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Research Article

Role of clinical laboratory parameters in management of dengue infection, beyond infancy: a tertiary care experience

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ABSTRACT

Background: Dengue infection is the most rapidly spreading mosquito-borne viral disease in the world affecting millions of children all over the world with varied clinical features. This study was done to study the clinical profile of children in a tertiary teaching hospital
Methods: This is a prospective observational study, all children with features suggestive of dengue infection as per WHO 2012 guidelines were enrolled in the study. Their demographic data was collected and after through clinical examination and initial stabilization they we categorized and treated accordingly.
Results: A total of 92 children were enrolled, males were 56.5% and females 45.6%, and most of the children were from Bangalore and neighbouring state Andhra Pradesh. Fever constituted the major compliant while pain abdomen with vomiting was the major warning sign. Thrombocytopenia was seen in 95.6%. Majority required IV fluids (69.5%) whole ventilation was required in 8.6%.the overall mortality was 8.6%.
Conclusions: Dengue fever is a dynamic disease with heterogeneous manifestation. The treatment many range from simple IV fluids to Ventilator support. Good clinical monitoring will identify those children developing shock and institute early treatment.

Keywords: Dengue fever, Children, Management

INTRODUCTION

Dengue fever has become the most rapidly spreading mosquito-borne viral disease in the world. In the last 50 years, incidence has increased 30-fold with increasing geographic expansion to new countries beyond national borders.[1] It is caused by the four serotypes of the dengue flavivirus and transmitted by mosquitoes; dengue affects an estimated 50–100 million people annually around the world, principally in tropical and subtropical regions.[2]

The manifestation varies from mild viral fever like symptoms with usually accompanied by arthralgia, myalgia, and headache, to dengue haemorrhagic fever (DHF) marked by thrombocytopenia, haemorrhagic manifestations, and increased vascular permeability (plasma leakage); to dengue shock syndrome (DSS), which when untreated may lead to death. The infecting serotype and an individual's previous exposure to other dengue serotypes are known to influence disease severity.[3]

This study was done to try and describe the varied clinical profile in children beyond infancy in children admitted in tertiary teaching hospital of Bangalore during the peak dengue season.

METHODS

It is a prospective observational study done in the month of June 2015 to July 2015 at Indira Gandhi institute of child health , Bangalore , Karnataka, India , which is an autonomous teaching hospital catering to children of Karnataka state and neighbouring states.

Inclusion criteria

Children 1-18yrs with features suggestive of Dengue fever as per Who 2012 guidelines.

Exclusion criteria

Conditions mimicking dengue e.g. malaria, rickettsial, ITP, malignancy

All children admitted with features suggestive of dengue fever or its complication as per WHO guidelines 2012 were admitted and after initial assessment their demographic data, history of the illness collected. A through clinical examination was done, categorised as per WHO 2012 guidelines and treated accordingly. Consent from parent/guardians was taken and children enrolled in the study.

RESULTS

Table 1: Demographic variables N=92.

Sex	No (%)
Male	52 (56.5)
female	40 (46.6)
Area	No (%)
Karnataka	23(25)
Bangalore	29(31.52)
Andhra Pradesh	23(25)
Neighboring Bangalore	17

Table 2: WHO category.

Category	Percentage
Category A	12 (13.04%)
Category B	47 (51.08%)
Category C	33(35.8%)
Compensated shock	22(23.9)
Hypotensive shock	7(7.6)

A total of 92 children were enrolled, who met the WHO criteria 2012 for dengue infections were included in the study, the sex distribution was male gender 52 (56.5%) and female 40(46.6%) in this study. Majority of children were from Bangalore and Karnataka State although there were children from Andhra Pradesh and neighbouring districts of Bangalore, constituting a significant number (Table 1).

47 (51.08%) belonged to Dengue CAT B, followed by CAT C 33 (35.8%) lastly 33 (35.8%) children belonged to Category A.

Table 3: Clinical features N=92.

Fever	90 (97.8%)
Malena	9(9.7%)
edema	19 (20.6%)
Petechiae	11(11.9%)
Vomiting	69(75%)
Pain abdomen	34(36.9%)
convulsion	10(10.8%)
Acute respiratory distress syndrome	6(6.5%)
Reyes like illness	3 (3.3%)
Myocarditis	1(1.08%)
Hypertension	3(3.2%)
Cough /URI	1 (1.08%)
Intra cranial bleed	3(3.2%)

Fever 90 (97.8%) was the most common presentation, persistent vomiting 69 (75%) was the most common warning sign followed by pain abdomen 34 (36.9%), Mild mucosal bleed (11.9%), severe bleeds (9.7%), plasma leakage/oedema (20.6%) was seen. At admission children in compensated shock constituted 22 (23.9%), and that hypotensive shock were 7 (7.6%).

Table 4: Laboratory parameters n=92.

Parameter	No (%)
Thrombocytopenia	88 (95.6%)
Altered LFT	16 (16.4%)
Prolonged PT &aPTT	27 (30%)
Hypoglycemia	7 (7.6%)
NS1Ag positive	56 (60.8%)
Dengue IgM positive	85(92.3%)
Equivocal	3(3.2%)

Rare/unusual presentations like convulsions 10(10.8%), encephalitis 3 (3.2%) Reyes syndrome 3 (3.3%), hypoglycaemia 7 (7.6%) hypertension 3 (3.2%), intracranial bleed 3 (3.2%), myocarditis 1 (1.08%), febrile seizure 3 (3.2%) and gastroenteritis 1 (1.08%) were observed (Table 3).

A majority of children in this study 88 (95.6%) presented with platelet counts between 10000-40000,only 1.08 % with platelet count <10,000, the trend reaching a nadir (lowest) around day 5-8 day of illness with extremes of day 2 and day 10 of illness with LFT being deranged in 16.4%, and PT/PTT being prolonged in 30.4%. Dengue serology done in this study showed NS1 positive in 56 (60.8%), negative in 30 (31.5%), Dengue IgM positive in 85 (92.3%), negative in 4 (4.3%) and equivocal 3 (3.2%).

All the children were treated according to WHO 2012 guidelines and critical care guidelines majority 64(69.5%) required fluids, ionotropes used in 22 (23.9%), transfusion (packed red blood cells/fresh blood 7 (7.6 %,) Fresh Frozen Plasma 12 (13.04%).

Non-invasive ventilation support in 7(7.6%) and mechanical ventilator support in 8 (8.6%) Overall mortality was 8 (8.6%).

DISCUSSION

Our study a prospective observational study conducted at a tertiary teaching hospital in Bangalore, Karnataka during the peak season of dengue infections. Majority of children hailed from in and around Bangalore (31.52%) followed by Andhra Pradesh (25%), we found a varied spectrum of clinical features, in additional to typical dengue symptoms.

Fever was seen in 98.7% of children whereas most studies report 100%.[4] Amongst the warning signs described in WHO 2012 dengue guidelines persistent vomiting was observed in 75% of children followed by severe pain abdomen in 36.5% of children. Persistent vomiting and severe abdominal pain are early indications of plasma leakage and become increasingly worse as the patient progresses to the shock state.[5]

There was unusual manifestation like 3 children presenting with intracranial bleed, 3 with reye like illness and 1 child with myocarditis features.

The number of children in Category C at admission was 35.8% and of these 23.9% and 7.8% was in compensated shock and hypotensive shock respectively (Table 2).

Dengue infection causes bleeding manifestations both due to coagulopathy and thrombocytopenia. Bone marrow suppression, immune mediated platelet destruction/adhesion, complement mediated all are possible explanation for bleeding diathesis. In our study thrombocytopenia was seen in 88 (95.6%) and prolonged PT/aPTT in 27 (30%) children. Seema A et al[3], only 8% patients had bleeding episodes while 26% patients had platelet count below 20,000/cmm and 84% had <1 lakh/cmm[6] 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.[7] In a study was done by Mittal H et al, which revealed thrombocytopenia in 92.6% while bleeding was there in 48.8% cases, which was similar to our observations.[8]

Dengue infections can cause alteration in liver function see in 16(16.4%) of children, this was similar to the study by Khan AH et al.[9] Serum ALT was >40 U/L in 40% cases. We also saw no relation between lowest platelet count and bleeding episode, as many children with low platelet count (their respective lowest) did not have bleeding manifestation, but patients with deranged PT/PTT had bleeding manifestation

All the children were treated as per WHO 2012 dengue guidelines and all the Category C children were care in PICU. IV fluids were given in all Category C children, 64 (69.5%) needed inotropes, Non-invasive ventilation was used in 7 (7.6%) children and 8 (8.6%) needed ventilator support. Blood and blood products were required in 19 (20.6%) children. The overall mortality was 8(8.6%) and all these children were in Category C at admission.

This study shows a variety of affections of dengue infections in children. The study stresses the importance of through clinical examination and laboratory tests for diagnosis.

CONCLUSION

Dengue is a dynamic disease with heterogenous clinical features. It requires good monitoring care with high alert for warning signs which can precede shock and haemorrhagic complications. Proper PICU care, judicious use of IV fluids, ionotropes will bring a favourable outcome in this dreaded disease.

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