Original Research Article

An Observational study of Clinico- Haematological Profile of Dengue Fever among Pediatric Patients

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Abstract

Background: Over the years, Dengue fever outbreaks are increasing both in number and distribution in India. **Aim:** To evaluate the incidence of dengue fever, clinical picture and laboratory parameters of dengue fever. **Subjects and Methods:** In this study all probable cases of dengue fever in age group 2-14 years were included in study. Their detailed clinical and laboratory profile were recorded in pre designed proforma. Cases were classified according to WHO 2009 classification. Patients with positive for Dengue markers (IgM/NS1 antigen) are considered as Dengue fever. **Results:** Total of 130 cases were included in the study out of these 74 were males and 56 were females with majority of them were in 10-15 years of age. Majority of patients presented with headache (51.5%) followed by vomiting (39.33%) and muscular pain (26.92%). Hess test, positive in 9 , with Spleenomegaly in 15 and Hepatomegaly in 60 cases. Lab parameters revealed thrombocytopenia and leucopenia. **Conclusion:** Dengue fever can presents with varied clinical and laboratory manifestation. Early diagnosis and appropriate management can reduce morbidity and mortality markedly.

Keywords: Dengue, Fever, Pediatric patients.

Introduction

Dengue is an acute viral infection with potential fatal complications[1]. According to the World Health Organization, the incidence of dengue globally has shot up 30-fold in the past 50 years. The cumulative dengue diseasesburden has attained an unprecedented proportion in recent times with a sharp increase in the size of human population at risk. Dengue disease presents highly complex pathophysiological, economic, and ecologic problems[2].

A recent study done at the University of Oxford using a map-based approach to model how many dengue cases were occurring in various parts of the world, estimated that India had the largest number of dengue cases, with about 33 million apparent and another 100 million asymptomatic infections occurring annually[3]. Dengue viruses (DV) belong to family Flaviviridae and there are four serotypes of the virus referred to as DV-1, DV-2, DV-3 and DV-4. It is transmitted mainly by Aedes aegypti mosquito. All four serotypes can cause the full spectrum of disease from asubclinical infection to a mild self limiting disease, the dengue fever (DF) and a severe disease, the dengue haemorrhagic fever/dengue shock syndrome (DHF/ DSS) that may be fatal[4]. Due to limitations of World Health Organisation (WHO) 1997 dengue classification guidelines, WHO guidelines were revised in 2009,[5] as dengue without warning signs, dengue with warning signs and severe dengue[6-8]. Potential variability in clinical picture of dengue disease and impact of heterogeneous genetic and geographical factors towards this spectrum summons for extensive studies of clinical picture and prognosis in dengue disease in different geographical location. Lack of such data from North India lead us to undertake this study.

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This work will clarify in detail the incidence of dengue fever in dengue like fever, clinical picture and laboratory parameters of serologically confirmed hospitalised cases of dengue fever.

Materials and Methods

This prospective study was conducted at Department of Pediatrics and neonatology, at Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga. The study was conducted over a period of 1 year from March 2017 to February 2018. The study was approved by institutional research and ethical research committee. Informed consent was taken from all the participants after explaining the study protocol.

The present study was an observational study. A total of 50 patients were recruited in the study. In the present research, all cases of Dengue like fever were considered in the study and out of these patients with positive for Dengue IgM/NS1 antigen were considered Dengue positive patients.

Inclusion Criteria

All probable cases of Dengue fever ranging from 02-14years of age

Exclusion Criteria

Cases presented with fever and other symptoms like UTI Pneumonia, Malaria, Typhoid, ASOM

Fever among patients was screened for Dengue through a thorough history, detailed examination and lab investigations, cases were admitted,treated and followed up for the treatment outcomes.

Statistcal Analysis

Statistical analysis was performed using SPSS (Statistical Package for the Social Sciences) for Windows (version 15.0).

Results

In this study, total of 130 dengue patients who met the inclusion criteria; who was diagnosed by any one of Dengue NS I antigen, anti-dengue IgM antibodies (card test) or IgM enzyme-linked

immunosorbent assay (ELISA), were included and analyzed.

The demographic details are depicted in Table 1, different clinical features of these patients are shown in Table 2 and Table 3 shows various clinical signs of children admitted with DF.

Most patients were from rural area (57%) when compared to urban area (43%). Most common age group affected was adolescents (10.1-15 years), youngest affected was 1 year of age.

Table 1: Demographic characteristics

Characters	No. of patients	%
Age in years		
0-5 years	23	18
5.1-10 years	49	38
10.1-15 years	58	44
Sex		
Male	74	57
Female	56	43
Epidemiological features		
Urban	55	43
Rural	75	5
History of DF in family	32	25
History of DF in neighbourhood	2	1.5

Table 2: Symptoms of dengue fever

Symptoms	No of patients (n=130)	%
Fever	130	100
Headache	67	51.5
Arthralgia/myalgia	35	26.92
Vomiting	51	39.23
Abdominal pain	32	24.61
Bleeding	4	3.0
Altered sensorium	3	2.30
Seizure	2	1.53
Rash	13	10

Fever was present in all 130 patients (100%), next common symptom was headache 67 (51.5%) followed by vomiting 51 (39.23%) and myalgia (26.92%). Bleeding from different sites of the body was evident in 4 patients (3%). Among these 2 patients had gum bleeding and other 2 patients had gastrointestinal bleeding in the form of hematemesis. 13 patients (10%) had rash, which was erythematous maculopapular type and 15 patients (11.53%) had petechiae.

60 children (46.15%) had hepatomegaly and abdominal tenderness was seen in 32 patients (24.69%). 32 children had hypotension (24.61%). One child had dengue encephalitis which recovered without any neurological deficits, and 1 had malaria (vivax) and dengue together. 2children had generalized seizure of which 1 was diagnosed to have encephalitis and other had febrile seizure. Two children died due to severe dengue (shock with multi organ dysfunction).

Table 3: Signs of dengue fever

Signs	No of patients (n=130)	%
Tachypnoea	2	1.53
Tachycardia	6	4.61
Hypotension	32	24.61
Hess test positive	9	6.92
Petechiae	15	11.53
Hepatomegaly	60	46.15
Oedema	5	3.84
Plasma leak	3	2.30
Encephalopathy	1	0.76
Splenomegaly	15	11.53
Abdominaltenderness	32	24.69
Flushing	58	44

Most of the patients admitted were in group A (68.46%) followed by group B (28.46%) and only 4 patients (3.07%) had characteristics of group C (Table 4). Various clinical parameters like headache, hemorrhagic manifestations, rash and hepatomegaly were compared in all three groups and a significant p value (<0.0001) was observed.

Table 4: Type of dengue and number of patients

Type of dengue	No of patients (n)	%
Group A	89	68.46
Group B	37	28.46
Group C	4	3.07

Haematologic parameters like haemoglobin andhaematocrit on admission and the lowest recorded platelet count during the hospital course was considered for this study. The mean and standard deviation of hemoglobin, hematocrit and platelet count were calculated. The mean Hb was 12.86 g/dl with standard deviation of 1.73 and the mean haematocrit was 39.12% with standard deviation of 3.28. The mean platelet count was 104202/mm^3 with a standard deviation of 47879. 35 patients had platelet count of <100000 cumm (26.92%). The lowest platelet count noted in this study was 8200 mm^3.

Table 5: Comparison of clinical parameters in types ofdengue

	Group A	Group B	Group C
Headache	50	15	2
Hemorrhagicmanifestation	0	0	4
Rash	10	2	1
Hepatomegaly	41	16	3

Discussion

We have found that the varied spectrum of dengue fever (DF) has ranged from some known clinical presentations of fever,rash, headache to some atypical presentations like encephalitis. Some features are increasing in the recent outbreaks like neurological manifestations (encephalitis), as evidenced by recent studies[7].In DF, cutaneous manifestations can vary from maculopapular rash, petechiae and flushing. In our study, we found maculopapular rash in 10% and flushing in 44%cases. In a study of 300 patients by Nadia A et al, flushing was present in 28.7% and 44.9% had maculopapular rash[5]. In a study of 62 patients in Japan, by Itoda et al, rash was more frequent in 82% cases[6]. In a north Indian study by Karoli R et al, rash was present in 26% cases while 16% had cutaneous hypersensitivity[7]. Rahim MA et al, also found rash in high frequency of 78.5% in a Bangladesh based study[8]. Thrombocytopenia is one of the important causes of devoloping petechial rash and other mechanism like immunologic cause may be an explanation for developing these rashes. Dengue virus when interacts with host cells, there occurs release of cytokines and stimulation of immunologic mechanism by which vascular endothelial changes, infiltration of mono-nuclear cells and perivascular edema occurs[5]. In our study the mean platelet count was 104202/ mm^3. Bleeding diathesis is a known feature of DF because of low platelet count and leakage of plasma from blood vessels. Bone marrow suppression, immune mediated clearance and spontaneous aggregation of platelets to virus infected endothelium may be responsible for such thrombocytopenia.In our study, we found only 4 patients (3%) had bleeding episodes in the form of gum bleeding and hematemesis, ina north Indian study by Seema A et al, 8% patients had bleeding episodes while 26% patients had platelet count below 20,000/cmm and 84% had <1 lakh/cmm[9]. On the other hand, in a Delhi based study by Tripathy BK et al, hematemesis, melena and epistaxis were found in 28.28%, 26.78% and 14.28% respectively but only 12.85% cases had platelet count <70,000/cmm[10]. But in a Hyderabad based study by Khan AH et al, only 5% patients had bleeding while 40% had thrombocytopenia[11]. A Studyconducted on 84 cases in Sudan by Ageep AK et al bleeding was present in 93% of cases and thrombocytopenia in 88% cases[12].In north Indian children, a study was done by Mittal H et al, which revealed thrombocytopenia in 92.6% while bleeding was present in 48.8% cases[13].Headache due to systemic inflammatory mediators, is a well-known feature in dengue fever. In our study, we found 51.5 % patients presented with headache. In a study done by Singh NP et al it was 61.6%[14].But in some studies, like by Itoda I et a1 done in Japan, headache was present in 90% cases[6]. On the other hand thenorth Indian study by Seema A et a1, reported headache in only 9% of cases[9]. We have noted some neurological manifestations which were not very common in previous outbreaks.One child had dengue encephalitis. MRI showed brainstem hyper intense lesion. He recovered without neurological deficits with disappearance of intensities on follow up scans.Neurological involvement in dengue may occur because ofneurotropism of the virus, immunologic mechanism, cerebral anoxia, intracranial haemorrhage, hyponatremia, cerebral oedema, fulminant hepatic failure with portosystemic encephalopathy, renal failure or release of toxic products. In a study by Kamath SR et al, neurological manifestations were noticed in 20% of the patients. In our study, it was only 0.76 %[2].In our study, 26.92% of patients had thrombocytopenia which was much lesser when compared to a study done by Ritu karoli et al (86%)[7]. Mortality was less (1.53%) in our study when compared to same study done by Ritu karoli et al (6%)[7].

Early interventions and awareness of the disease among our study population are probably the reasons for favourable outcome in our study.

Conclusion

The current study was an observational hospital based study. All probable cases of Dengue fever admitted in the hospital were recruited for the study and patients positive for Denguemarkers would be considered as dengue fever, while those that were not positive for the three assays were considered dengue negative. All subjects presented with fever. A majority of study subjects presented with headache and muscular pain. A very less percentage of patients had a positive Hess test, followed by an even less frequency of positive Petechial rash, Ecchymotic Patch, and Mucosal bleed. There was correlation between platelet counts and bleeding manifestations with increased frequency of petechial rash, ecchymotic patch, mucosal bleed in patients with thrombocytopenia. A greater proportion of school age children (>6 years) were seen to have lower platelet count,however the difference was statistically not significant. Nearly 70% subjects had at least one abnormal dengue biomarker, and majority of patients were discharged after improvement.

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