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A CLINICAL STUDY OF DENGUE VIRUS INFECTION IN PEDIATRIC AGE GROUP

Paediatrics

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ABSTRACT

Dengue without or with warning signs is a fast emerging global health problem. Dengue viral infections are known to present a diverse clinical spectrum, ranging from asymptomatic illness to severe dengue. Unusual manifestations of dengue infections such as encephalitis, Gullian Barre syndrome, hemolytic uremic syndrome, dengue hepatitis, myocarditis, acute respiratory distress syndrome are recognized and they have become more common in recent years.

Since our hospital (Kanachur Institute of Medical Sciences) is a tertiary care hospital, we do see a lot of children with dengue infections including those with atypical manifestations. So, an attempt has been made to study clinically in children with dengue virus infection.

KEYWORDS

Clinical, Study, Dengue, Pediatric.

Introduction:

Dengue virus infection is a major and important public health problem in many South East Asian countries and also in more than 100 countries of tropical and subtropical region.[1] Two–fifths of the world's population or 2500 million people are now at risk for dengue, and every year approximately 50 million new cases occur world wide[2] Dengue is the most common arboviral disease transmitted globally, is caused by four antigenically distinct dengue virus serotypes (DEN 1, DEN 2, DEN 3 and DEN 4).[3]The global prevalence of dengue infection has increased dramatically in the recent decades.[2] Dengue infection of classical type has been endemic in India for many years.[3] Recently an increasing trend of outbreaks of dengue infections and its severe forms have been reported in India.[3] Factors responsible for dengue's spread include explosive population growth, unplanned urban overpopulation with inadequate public health systems, poor vector control and increased international travel to endemic areas. Indeed Dengue without or with warning signs is a fast emerging global health problem.[3,2] Dengue viral infections are known to present a diverse clinical spectrum, ranging from asymptomatic illness to severe dengue.[1] Unusual manifestations of dengue infections such as encephalitis, Gullian Barre syndrome, hemolytic uremic syndrome, dengue hepatitis, myocarditis, acute respiratory distress syndrome are recognized and they have become more common in recent years.[4]

Since our hospital (Kanachur Institute of Medical Sciences) is a tertiary care hospital, we do see a lot of children with dengue infections including those with atypical manifestations. So, an attempt has been made to study clinically in children with dengue virus infection.

Aims and Objectives:

To Clinically Study the Dengue Virus Infection in Paediatric Age Group.

Materials and Methods:

METHODOLOGY

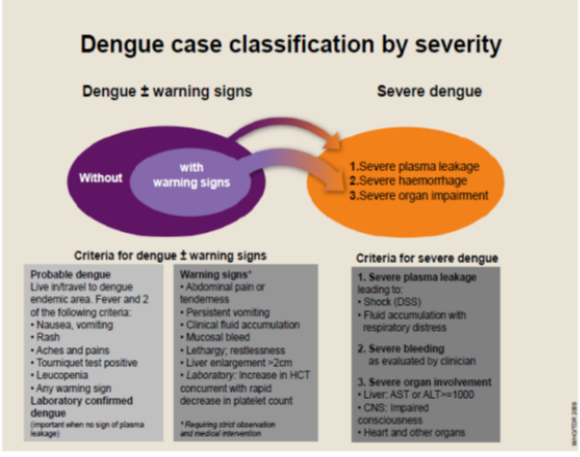
The present study was conducted in the Department of Pediatrics Kanachur Institute of Medical Sciences Mangalore during the study period from May 2017 to April 2018.

ENROLLMENT OF CASES

All the clinically suspected cases of dengue infection aged between 2months to 15years of age as per the WHO guidelines were screened and only confirmed cases by dengue NS1 antigen detection by rapid test were included in this study. A detailed history and a thorough clinical examination were done for all the cases. Data was collected in a prewritten proforma. All the cases were subjected to following investigations.

1) NS1 antigen detection by rapid test.
2) Platelet count
3) SGOT and SGPT

The Cases were classified and put into specific groups and the various clinical manifestations were studied.



ALT = alanine aminotransferase; AST = aspartate aminotransferase; CNS = central nervous system; DSS = dengue shock syndrome; HCT = haematocrit

Study design

Prospective/descriptive study

Sample size

For the study to be statistically significant required sample size was calculated online by sample size calculator through "CREATIVE SYSTEM INC", which is **100** for the present study.

Inclusion criteria

Cases positive for dengue NS1 antigen.

STATISTICAL METHODS APPLIED

Descriptive statistics

The Descriptive procedure displays univariate summary statistics for several variables in a single table and calculates standardized values (z scores). Variables can be ordered by the size of their means.

Frequencies

The Frequencies procedure provides statistics and graphical displays that are useful for describing many types of variables. For a first look at your data, the Frequencies procedure is a good place to start.

Chi-Square Test

The Chi-Square Test procedure tabulates a variable into categories and computes a chi-square statistic. This goodness-of-fit test compares the

observed and expected frequencies in each category to test either that all categories contain the same proportion of values or that each category contains a user-specified proportion of values.

Fisher's exact test

It is a statistical significance test used in the analysis of contingency tables. Although in practice it is employed when sample sizes are small, it is valid for all sample sizes. It is one of a class of exact tests, so called because the significance of the deviation from a null hypothesis. The test is useful for categorical data that result from classifying objects in two different ways; it is used to examine the significance of the association (contingency) between the two kinds of classification.

ANOVA

Analysis of variance (ANOVA) is a collection of statistical models used to analyze the differences between group means and their associated procedures. It provides a statistical test of whether or not the means of several groups are equal, and therefore generalizes the t-test to more than two groups.

RESULTS

Table 1: Age and gender distribution of total dengue cases

	Male	Female	Total			
Age	No	%	No	%	No	%
2m to1year	10	17.2	3	6.25	13	12.9
1yr to 5yr	8	13.8	6	12.5	14	13.9
6yr to10yr	20	34.5	15	31.25	35	34.7
11yr to15yr	20	34.5	19	39.6	39	38.6
Total	58	57.4	43	47.5	101	100

Graph 1: Gender distribution of dengue cases

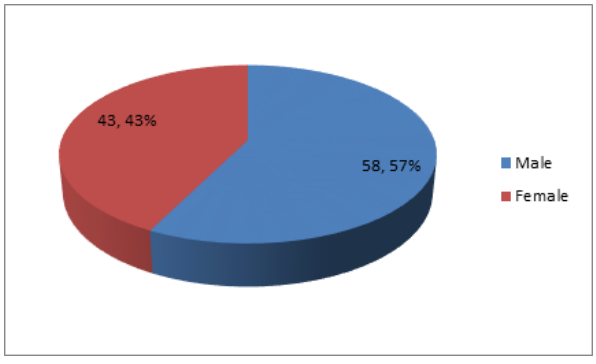


Table 2: Categorization of cases into dengue without warning signs, dengue with warning signs AND severe dengue (W.H.O 2009)

Grouping	Number of cases
Dengue without warning signs	36
Dengue with warning signs	49
Severe dengue	16

Table 3: Comparison of clinical Symptomatology in dengue without warning signs, Dengue with warning signs and Severe dengue.

	Dengue without warning signs(n=36)	Dengue with warning signs (n=49)	Severe Dengue (n=16)					
	Frequency	%	Frequency	%	Frequency	%	Total	P
Fever	36	100	49	100	16	100	101	NA
Pain abdomen	1	2.8	27	55.1	15	93.75	43	<0.001
Vomiting	13	36.1	38	77.6	16	100	67	<0.001
Myalgia	6	16.7	22	44.9	11	68.75	39	.001
Headache	7	19.4	19	38.8	11	68.75	37	0.003
Rash	5	13.9	15	30.6	11	68.75	31	<0.001
Joint Pain	2	5.6	7	14.3	6	37.5	15	.011
Retro orbital pain	2	5.6	6	12.2	2	12.5	10	.553
Puffiness of face	3	8.3	10	20.4	11	68.75	24	<0.001

Table 4: Comparision between the groups with respect to clinical signs

Signs	Dengue without warning signs (n=36)	Dengue with warning signs (n=49)	Severe Dengue (n=16)		P			
	No	%	No	%	No	%	Total	
Tender hepatomegaly	0	0	17	34.7	12	75	29	<0.001
Hepatomegaly	18	50	35	71.4	14	87.5	67	.015
Icterus	0	0.0	2	4.0	5	31.25	7	<0.001
Positive hess test	0	0.0	2	4.1	7	43.75	9	<0.001
Bleeding(GIT, mucosa)	0	0.0	6	12.2	13	81.25	19	<0.001
Petechiae/purpura, ecchymosis	0	0.0	4	8.2	12	75	16	<0.001
Pedal odema	1	2.8	6	12.2	8	50	15	<0.001
Hypotension at admission	0	0.0	1	2.0	9	56.25	10	<0.001
Rapid and weak pulse	0	0.0	0	0.0	8	50	8	<0.001
Narrow pulse pressure	0	0.0	1	2.0	7	43.75	8	<0.001
cold clammy skin and extremities	0	0.0	1	2.0	8	50	9	<0.001
Complicated dengue	0	0.0	3	6.1	13	81.25	16	<0.001
Thrombocytopenia	19	52.8	45	91.8	16	100	80	<0.001
Convulsions /altered sensorium	0	0	2	66.6	1	33.3	3	0.4

Table 5: System involved in severe dengue

System	No	%
Hematological	12	75
Hepato biliary	2	12.5
CNS	3	18.75
Renal	0	0
Respiratory	5	31.25

N=16

Discussion:

Dengue viral infections are one of the most important mosquito borne diseases in the world caused by four serotypes (DEN1, DEN2, DEN3 and DEN4) of dengue virus. Presently dengue infection is endemic in 112 countries with annually 100 million cases of dengue without warning signs and 50 million cases of dengue with warning signs and severe dengue occurring globally with an average case fatality rate of around 5%. The manifestations of dengue infections are protean from

being asymptomatic to undifferentiated fever, severe dengue infections and unusual complications. Recent studies suggest that there is an upsurge of complicated dengue infections in children less than 15 years of age especially in South east and South Asia.[5] Recognition of varied presentations of dengue infections is important so as not to miss the diagnosis.

HEPATIC INVOLVEMENT IN DENGUE INFECTION

Hepatic involvement due to dengue infection is not uncommon and has been described since 1970.[6] Hepatic dysfunction is a well recognized feature of dengue infections and varying degree of dengue hepatitis is seen.

HEPATOMEGALY:

Hepatomegaly is one of the commonest clinical sign of dengue infection. Hepatomegaly is frequent and is commoner in patients with dengue with warning signs than in those with dengue without warning signs. Association of hepatomegaly with cases of dengue infection has been quite variable, the incidence varying from 43% to 98%[1] whereas in the present study, it was observed in 66.3% of total cases as shown in the table below. The incidence of hepatomegaly was more in severe dengue cases as compared to other cases. The maximum liver size noted was 6 cm below the right costal margin in our study.

Hepatomegaly in dengue infection

Studies	% of cases with hepatomegaly
Moren et al7	90%
Ratageri et al 8	87%
Gurdeep S. Dhoria et al 9	60%
Nimmantya et al10	98%

Conclusion:

Clinical hepatomegaly is consistent features in dengue infection.

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