ISSN:0975-3583,0976-2833 VOL12,ISSUE05,2021

CLINICAL SPECTRUM OF DENGUE IN CHILDREN AND CORRELATION OF ITS SEVERITY WITH COAGULATION PROFILE AND PLATELET COUNT- AN ORIGINAL RESEARCH

Dr. Ravindra S. Sonawane[1], Dr.Esha Gupta[2], Dr. Sagar V. Sonawane[3], Dr. Akshay N. Patil[4]

[1]MBBS, MD [Paediatrics], Professor and Head of department, Dr Vasantrao Pawar Medical College, Hospital and Research Centre, Nashik, Maharashtra, India
[2]MBBS, MD[Paediatrics],Clinical Associate, H N Reliance Hospital,Mumbai, Maharashtra, India
[3]MBBS, DCH, DNB [Paediatrics], Associate Professor, Department of Paediatrics, Dr Vasantrao Pawar Medical College, Hospital and Research Centre, Nashik, Maharashtra, India.
[4]MBBS, MD[Paediatrics], Senior Resident, Department of Paediatrics, Dr VasantraoPawar Medical College, Hospital and Research Centre, Nashik, Maharashtra, India.

Corresponding Author:
Dr. Akshay N. Patil
Department of Paediatrics, Dr VasantraoPawar Medical College, Hospital and Research Centre, Nashik, Maharashtra, India.
Email id: akshaypatil1165@gmail.com

ABSTRACT

Background: Dengue fever is an acute febrile infectious disease in subtropical and tropical areas that is progressively making its way from being "one of the great neglected diseases of mankind" towards being acknowledged as one of the world's major infectious diseases.

Aim: The aims of the study were to study the clinical manifestation of patients with dengue fever along with various laboratory parameters in patient with dengue fever.

Methods: This is a prospective observational study will be conducted at Department of Paediatrics of a tertiary care centre. The study was conducted between October 2016 and September 2018 on50 patients between the age group 0-18 years and a confirmed diagnosis of dengue fever. The study included consents by parents/guardian, data collection by meticulous history talking and clinical examination, appropriate investigations followed by statistical correlations.

Results: In our study incidence rate of dengue was 29.8% and prevalence was 2.9 %. The most common age group amongst study population wasmore than 10 years (36%) followed by 6 to 10 years (34 %) and 1 to 5 years (24%). There was male predominance (56%) as compared to female (44%). Fever was the most common clinical features observed amongst study population followed by Nausea (62%) and headache (42%) On general examination, high grade fever, Low grade fever, Pallor and Tachycardia was present in 48%, 52%, 8% and 36% of study population respectively. TLC was deranged in 80 % of dengue cases. SGPT deranged was deranged in 28 % of dengue cases. Sixty six percent of the study population had Platelet count of< 1.5 lakh and 34% had > 1.5 lakh. PT, INR and PTT was observed deranged in 8%, 6 % and 12 % of study population respectively.

Conclusion: Most of the dengue cases were diagnosed by NS 1 followed by IgM and IgG. Leucopoenia, deranged coagulation profile and thrombocytopenia were associated with sever dengue infection.

Keywords: Dengue, Fever, IgM, IgG, International Normalized Ratio [INR], NS-1, Thrombocytopenia.

INTRODUCTION

The etiologic agents include all four serotypes which belong to the genus Flavivirus in the family Flaviviridae. The principle vector is mosquito, AedesAegypti, which breeds largely indoors in clean waters mainly in artificial water containers, and feeds on humans in daytime

The clinical manifestations of dengue vary with the age and immunity of the patient. It can present as 1) in apparent infection 2) non- specific febrile illness, 3) classic dengue fever, 4) dengue hemorrhagic fever, 5) Dengue shock syndrome (DSS) and 6) encephalopathy and fulminant liver failure[1]

Guzman et al. studied to show that most cases present as classic dengue fever with high fever, retro-orbital pain, severe myalgia, arthralgia, and rash. However, in some cases, illness progresses to life-threatening dengue haemorrhagic fever/dengue shock syndrome (DHF/DSS), characterized by vascular leakage leading to hypovolemic shock and a case fatality rate up to 5%.[2,3]

Early identification of patients at risk of developing severe dengue is critical to provide timely supportive

ISSN:0975-3583,0976-2833 VOL12,ISSUE05,2021

care, which can reduce the risk of mortality to < 1%. Recent approaches have shown that petechiae, thrombocytopenia (platelet count ≤100,000 cells/mm3), positive tourniquet test, rash, and other signs and symptoms can distinguish dengue from other febrile illness.
Treated DHF/DSS is associated with 3% mortality whereas untreated is associated with 20% mortality.[3,4] Hence early prediction of severe dengue in patients without any warning signs who may later develop severe DHF is very important to give the best supportive care since approved vaccines for immunization are yet to be commercialized. An ideal biomarker should be able to identify individuals who are at risk of developing severe dengue. The warning signs were assessed by the following clinical parameters: abdominal pain or tenderness, persistent vomiting, clinical fluid accumulation, mucosal bleed, lethargy, restlessness, and liver enlargement >2 cm associated with laboratory parameters such as increase in haematocrit (HCT) concurrent with rapid decrease in platelet count. Mild haemorrhagic manifestations such as petechiae and mucosal membrane bleeding (e.g., nose and gums) may be present.[4,5]
We have performed this study to evaluate the clinical manifestations of patients with dengue fever and to study various laboratory parameters in patients with dengue fever.

MATERIALS ANDMETHODS
A prospective observational study was conducted at Department of Paediatrics of a tertiary care centre in the period of October 2016 to September 2018.
Sampling Technique and Sample Size wasbased on the previous literature, the prevalence of Thrombocytopenia in cases of Dengue fever was approximately 40%. So, final sample size was taken as 50 diagnosed pediatric patients of Dengue fever admitted in our hospital.

Inclusion Criteria:
1. Patient between the age group of 0 – 18 years.
2. Patients with confirmed diagnosis of dengue fever (positive test for NS1 antigen/IgM dengue/IgG dengue).

Exclusion Criteria:
1. Patient with serological test negative for dengue.
2. Patients having fever of more than 2 weeks duration.

All patients were admitted and treated as indoor patients. On admission, detailed history and complete physical examination findings were recorded. The vitals (temperature, pulse, respiration, blood pressure) of the patients were recorded on admission and thereafter till discharge.
In all patients, complete blood count and serological tests for dengue (NS1 antigen/ IgM dengue/ IgG dengue) were done depending on duration of fever on presentation. Other tests were done depending on clinical presentation of patients.
All the data was noted down in a pre-designed study proforma. Qualitative data was represented in the form of frequency and percentage. Association between qualitative variables was assessed by Chi-Square test with Continuity Correction for all 2 X 2 tables and Fisher's exact test for all 2 X 2 tables. Quantitative data was represented using Mean ± SD and Median and IQR (Interquartile range). Analysis of Quantitative data between the two groups was done using unpaired t-test if data passed 'Normality test' and by Mann-Whitney Test if data failed 'Normality test'. A p-value < 0.05 was taken as level of significance.Results were graphically represented where deemed necessary. SPSS Version 17 was used for analysis and Microsoft Excel 2010 for graphical representation.

RESULTS
As seen in the table no. 1, the most common age group amongst study population was more than 10 years (36%) followed by 6 to 10 years (34 %) and 1 to 5 years (24%). As seen in the above table, there was male predominance (56%) as compared to female (44 %). As seen in table no. 2, fever was the most common clinical features observed amongst study population followed by Nausea (62%) and headache (42%). Table no. 3 describes High grade fever, Low grade fever, Pallor and Tachycardia was present in 48%, 52%, 8% and 36% of study population respectively. As seen in the table no. 4, TLC was deranged in 88% of dengue cases. 66% of the study population had Platelet count of< 1.5 lakh and 34% had > 1.5 lakh was explained in the table no. 5. As seen in the table no. 6, PT was observed deranged in 8% of study population.INR was observed deranged in 6.3 % of study population as shown in table no. 7.

Table no 1: Age and sex distribution of dengue cases

Demographic characters	Subgroups	Frequency	Percent %

ISSN:0975-3583,0976-2833 VOL12,ISSUE05,2021

Age group	Less than 1 year	3	6
	1 to 5 years	12	24
	6 to 10 years	17	34
	more than 10 years	18	36
Sex	Male	28	56
	Female	22	44

Table no 2: Clinical Presentation of Dengue

Clinical Features	Frequency	Percent
Fever	49	98
Retro orbital pain	17	34
Headache	21	42
Sore throat	4	8
Petechiae	6	12
Rash	8	16
Anorexia	8	16
Arthralgia	8	16
Hematemesis	2	4
Melaena	1	2
Itching/purities	17	34
Difficulty in breathing	4	8
Vomiting	6	12
Abdominal distension	8	16
Peri orbital puffiness	8	15
Anasarca	6	12
Altered sensorium	4	8
Decreased urine output	7	14
Nausea	31	62
Hepatomegaly	4	8

Table no 3: General Examination

General examination	Frequency	Percent %
High grade fever	24	48
Low grade fever	26	52
Pallor	4	8
Tachycardia	18	36

Table No 4: TLC deranged

TLC deranged	Frequency	Percent %
Yes	44	88
No	6	12
Total	50	100

Table no 5: Platelet count (lakhs/cu.mm)

ISSN:0975-3583,0976-2833 VOL12,ISSUE05,2021

Platelet count (lakhs/cu.mm)	Frequency	Percent %
< 1.5 lakh	33	66
> 1.5 lakh	17	34
Total	50	100

Table no 6: Coagulation Profile (PT/ INR, PTT)

PT Deranged	Frequency	Percent %
No	46	92
Yes	4	8
Total	50	100

Table no.7: INR

INR deranged	Frequency	Percent %
No	47	94
Yes	3	6
Total	50	100

DISCUSSION

Globally 50 million dengue infections are reported annually. The first case of dengue fever in India was reported during 1956 from Vellore and the first dengue haemorrhagic fever occurred in Calcutta in 1963. In India the annual incidence is estimated to be 7.5 to 32.5 million[6] According to the WHO the case fatality rate for dengue is roughly 5%. *Aedes albopictus* was found to be the most abundant vector in transmission of dengue in the areas surveyed, followed by *Aedes aegypti*. Among the dengue viruses DENV-2 is the prevailing serotype. The case fatality rate in patients with severe dengue infection which consists of dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS) can be as high as 44%[7.] If intervention occurs early, mortality is less than 1%. Dengue fever presents as common viral fever which can cause dangerous complications. Dengue re infection is observed to be more severe in children due to immunological phenomenon.[8]

In our study, Incidence rate of dengue was found to be 29.8%, Prevalence (Disease Burden) was2.9 % and Seropositivity of Dengue among clinically suspected dengue cases was 47% in our tertiary care hospital. This finding is in agreement with the study conducted by Bhardwaj LM et al. in which out of total 394 indoor suspected cases of dengue, 127 patients came out to be seropositive. (32.2%).[9]

Similarly in the study conducted by SriramPothapregada et al, in which out of 398 children admitted with dengue fever the diagnosis was confirmed in 261 cases (65.5%).[10]

In the present study, the most common age group suffered with dengue infection amongst study population was more than 10 years 36%) followed by 6 to 10 years (34 %) and 1 to 5 years (24%). This finding is in agreement with the study conducted by Shubhankar Mishra et al., The maximum number of cases were seen in the group >11 years of age (34.02%) and the least affected age group was infants.[11]More involvement of adolescent children can be explained by diurnal adaptation of *Aedes* mosquito in stored water and as these children work or play in open field. This makes them prone to repeated attacks by *Aedes* mosquitoes.

In the present study, Dengue infection was more predominant in males (56%) as compared to female (44%). This finding is in agreement with the study conducted by Shubhankar Mishra et al., there was significant difference in male : female ratio in our study (3.4 : 1) whereas in other studies there were no such significant differences.[11,12] This was probably due to more importance being given to the male children in the Indian society. Covered dress used by females may be another cause for fewer incidences.

In the present study, Fever was the most common clinical features observed amongst study population followed by Nausea (62%) and headache (42%). This finding is in agreement with the study conducted by Shubhankar Mishra et al., Fever was present in almost all (100%) of the cases; myalgia (76.8%) and abdominal pain (54.3%) were common. Hepatomegaly (43.8%) was the most common physical finding.[13] Similarly in the study

ISSN:0975-3583,0976-2833 VOL12,ISSUE05,2021

conducted by Bhardwaj LM et al. in which Fever was the most common symptom present in almost 100% cases, followed by headache 85.36%, myalgia 81.30%, nausea and vomiting 61.78% and joint pain 52.03%. Among haemorrhagic manifestations, petechiae and gum bleed were most common.[14] Similarly Selvan T et al. also reported that the most common symptoms noticed were fever 90.1% (512/568) followed by myalgia 88.3% (502/568), decreased appetite 88.2% (501/568), retro-orbital pain in 84.5% (480/568), vomiting 84.1% (478/568).[15]

In the present study, TLC was deranged showing leucopoenia in 80 % of dengue cases. In the present study, Sixty six percent of the study population had Platelet count of< 1.5 lakh and 34% had > 1.5 lakh.

This finding is in agreement with the study conducted by Anju Aggarwal et al., 67% of study population had less than 50000 (per mm^3).[16]Liver enzymes (SGPT) were deranged in 28 % of dengue cases. Bhardwaj LM et al. also reported in their study that common laboratory alteration among dengue cases viz.leukopenia, thrombocytopenia and marked elevation in AST and ALT were observed in the frequency of 51.21%, 70.73%, and 17.07% respectively.

In the present study, PT, INR and PTTwas observed deranged in 8%, 6 % and 12 % of study population respectively. This finding is in agreement with the study conducted by Shubhankar Mishra et al., Parameters like prothrombin time (PT) and activated partial thromboplastin time (aptt) were abnormal in 23 (23.7%) patients.[17,18] A similar finding was also noted in other studies. Various factors apart from thrombocytopenia lead to bleeding in dengue. They are decreased platelet function, fibrinogen consumption, prolongation of PT/APTT.[19,20]

CONCLUSION

Dengue is one of the dreaded fevers with variable presentations and complications. The most common clinical feature was fever followed by headache and nausea. The clinical spectrum of dengue included myalgia, joint pain, and haemorrhagic manifestation, retro-orbital pain and deranged liver enzymes.Most of the dengue cases were diagnosed by NS 1 followed by IgM and IgG. Leucopoenia, deranged coagulation profile and thrombocytopenia were associated with sever dengue infection.

REFERENCES

1. Halstead SB. The XXth century dengue pandemic: need for surveillance and research. World Health Stat Q. 1992;45(2-3):292-8.
2. Nathan Michael B., Dr. DayalRenu-Drager, Guzman Maria."Epidemiology, Burden of disease and Transmission. WHO Dengue guidelines for diagnosis, treatment, prevention and control, New edition 2009.1: 3-17.
3. Jelinek T, Mühlberger N, Harms G, Corachán M, Grobusch MP, Knobloch J et al. European Network on Imported Infectious Disease Surveillance. Epidemiology and clinical features of imported dengue fever in Europe: sentinel surveillance data from Trop Net Europ. Clin Infect Dis. 2002 Nov 1;35:9:1047-52.
4. Sirivichayakul C. Dengue infection in children in Ratchaburi, Thailand. Clinical manifestations. PloSNegl Trop Dis. 2012; 6:2:e1520.
5. Pancharoen C, Kulwichit W, Tantawichien T, Thisyakorn U, Thisyakorn C et al. "Dengue Infection: A Global Concern." J Med Assoc Thai. 2002;85 (Supp 1): S25 – S3
6. Guzman MG, Halstead SB, Artsob H, Buchy P, Farrar J. Dengue: A continuing global threat. Nat Rev Microbiol. 2010; 8: S7–16.
7. Ghosh SK, De S, Sarkar U, Ghosh M, Chatterjee MK, Samanta S. Clinical profile of dengue during 2005 outbreak in Kolkata and predictive markers of dengue haemorrhagic fever. J Indian Med Assoc. 2011; 109:11:790-3.
8. Potts JA, Thomas SJ, Srikiatkhachorn A, Supradish PO, Li W. Classification of dengue illness based on readily available laboratory data. Am J Trop Med Hyg. 2010; 83: 781–8.
9. Low JG, Ong A, Tan LK, Chaterji S, Chow A. The early clinical features of dengue in adults: Challenges for early clinical diagnosis. PLoSNegl Trop Dis. 2011; 5:e1191.
10. Gregory CJ, Santiago LM, Arguello DF, Hunsperger E, Tomashek KM. Clinical and laboratory features that differentiate dengue from other febrile illnesses in an endemic area–Puerto Rico, 2007-2008. Am J Trop Med Hyg. 2010; 82:922–29.
11. J. Barniol, R. Gaczkowski, E. V. Barbato et al., "Usefulness and applicability of the revised dengue case classification by disease: multi-centre study in 18 countries," BMC Infectious Diseases. 2011;106:11:123-34.
12. National Vector Borne Disease Control Programme website. "Introduction." Guidelines for Clinical Management of Dengue fever, Dengue haemorrhagic fever, Dengue shock syndrome, National Vector Borne Disease Control Programme 2008. 1: 1-2.

ISSN:0975-3583,0976-2833 VOL12,ISSUE05,2021

13. Guzman Maria et al. Epidemiology, Burden of disease and Transmission." WHO Dengue guidelines for diagnosis, treatment, prevention and control, New edition 2009.1: 3-17.
14. Thisyakorn U, Thisyakorn C. "Dengue hemorrhagic fever." In: Dupont HL, Steffen R, editors. Textbook of travel medicine and health. 2nd ed. Hamilton: B.C: Decker Inc. 2011; 312 – 4.
15. Rigau-Perez, J. G., G. G. Clark, et al. "Dengue and dengue haemorrhagic fever." Lancet. 1998; 352(9132): 971-977.
16. Srikiatkhachorn and S. Green, "Markers of dengue disease severity," Current Topics in Microbiology and Immunology. 2010; 338:67–82.
17. Zaman SQ, Roshan E, Mahmood A, Mahmud S. Clinical Spectrum, Progress Of Disease, Grades Of Severity And Outcome Of Children With Dengue Fever. Editorial Advisory Board. 2016 Feb;66:16.
18. Ghosh SK, De S, Sarkar U, Ghosh M, Chatterjee MK, Samanta S. Clinical profile of dengue during 2005 outbreak in Kolkata and predictive markers of dengue haemorrhagic fever. J Indian Med Assoc. 2011; 109:11:790-3.
19. Prathyusha CV, Rao MS, Sudarsini P, Rao KM. Clinico-haematological profile and outcome of dengue fever in children. International Journal of Current Microbiology and Applied Sciences. 2013;2:10:338-46.
20. Dhooria G, Bhat D, Bains H. Clinical profile and outcome in children of dengue hemorrhagic fever in North India. Iranian Journal of Paediatrics. 2008;18:3:222-8.