



ASSESSMENT OF PAEDIATRIC DENGUE PATIENT AT RURAL TERTIARY CARE HOSPITAL

Pediatrics

Amol Jadhav	Junior Resident, Department of Pediatrics, Swami Ramanand Teerth Rural Medical College, Ambajogai, Beed, Maharashtra India- 431517
Sambhaji C. Chate*	Professor and HOD, Department of Pediatrics, Swami Ramanand Teerth Rural Medical College, Ambajogai, Beed, Maharashtra India- 431517. *Corresponding Author
Sunil Holikar	Associate Professor, Department of Pediatrics, Swami Ramanand Teerth Rural Medical College, Ambajogai, Beed, Maharashtra India- 431517
Ramachandra Nagargoje	Assistant professor, Department of Pediatrics, Swami Ramanand Teerth Rural Medical College, Ambajogai, Beed, Maharashtra India- 431517

ABSTRACT

Background: Dengue is one of the dreadful infectious diseases in pediatric age group. The present study was undertaken to evaluate the clinical profile, laboratory findings, outcome and serology of children suffering from dengue fever admitted in a rural tertiary care hospital.

Method: Total 248 dengue cases were enrolled in the study during a period from 1 January to 31st December 2019. A detailed history, demographic variables, clinical examination and relevant laboratory investigations were assessed and data were entered into Microsoft Excel to calculate percentages.

Results: Maximum numbers of cases were in the age group of 3-7 years (42.74%) with male predominance (136; 55%). The number of dengue patients increased progressively from the month of June (17; 6.85%) to maximum in the month of December (51; 20.56%). Fever (244; 98.38%) was the most common presenting symptoms. 222 (89.51%) cases found to have NS1 positive serology and 66 (26.61%) have IgM serology. Laboratory parameters seen were, raised haematocrit (167; 67.33%), leucopenia (90; 36.29%), thrombocytopenia (178; 71.77%) and liver enzymes (SGOT and SGPT) (248; 100%). Right-sided effusion (8; 3.22%) and hepatomegaly (18; 7.25%) were the commonest clinical findings. 216 cases were hospitalized for <1 week, 243 cases were discharged and 5 patients were died.

Conclusion: In present study the incidence of dengue was more in male child, peak age group being 3-7 years with most admissions during the month of December. Fever, positive NS1 and dengue IgM were the main findings. Laboratory parameters like leucopenia, raised haematocrit and thrombocytopenia along with raised SGOT and SGPT were strongly associated with risk of developing complications.

KEYWORDS

Dengue, Children, Serology, Fever, Haematocrit, Leucopenia, Thrombocytopenia, Enzymes, Hepatomegaly

INTRODUCTION

Dengue infection is the most rapidly spreading mosquito-borne viral disease in the world and estimated 50 million cases of severe dengue occur in Asian countries with a case fatality rate of lesser than 5%. Of these, at least 90% are children younger than 15 years old [1]. The first dengue fever in India was reported during 1956 from Vellore and the first dengue haemorrhagic fever occurred in Calcutta in 1963 [2]. Since then, more than 60 outbreaks have been reported in India from different states with maximum dengue deaths were from Haryana, Kerala, and Punjab state [3]. In Maharashtra, the dengue outbreak was reported from Parbhani [4] and Dhule [5]. In 2018, about 11,011 dengue cases and 55 deaths were reported from Maharashtra as per the National Vector Borne Disease Control Program of the government. As per the State Health Department, over 1,231 cases of dengue were reported across Maharashtra in 2019 [6].

Moreover, until a few years ago, dengue occurred with the onset of monsoon when the humidity was on the rise. But now, the pattern has changed, owing to shift in climatic patterns and other factors. Climate change has a profound effect on the global distribution and burden of infectious diseases and the range of mosquito-borne diseases may expand due to climate change. Dengue fever presents as common viral fever which causes dangerous complications. Dengue reinfection is observed to be more severe in children due to immunological phenomenon [7]. It is characterized by a high fever (104°F) that is accompanied by two of the following symptoms: severe headache, pain behind the eyes, muscle and joint pains, nausea, vomiting, swollen glands or rash and the symptoms usually last for 2 to 7 days [6].

There are few studies to assess the clinical profile, laboratory finding and outcome of the dengue infection in children less than 12 years of age in western Indian state of Maharashtra. Therefore present study was undertaken to evaluate the clinical profile, laboratory findings, outcome and serology of children suffering from dengue fever admitted in a rural tertiary care hospital.

MATERIALS AND METHODS

This prospective observational study was conducted in total 248

dengue cases in the Department of Pediatrics, at a Swami Ramanand Teerth Rural Medical College Ambajogai, Maharashtra, India over a period of one year from 1 January to 31st December 2019.

A detailed history was taken. The diagnosis of dengue infection was based on clinical features like fever of 1 to 5 days duration, body aches, headache, arthralgia, vomiting, skin rash, petechiae, mucosal bleeds, hepatomegaly, jaundice, abdominal pain and serologically confirmed by NS1 antigen or IgM ELISA. Children with any identified specific infection or febrile illness more than 14 days and serologically dengue negative cases were excluded from the study. Approval from hospital ethical committee and written consent of the parents were obtained. All cases were subjected to appropriate investigations like complete blood picture, liver function tests, chest X-ray, ultrasonography of the abdomen. The variables recorded were demographic profile, clinical manifestations, and laboratory parameters like total leucocyte count, hematocrit, platelets count, liver transaminases (SGPT, SGOT). Outcome of the children was studied as duration of hospital stay (<1 week / > 1 week), discharged and death. Data were entered into Microsoft Excel to calculate number and percentages.

OBSERVATIONS AND RESULTS

Total 248 dengue cases were studied during a study period of one year, among them 136 (55%) were male and 112 (45%) were female child. The maximum numbers of patients were in the age group of 3-7 years (42.74%) followed by 7-10 years (26.20%) as shown in Table 1.

Table 1: Age Group Wise Distribution Of Dengue Patient

Age Group	No. of Patients	Percentage
Up to 1 year	31	12.5
1 year - 3 years	18	7.2
3 years - 7 years	106	42.74
7 years - 10 years	65	26.20
>10 years	28	11.29
Total	248	100

Figure 1 shows the age and gender wise distribution of dengue patient. The maximum males and females were in the age group of 3-7 years followed by in 7-10 years.

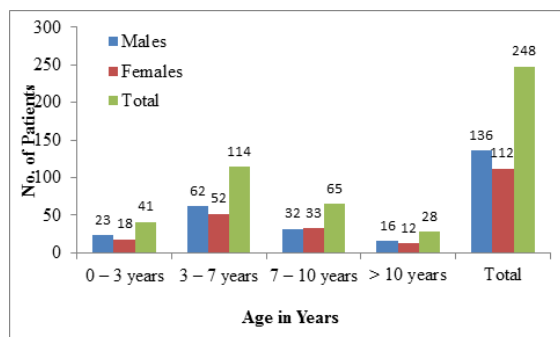


Figure 1: Age and Gender Wise Distribution of Dengue Patient

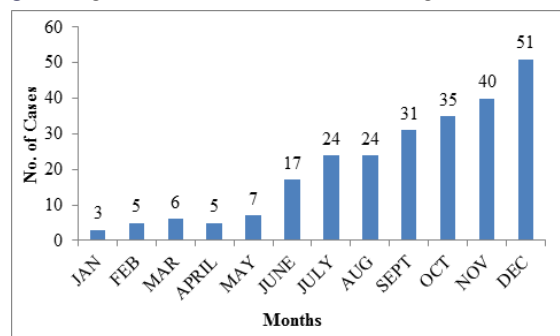


Figure 2: Month Wise Distribution Of Dengue Cases

Figure 2 show the monthly distribution of the dengue cases. From June number of cases increases up to December, total no of cases in 2019 was 248, among them maximum number of cases (20.56%) were seen in month of December followed by in November (16.12%).

The common clinical manifestations were fever (98.38%), vomiting (60.48%) and abdominal pain (45.16%). Other clinical manifestations of the patients are shown in table 2.

Table 2: Clinical Features Of Dengue Patient

	No. of Cases	Percentage
Fever	244	98.38
Abdominal Pain	112	45.16
Vomiting	150	60.48
Retro-Orbital Headache	71	28.62
Cough	56	22.58
Arthralgia	55	22.17
Epistaxis	49	19.75
Melena	2	0.80

The majority of the patients were positive for NS1 222 (89.51%), IgM was positive in 66 (26.61%) and IgG was positive in 11 (4.43%). Both IgG and IgM was positive in 3 (1.20%) patient and both NS1 and IgM positive serology in 39 (15.72%) cases, (Table 3).

Table 3: Shows Investigation Detail Of Dengue Cases

Investigation	Variable	Cases	Percentage
TLC	<4000	90	36.29
	4000 – 11000	138	55.64
	>11000	20	8.06
Platelet	>100000	70	28.22
	50000 – 100000	81	32.66
	<50000	97	39.11
SGOT	50 – 200	224	90.32
	200 – 1000	22	8.87
	>1000	2	0.80
	Total	248	100
SGPT	50 – 200	241	97.17
	200 – 1000	7	2.82
	>1000	0	0
	Total	248	100
HCT	>35	167	67.33
	<35	81	32.66
CXR (pleural effusion)	Right	8	3.22

CXR (pleural effusion)	Right	8	3.22
	Left	3	1.20
	Bilateral	3	1.20
	Total	14	5.64
USG Abdomen	Hepatomegaly	18	7.25
	Splenomegaly	5	2.01
	Ascites	15	6.04
Dengue Serology	NS 1	222	89.51
	IGM	66	26.61
	IGG	11	4.43
	IGG +IGM	3	1.20
	NS 1 +IGM	39	15.72

In investigations, normal leucocyte count was seen in most of the patients (138; 55.64%). Leucopenia was seen in 90 (36.29%) cases and leucocytosis in 20 (8.06%) cases. Thrombocytopenia (platelets <1 lakh) was seen in 178 (71.77%) cases out of which 97 (39.11%) cases had platelet count less than 50,000. Among the liver enzymes, SGOT and SGPT were elevated in all the patients (248; 100%). Raised haematocrit (>35%) was observed in 167 (67.33%) cases. 14 (5.64%) of the cases were detected to have pleural effusion on chest X-ray (PA view). Right-sided effusion (8, 3.22%) was most commonly seen. Left and bilateral effusion was seen in 3 (1.20%) cases each. Ultrasound of the abdomen detected hepatomegaly in 18 (7.25%) of the cases, which was the most common finding followed by splenomegaly (5, 2.01%) and ascites (15, 6.041%), (Table 3).

The duration of hospital stay in majority of cases (216; 87%) was <1 week while in 32 (13%) cases duration of hospital stay was >1 week. Out of 248 patients, 243 (97.98%) cases were discharged from hospital and 5 (2.01%) patients were died.

DISCUSSION

Dengue is an important arboviral infection in tropical countries like India. Global incidence of dengue fever has increased dramatically in the recent decades [8]. In present study, total 248 dengue cases were studied during a period of 1 year from 1 January to 31st December 2019 in Swami Ramanand Teerth Rural Medical College Ambajogai, Maharashtra India. The majority of patients were in the age group of 3-7 years (42.74%) which is comparable with the previous studies [9-13] and all these studies reported maximum number of cases below 10 years of age. The mean age of children with dengue being higher (>5 years), this could possibly be explained as older children are more likely to be exposed to the environment and therefore more likely to experience mosquito bites. Boys (55%) were more commonly affected than girls. Both Gupta et al [14] and Chakrabarti et al [15] also reported maximum cases of male gender. Girls wearing body covering clothes could be a factor; also boys doing more outdoor activities and they are more likely to be brought to the hospital due to gender bias.

The number of dengue patients increased progressively from the month of June to maximum in the month of December. The majority of patients were reported during monsoon and post-monsoon seasons, in accordance with the earlier reports of the dengue transmission [11, 16]. Probable reason behind it may be due to heavy rainfall and flood which occurred in the months of July and August and this season is very favorable for high breeding of the vector, i.e., *Aedes aegypti*. This seasonal outbreak of disease transmission is very important at local level for effective control measures [17]. Mild symptoms of dengue can be confused with other illnesses that cause fever, aches and pains, or a rash and symptoms of dengue typically last 2-7 days. In existing study, the common presenting features of dengue patients were fever (98.38%), vomiting (60.48%) and abdominal pain (45.16%). Other clinical manifestations were retro-orbital headache (28.62%), cough (22.58%), arthralgia (22.17%) and epistaxis (19.75%). Least common presenting feature was melena (0.80%). These findings are quite similar to the observations of other studies [10, 13, 18, and 19].

In dengue serology, maximum cases (222 cases) were NS1 and IgM (66 cases) positive, because all were sick on admission NS1 and IgM tests were done [13, 20]. NS1 antigen detection was found to be reliable and sensitive early indicator of dengue infection. 11 cases were IgG positive. Both IgG and IgM was positive in 3 (1.20%) patient and both NS1 and IgM positive serology in 39 (15.72%) cases. These findings are correlated with the study done by Mobarak et al [11] and Alam et al [21]. Decreasing sequential leukocyte count with increasing haematocrit and decreasing platelet count were reliable indicators of developing dengue complications [12, 22]. In current study,

leucopenia was seen in 90 (36.29%) cases and leucocytosis in 20 (8.06%) which is similar to findings of Shekar et al [10]. Thrombocytopenia (platelets <1 lakh) was seen in 178 (71.77%) cases out of which 97 (39.11%) cases had platelet count less than 50, 000, this is comparable with the study done by Potdar et al [13].

The spectrum of liver dysfunction in children with dengue infection is wide and has been associated with disease severity. The incidence of hepatic dysfunction is more in dengue shock syndrome and dengue haemorrhagic fever [23]. Liver involvement in dengue is usually manifested by hepatomegaly (clinically) or increase in liver enzymes (biochemically). Severe dengue can manifest with fulminant hepatic failure and has been the cause of death in many children with dengue infection [24, 25]. Upon injury to the liver, the enzymes (SGOT and SGPT), are released into the bloodstream, and as a consequence these enzymes are believed to be sensitive indicators of liver damage. In the present study liver enzymes i.e. SGOT and SGPT were elevated in all dengue patients (248; 100%) as has been shown in numerous studies [23, 26]. Raised haematocrit (>35%) was observed in 167 (67.33%) cases which is in agreement with earlier studies [10, 27].

14 (5.64%) of the cases were detected to have pleural effusion on chest X-ray (PA view). Right-sided effusion (8, 3.22%) was most commonly seen, this is in accordance with the study by Potdar et al [13] and Mishra et al [19]. Ultrasound of the abdomen detected hepatomegaly in 18 (7.25%) of the cases, which is the most common finding followed by splenomegaly (5, 2.01%) and ascites (15, 6.041%). Most of our patients (87%) were hospitalized for less than one week; this result is at par with study done by Shekar et al [10] and Mishra et al [19]. Out of 248 patients, 243 (97.98%) cases were discharged from hospital and 5 (2.01%) patients were died which is correlated with other studies [11, 21, 28].

CONCLUSION

In present study the incidence of dengue was more in male child, peak age group was being 3-7 years with most admissions during the month of December. Fever with vomiting and abdominal pain, positive NS1, dengue IgM were the main findings found in children with dengue. Laboratory parameters like leucopenia, raised haematocrit and thrombocytopenia along with raised SGOT and SGPT were strongly associated with risk of developing complications. All these findings will add to the existing knowledge about the disease will help in improving outcome and decreasing case fatality rate.

The study suggested that- in children, early recognition of dengue fever and its severity in a dengue endemic and resource-limited region would very helpful in reducing not only the mortality and morbidity of dengue illness but also the overall cost of hospitalization. However, in developing countries like India, where vector-borne diseases are quite rampant, a technique like that of a rapid field epidemiological survey/investigation, though unfortunately not being implemented so often nowadays, would definitely help us to control an impending epidemic even today.

REFERENCES

1. World Health Organization. Dengue: Guideline for Diagnosis, Treatment, Prevention and Control. Geneva: World Health Organization; 2009.
2. Special Programme for Research, Training in Tropical Diseases, and World Health Organization. Dengue: Guidelines for Diagnosis, Treatment, Prevention and Control, World Health Organization, Geneva, Switzerland, 2009.
3. Sharma RR, Kumari R, Srivastava PK, Barua K, Chauhan LS. Emergence of dengue problem in india – a public health challenge. J. Commun. Dis. 2014; 46(2): 17-45.
4. Mehendale SM, Risbud AR, Rao JA, Banerjee K. Outbreak of Dengue fever in rural areas of Parbhani district of Maharashtra, India. Indian J Med Res. 1991;93:6-11.
5. Padbidri VS, Mahadev PV, Thakre JP, Pant U, Illikal MA, Varghese GG, et al. Virological and entomological investigations of an outbreak of Dengue fever in Dhule district, Maharashtra. Indian J Med Microbiol. 1996;14:25-32.
6. <https://www.sakaltimes.com/pune/over-1231-dengue-cases-state-pune-tops-list-38183>
7. Wichmann O, Hongsiriwon S, Bowonwatanuwong C, Chotivanich K, Sukthana Y and Pukrittayakamee S. Risk factors and clinical features associated with severe dengue infection in adults and children during the 2001 epidemic in Chonburi, Thailand," Tropical Medicine & International Health 2004; 9(9):1022-1029.
8. World Health Organization. WHO report on global surveillance of Epidemic prone infectious diseases. http://apps.who.int/iris/bitstream/10665/66485/1/WHO_CDS_CSR_ISR_2000.1.pdf.
9. Nagaram PP, Piduru P, Munagala VK, Matli VV. Clinical and laboratory profile and outcome of dengue cases among children attending a tertiary care hospital of South India. Int J Contemp Pediatr. 2017;4(3):1074-80.
10. Shekar V, Kumar KP, Soren C, Reddy KV, Dharani N. Clinico-laboratory profile and outcome of dengue fever among children attending a tertiary care hospital of rural Telangana, India. Int J Contemp Pediatr 2020;7:382-6.
11. Mobarak MR, Islam R, Bhuiyan AKMT, Akand N, Begum F. Evaluation of dengue fever in a tertiary care children hospital of Bangladesh. Northern International Medical College Journal 2017; 9 (1): 274-277.
12. Sahana KS, Sujatha R. Clinical profile of dengue among children according to revised

WHO classification: analysis of a 2012 outbreak from Southern India. Indian J Pediatr 2015;82(2):109-13.

13. Potdar S, Junagade S, Panot J, et al. Clinical profile of dengue fever in paediatric patients in a tertiary care hospital. J. Evolution Med. Dent. Sci. 2017;6(92):6613-6617.
14. Gupta E, Dar L, Kapoor G, Broor S the changing epidemiology of dengue in Delhi, India. Virology Journal. 2006;3(1):1.
15. Chakravarti a, Kumaria R. eco-epidemiological analysis of dengue infection during an out break of dengue fever, india. Virology journal.2005;2(1):1.
16. Anuradha S, Singh NP, Rizvi SN, Agarwal SK, Gur R, Mathur MD The 1996 outbreak of dengue hemorrhagic fever in Delhi, India. Southeast Asian J Trop Med Public Health. 1998;29:503-6.
17. Ukey P, Bondade S, Paunipagar P, Powar R, Akulwar S. Study of seroprevalence of dengue Fever in central India. Indian J Community Med. 2010;35(4):517-519.
18. Ahmed S, Arif F, Yahya Y, et al. Dengue fever outbreak in Karachi 2006-a study of profile and outcome of children under 15 years of age. Journal of the Pakistan Medical Association 2008;58(1):4-8.
19. Mishra S, Ramanathan R and Agarwalla SK. Clinical profile of dengue fever in children: a study from southern Odisha, India. Hindawi Publishing Corporation Scientifica, Volume 2016 | Article ID 6391594 | 6 pages.
20. Arya SC, Agarwal N, Parikh SC, et al. Simultaneous detection of dengue NS1 antigen, IgM plus IgG and platelet enumeration during an outbreak. Sultan Qaboos Univ Med J 2011;11(4):470-6.
21. Alam ABMS, Sadat SA, Swapan Z. Clinical Profile of Dengue fever in Children. Consists of 4 serotypes (DEN 1-4). In Bangladesh. Bangladesh J Child Health 2009; 33(2): 160-164.
22. Mittal H, Faridi MM, Arora SK, et al. Clinicohematological profile and platelet trends in children with dengue during 2010 epidemic in north India. Indian J Pediatr 2012;79(4):467-71.
23. Roy A, Sarkar D, Chakraborty S, Chaudhuri J, Ghosh P, Chakraborty S. Profile of Hepatic Involvement by Dengue Virus in Dengue Infected Children. North Am J Med Sci 2013;5:480-5.
24. Wiwanitkit V. Liver dysfunction in dengue infection: An analysis of the previously published Thai cases. J Ayub Med Coll Abbottabad 2007;19:10-2.
25. Kumar R, Tripathi P, Tripathi S, Kanodia A, Venkatesh V. Prevalence of dengue infection in north Indian children with acute hepatic failure. Ann Hepatol 2008;7:59-62.
26. Tirumani HB, Bejugam VK, Naseem A, Hussain A, Nizaralalani. Study of hepatic involvement in children with dengue infection. Int J Contemp Pediatr 2017;4:2012-4.
27. Kumar SK, Rajendran NK, Brabhu kumar AC. Clinical profile of dengue fever in children: analysis of 2017 outbreak from central Kerala. Int J Contemp Pediatr. 2018;5(6):2265-9.
28. Rahim MA, Azad MAK. Dengue: past, present and future- A review. Bangladesh J Medicine 2006; 17: 27-39.