengue and severe dengue [23]. This classification is easily acceptable for clinical and epidemiological purposes. However, efforts are on to develop standards for detailed discrimination of dengue clinical types [24-26]. We in the present study found fever, headache, myalgia, rash and abdominal pain as the important clinical presentations in children with dengue. Although the non-specific features like fever, headache, myalgia may also develop in other types of viral illnesses it becomes difficult sometimes to diagnose mild dengue infection clinically alone. A definitive diagnosis always requires dengue serology and isolation [12, 14]. A study by RV Dhobale *et al.*, found high-grade fever in 93% followed by abdominal pain and vomiting. They also reported that headache, retro-orbital pain, myalgia and skin rash were very rare [27, 28]. In this study, we found the presence of rash in 31.34% and Headache in 53.23% of cases. A study by AH Khan *et al.*, have found that the fever associated with chills and rigors, body aches, bone pain, headache, myalgia, rash, and low platelet counts leucocytopenia and increased ALT with hemorrhagic manifestations were some of the important parameters for probability of dengue fever [14] we in the present study found hemorrhagic manifestations like rash purpura in 7.46% of the patients. Shah I et al; studying the outbreak of dengue in Mumbai Maharashtra in the year 2004 found hepatomegaly and vomiting among the prominent clinical features in dengue patients [17]. The serological evaluation in our study showed NS1Ag 30(44.77%), IgM was positive in 22(32.83%) and IgG 19(28.35%). In the present study we found the platelet counts from 50,000 – 100,000 in 37(55.22%) patients and platelet counts <50,000 were found in 8(11.94%) of patients. The mean duration of stay in the hospital during the study was found to be 5.5 days range was from 3 – 5 days and > 10-day stay were for one male patient who developed the complication of pleural effusion. In the present study, 2 patients were with platelet counts <20,000 they were managed as per whom guidelines and the fatality rates were not recorded in the present study.

CONCLUSION

The tribal Adilabad region is one of the important dengue epidemic areas with dengue outbreaks common. The present study has shown that children aged between 8-12 years are the common victims of dengue infection. Male children were commonly affected twice as compared to females. Rapid diagnosis and early treatment ensure complete recovery of the patient without any complications. Efforts must be directed to prevent such outbreaks in this area.

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